Psychological Recovery after Aneurysmal Subarachnoid Haemorrhage: The Role of Post-traumatic Growth and Self-compassion

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Submitted in fulfilment of the requirement for the degree of
Doctor of Philosophy

March 2021

Abstract

Aneurysmal subarachnoid haemorrhage (aSAH), a subset of haemorrhagic stroke, is a potentially fatal condition with a mortality rate of 50%. Of those that survive, some 60% will experience ongoing disability and impairment. Forty percent of remaining survivors will experience what is deemed as a good neurological recovery. Despite this seemingly good recovery, people have still been found to experience negative psychosocial outcomes such as elevated levels of post-traumatic stress symptoms (PTSS), depression and reduced levels of overall well-being. As a result, an aSAH can be viewed as a traumatic life experience with the potential for ongoing psychological sequelae. More recently the literature has identified that traumatic experiences can also elicit an opportunity for growth. Post-traumatic growth (PTG) has previously been investigated as an outcome after a range of natural disasters and medical conditions; however, no known studies have specifically investigated PTG after an aSAH. Recently PTG has been identified as playing a psychologically protective role after a diagnosis of breast cancer. The Transformational theory of PTG posits that there is an interrelationship between cognitive and social aspects of an individual's functioning after trauma that may support the recovery process. This model will be used for this study. This research comprised two separate studies incorporating established measures and semi-structured interviews. The quantitative study comprised *N* = 251 adults who had experienced an aSAH, and were recruited from Australia, New Zealand, U.K., U.S.A. and Canada. This study examined whether people who have survived an aSAH experience PTG; if predictors including self-compassion and social support influence the development of PTG after an aSAH; if PTG moderates the relationship between PTSS, and depression and subjective well-being (SWB); and if self-compassion moderates the relationship between PTSS and depression and SWB. Regression analyses were used to analyse the data. Results showed that people experience PTG after an aSAH; Self-compassion predicted PTG, but social support did not; PTG and self-compassion were not found to moderate the relationship between PTSS and either depression or SWB domains. Supplementary analyses revealed that self-compassion was found to mediate the relationship between PTSS and depression and PTSS and SWB domains. The qualitative study comprised *N* = 6 Australian adults exploring experiences of recovery. Qualitative data was analysed using a comparative exploratory descriptive case studies approach with four categories (physical, psychological, social, and treatment) and four main cross-case themes identified: psychological impacts, physical impacts, impact on family, friends and work, interaction with medical professionals and the implications of surgical treatment. Exploration of PTG and self-compassion after an aSAH was also explored with seven themes being identified: feeling grateful, new directions in life, prioritising living life to the fullest, strengthening of relationships, spiritual and existential growth and change, self-criticism and frustration, and putting the aSAH experience in context.

Keywords: *aneurysmal, subarachnoid, post-traumatic growth, self-compassion*

Doctor of Philosophy Declaration

“I, **Joanne Marie Thorburn**, declare the PhD thesis entitled

Psychological Recovery after Aneurysmal Subarachnoid Haemorrhage: The Role of Post-traumatic Growth and Self-compassion is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.”

Signature [redacted] Date: 31/3/2021

Acknowledgements

An undertaking of this nature was not possible without the support and guidance of a number of people. Firstly, I would like to acknowledge the contributions made by Professor Jenny Sharples and Dr Kim Shearson towards this thesis and Professor John Price for his assistance around submission. Secondly, to the incredible PhD. cohort at Victoria University, with whom I connected from the outset. Although we were all from different academic disciplines, we all understood and supported each other on a common level, navigating and comprehending the vagaries and stresses of each phase of our research together. To Paul, Roxie, James and Samantha, thank you for the impromptu coffee shop debriefing sessions, the text messages, phone calls and emails. Thirdly, to my clinical supervisor Dr Erin Bowe thank you for normalising and validating everything I was feeling at times, and more importantly encouraging me to keep moving forward! Fourthly, to Dr Delwyn Goodrick, thank you for your words of encouragement, guidance and sage advice from afar (i.e., while in international pandemic isolation) when required. All of your support, particularly at times when I was ready to admit defeat, made all the difference and inspired me to keep going.

To my beautiful children, Ryan and Connor (and fur baby Felix the cat). You must be so relieved that your mother has FINALLY finished studying!! Your love, support, encouragement and most of all patience, when you may well have wanted my undivided attention, has been unequivocal, and provided without question. I love you both so much and thank you for stepping up when I have needed you to. I dedicate this thesis to the memory of my Nanna Ingrid, a strong

Swedish matriarch of our family, who passed away during my study due to stroke; you are my inspiration and driving force. Finally, to those aSAH patients who were my ward mates at RMH HDU in 2013, particularly to those who sadly didn’t make it through and to those people whom I have met since, most importantly the participants in this study, thank you for your time and sharing your recovery experiences. If not for you, this study would not have been possible. I hope that I have done your stories justice, and wish you continued strength for your ongoing recovery.

An Australian government research-training program supported this study.

Thank you to Adam Finlay from Writefish for his proofreading and copyediting of this thesis in accordance with Victoria University professional editing guidelines and Australian standards for editing practice guidelines.

But who can remember pain, once it is over?

All that remains of it is a shadow, not in the mind even, in the flesh.

Pain marks you, but too deep to see.

Out of sight, out of mind.

Margaret Atwood – The Handmaid's Tale

A PhD finalised and submitted during a global COVID-19 pandemic!

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List of Abbreviations

ABI	Acquired brain injury
aSAH	Aneurysmal Subarachnoid Haemorrhage
BCa	Breast Cancer
Ca	Cancer
DALY	Disability Adjusted Life years
HIV	Human Immunodeficiency Virus
HRQOL	Health Related Quality of Life
HW	Hedonic Well-being
ICU	Intensive Care Unit
MCA	Middle Cerebral Artery
PCOM	Posterior Communicating Artery
PKD	Polycystic Kidney Disease
PSD	Post Stroke Depression
TBI	Traumatic Brain Injury
TIA	Transient Ischemic Attack
WHO	World Health Organisation
WSO	World Stroke Organisation

Chapter 1: Introduction

1.1. Overview of Thesis

The purpose of this study is to examine the recovery experiences of people who have experienced a non-traumatic spontaneous aSAH[1]. The first objective of this study is to empirically investigate predictors of negative psychological sequelae as well as potential psychologically protective buffer that may reduce such outcomes. The second objective of this study is to explore the unique individual experiences of recovery, PTG and self-compassion after an aSAH. The aim of this thesis is to present a comprehensive investigation of recovery after a life threatening aSAH.

This chapter consists of 15 sections comprising an introduction to aSAH, followed by a comprehensive literature review, then an exploration of aSAH risk factors, adverse psychological outcomes after an aSAH, post-traumatic stress symptoms, and how they may be experienced after an aSAH, depression after a stroke related disorder such as an aSAH, subjective well-being along with its connection to post-traumatic stress, and depression, post-traumatic growth, self-compassion, social support, post-traumatic growth as a protective factor, gaps in the literature, rationale and conceptualisation of this study, research questions and hypotheses.

The second chapter focuses on the methodological aspects of the study and comprises 7 sections such as an introduction, theoretical perspective, research design, study one being the quantitative study, followed by study two the

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[1] aSAH – Aneurysmal subarachnoid haemorrhage

qualitative study, and finally the quantitative method and qualitative methods used.

The third chapter presents the findings and discussion of the empirical investigations conducted as part of study one and comprises 15 sections such as; a review of hypotheses, overview of the demographics, preliminary analyses, descriptive statistics, primary analyses, testing moderation, supplementary analyses, summary of results followed by sections pertaining the discussion such as post-traumatic growth, subjective well-being, self-compassion, further findings, theoretical implications, and finally clinically implications and summary.

The fourth chapter presents the qualitative study (i.e., study two) results and discussion and consists of 9 sections including participant characteristics, details of 6 case studies conducted followed by cross-case synthesis, discussion followed by a final summary and reflections.

The fifth and final chapter presents the conclusion where it will be shown the evidence suggests that people report that they experience post-traumatic growth and that self-compassion is an important predictor of negative psychological outcomes such as depression and reduced well-being, and also acts as a mediator between post-traumatic stress symptoms and depression and well-being. In addition, based on interview aSAH recovery is not a linear experience, but rather and enduring experience that shares similarities with other survivors, yet is also unique to the individual as well. This chapter consists of 3 sections and presents the conclusion overview, strengths and limitations of the studies and future directions.

1.2. Introduction to Psychological Recovery after Aneurysmal Subarachnoid Haemorrhage

aSAH is a spontaneous life-threatening subset of haemorrhagic stroke, recording the highest mortality rate of all stroke subtypes, with 50% of people succumbing at onset or during the subsequent recovery period due to complications (Van Gijn, Kerr, & Rinkel, 2007) and is viewed as a non-traumatic subarachnoid haemorrhage (SAH) as compared to acquired brain injury (ABI) and traumatic brain injury (TBI) caused by external factors such as injuries and accidents. Of those people who survive, up to 60% are left with lifelong disabilities comprising impairments in visual, physical, cognitive and memory functioning. This means that only 40% of people who survive an aSAH are likely to return to their pre-aSAH level of physical and psychological functioning. It is known that in addition to physiological impacts, up to 60% of people are also at higher risk of developing psychopathologies such as post-traumatic stress disorder (PTSD), depression and anxiety (Berry, 1998; Morris, Wilson, & Dunn, 2004). This is also the case for those who have achieved a good neurological recovery, with many diagnosed with psychopathologies such as PTSD, anxiety, depression, lower overall well-being and reduced quality of life (QOL) (Powell, Kitchen, Heslin, & Greenwood, 2004; Visser-Meilly, et al., 2013; Passier, Visser-Meilly, Rinkel, Lindeman, & Post, 2010) similar to those left with more severe impairments. Consequently, regardless of neurological and functional outcome, experiencing a life-threatening condition, such as an aSAH, may be viewed as a traumatic experience, with significant ongoing psychological sequelae and psychosocial impacts.

Traditionally trauma has been viewed as a negative experience with devastating long-term psychological outcomes. However, more recently this view has changed. There is currently recognition that trauma may also have the potential to provide positive outcomes as well (Cordova, et al., 2007). The ability to experience positive psychological gains after a traumatic experience has been conceptualised as post-traumatic growth (PTG) (Tedeschi & Calhoun, 1995). PTG posits that people have the potential to experience growth after cognitively processing their traumatic experiences, resulting in psychological gains across a number of life domains (e.g., improved relationships with others, new life possibilities, increased awareness of personal strengths, spiritual change and greater appreciation of life). PTG draws on the work of trauma theorists such as Janoff-Bulman (1992) who believe that a traumatic experience involves an individual processing and reframing a distressing event, followed by a complete shattering of their existing world views. This initial phase is followed by a rebuilding of previously held schemas. This ability to rebuild shattered world views, along with precursory existential crises subsequently leading to an invocation of meaning derived from the trauma experience, are viewed as crucial factors involved in the development of PTG.

Previous studies have investigated potential predictors of PTG including optimism, (Zoellner & Maercker, 2006), spirituality (Calhoun, Tedeschi, Cann, & McMillan, 2000) and rumination style (Taku, Cann, Tedeschi, & Calhoun, 2009). Some forms such as dispositional optimism have been found to be positively related to PTG, particularly after a traumatic health-related experience, when participants were able to view the threat to their health as controllable (Bostock, Sheikh, & Barton, 2009). In addition, PTG has also been found to be higher after a traumatic experience when participants engaged in higher levels of religiosity (Schaefer, Blazer, & Koenig, 2008). Furthermore, deliberate rumination style has also been found to strongly predict PTG as compared to an intrusive rumination style (Taku, Cann, Tedeschi, & Calhoun, 2009). Furthermore, the ability to engage in immediate and ongoing rumination seems to play a significant role in PTG development (2009). Despite these initial findings, predictors that influence the development of PTG are still being explored in order to better understand how PTG develops in different circumstances, particularly in relation to specific disorders or disease presentations (Boot, Holcombe, & Salmon, 2010). It is possible that there may be unique predictors responsible for the development of PTG after an aSAH; however, this has never been investigated.

Existing studies have posited that other variables may be involved in the development of PTG, resulting in differing conceptual models such as those recognised as transformational and (Tedeschi & Calhoun, 1995) and organismic valuing (Joseph & Linley, 2005). Although both models share similar theoretical aspects, there continues to be ongoing discourse aimed at building on these initial models, in order to better understand unique trauma presentations (i.e., health diagnoses, differing large scale disasters, intimate assault).

As aSAH involves multiple factors (i.e., location of aneurysm, treatment type utilised, level of ongoing impairment, differing recovery outcomes and experiences) that may potentially impact on the rehabilitative process, the transformational model will be used for this study. This model will allow for a more thorough investigation, in respect to the development of PTG, that will take the varied factors experienced into account. Furthermore, this model will allow for the investigation of healthy aspects of emotional regulation in the form of self-compassion along with social support with a focus on their potential as a predictive influence on PTG. It is possible that self-compassion may be an important predictor given previous findings that have found that it is a significant mechanism in distress reduction across a variety of negative psychological sequelae connected with trauma such as anxiety, self-criticism, shame, guilt and stress (Pauley & McPherson, 2010). As no previous study has investigated self-compassion and its relationship to PTG after an aSAH, self-compassion may be an important predictor involved in the development of PTG in people who have experienced an aSAH as well; however, this remains unclear. Similarly, social support has been found to play a vital role in the recovery phase after serious illness (Cookson & Casey, 2013); however, few studies have investigated whether it plays a role in the development of PTG after an aSAH (Cookson & Casey, 2013). The predictive role of social support in PTG has also not been extensively investigated, particularly in the context of aSAH. Perhaps social support is an important requirement for people in order to initiate the processing of an individual's aSAH experience, with this in turn potentially playing a role in the development of positive psychological gains, yet this remains unclear.

As there has been limited research undertaken investigating the specific interrelationships of factors connected with psychological recovery after an aSAH, it is currently unclear as to what may be occurring. In summary, there have been few studies conducted to date that have investigated the possibility of people experiencing PTG after stroke or stroke-related disorders such as aSAH. Given that an aSAH occurs quickly and without warning, with the potential to induce traumatic stress responses, it may be possible that positive psychological gains are also occurring, yet this is not well understood. As a result, there is a need for further investigation into whether or not PTG is experienced; whether factors such as self-compassion and social support predict its development; and the relationship between PTG, PTSS, and depression and subjective well-being (SWB), in people who have experienced an aSAH. It is possible that PTG may provide a psychologically protective benefit such as reduced psychological sequelae and increased overall well-being.

1.3. Literature Review: Definition of Aneurysmal Subarachnoid Haemorrhage (aSAH)

Stroke is the second highest cause of death worldwide (World Health Organization, 2014b). It is regarded as a devastating life-threatening and disabling medical condition. A stroke is defined as “rapidly developing clinical signs of focal or global disturbance of cerebral function, with symptoms lasting 24 hours or longer, or leading to death with no apparent cause other than of vascular origin” (WHO MONICA Project investigators, 1988, p. 105). Although globally, mortality rates have decreased in the past decade, it is currently predicted that by 2030 over 12 million people will die, 70 million people will survive, and over 200 million disability adjusted life years (DALY) will be lost due to stroke (Feigin, et al., 2014).

There are four predominant types of stroke: ischaemic stroke, thrombotic stroke, transient ischaemic attack (TIA) or mini stroke (National Stroke Foundation, 2010; Sacco, et al., 2013) and haemorrhagic stroke. Haemorrhagic stroke involves the rupturing of an artery within the brain. There are two subsets of haemorrhagic stroke. Arteriovenous malformation is defined as the abnormal development of arteries and blood vessels within the brain, likened to a varicose vein within the brain, which results in an arterial rupture (Cagnazzo, Brinjikji, & Lanzino, 2016). The second subset, which has the highest mortality rate of all the stroke types, occurs as the result of a ruptured cerebral aneurysm (Shukla, 2017). The majority of cerebral aneurysms are located within region of the brain known as the circle of Willis (Van Gijn, Kerr, & Rinkel, 2007). Cerebral aneurysms develop due to a weakening of the wall within a cerebral artery which, over time, balloons outwards in the form of a bubble (Bowles, 2014). This weakened arterial balloon thins further until it eventually ruptures, resulting in a haemorrhage within the brain (Van Gijn & Rinkel, 2001). The literature refers to this type of haemorrhagic stroke as an aneurysmal subarachnoid haemorrhage (aSAH) (Shukla, 2017). An aSAH involves bleeding within the subarachnoid space of the brain (Souter, 2017). Bleeding within the subarachnoid space is regarded as an emergency requiring immediate medical intervention, due to the threat of imminent brain damage or death (Bowles, 2014; Venti, Acciarresi, & Agnelli, 2011). If medical treatment is not promptly received, the potential for mortality is high, with previous studies reporting between 10% to 15% of people dying before reaching hospital (Greenberg, 2010).

aSAH accounts for around 5% of all strokes worldwide (Feign, Lawes, Bennett, & Anderson, 2003). It is regarded as a life-threatening condition with an overall mortality rate of between 45% to 50% (Nieuwkamp, et al., 2009). As such, aSAH has been described as “the only intracranial lesion capable of producing almost instantaneous death” (Toole & Patel, 1967, p. 289). aSAH affects between six and nine people per 100,000 worldwide each year (DeRooij, Linn, van der Plas, Algra, & Rinkel, 2007; Van Gijn, Kerr, & Rinkel, 2007). Most people are asymptomatic prior to an aSAH; therefore, it can occur suddenly and with very little warning (Feign, Lawes, Bennett, & Anderson, 2003). aSAH predominantly affects women between the ages of 40 and 60 years, although it also occurs in men and rarely in children (Van Gijn, Kerr, & Rinkel, 2007). Women are 1.24 times more likely to experience an aSAH than men, particularly from the age of 55 years onwards (DeRooij, Linn, van der Plas, Algra, & Rinkel, 2007). Within the Australian and New Zealand context, a previous population-based epidemiological study reported that 9.7 per 100,000 women (95% CI: 8.6, 11.0) were diagnosed with the condition as compared to 6.5 per 100,000 men (95% CI: 5.5, 7.6) (The ACROSS Group, 2000). Although overall case fatalities have reduced by some 17% in the past 30 years, people who have experienced an aSAH are at higher risk of a shorter life expectancy. This is due to an increased risk of developing further aneurysms (i.e., 15 times higher) or other cardiovascular disorders (i.e., ischaemic stroke, myocardial infarction), as compared to the general population (Rinkel & Algra, 2011).

There are three main types of aSAH: berry or saccular, fusiform and dissecting (Pritz, 2011). Saccular aneurysms are defined as a berry-like balloon shaped structure protruding from a cerebral artery (Pritz, 2011). The second type is referred to as fusiform aneurysms, which are defined as an elongated bulge within the circumference of an artery that is located within the brain (Pritz, 2011). The third type is referred to as the dissecting aneurysm, which as its name suggests is located at the joins or dissecting points between arteries (Pritz, 2011). The most common of the aneurysm types is the saccular or berry aneurysm, accounting for between 85 and 90% of all aneurysms (Greenberg, 2010). Of those aneurysms found, 35% are located in the anterior communicating artery (ACOA), 30% in the internal carotid artery and posterior communicating artery (PCOM) and 25 % in the middle cerebral artery (MCA), with the remaining 10% located in the vertebra-basilar, cerebellar and vertebral regions (Fennell, Kalani, Atwal, Martirosyan, & Spetzler, 2016). Previous research has also found that up to 30% of people experience multiple brain aneurysms (Greenberg, 2010). As there are a number of locations within the brain that are impacted (i.e., by the location of CA and extent of haemorrhage) after an aSAH, a variety of ongoing consequences may result; thus, it is important to understand how location and subsequent haemorrhage may also impact on overall outcomes in the context of recovery.

1.4. Risk Factors and Symptoms for Aneurysmal Subarachnoid Haemorrhage

Research has identified several risk factors for aSAH. A previous global case-control study (*N* = 22 countries) identified six main risk factors that were associated with haemorrhagic stroke disorders (*n* = 663) (O'Donnell, et al., 2010). These factors included hypertension, smoking, waist to hip ratio measurement, level of physical activity and alcohol intake (O'Donnell, et al., 2010). Of all the risks identified, hypertension was regarded as the most important, due to the damage it causes within the arterial system over time (Greenberg, 2010; De Marchis, et al., 2014). Furthermore, activities that may increase the risk of cerebral aneurysm rupture have also been identified. It has been posited that activities which involve a rapid increase of blood pressure such as vigorous physical exercise or sexual intercourse may also be contributing factors for cerebral aneurysm rupture and subsequent aSAH (Vlak, Rinkel, Greebe, Van der Bom, & Algra, 2011). Similarly, cigarette smoking and cocaine use have been found to be important risk factors due to the potential for damage and weakening of arterial structures caused by these substances (Johnson, Onuma, Owolabi, & Sachdev, 2016), with a recent large longitudinal twin study (*N* = 16,282 pairs) finding a strong causal link between smoking and the development of aSAH (Rautalin, Korja, & Kaprio, 2020). Although previous studies have investigated other unique areas such as the impact of seasonal variability, barometric changes (Gill, et al., 2013) and time of day (Miranpuri, et al., 2013), results remain inconclusive with specific causal factors, except smoking, remaining largely unknown.

It is known that some demographic factors also increase the risk of cerebral aneurysm development. For example, gender (i.e. being female and peri-menopausal or menopausal), ethnicity (i.e. Finnish, Japanese, Indigenous, African American) and age (i.e. between the ages of 45–55 years) are known to be significant risk factors for aSAH (Rinkel, Djibuti, Algra, & Van Gijn, 1998; Labovitz, Halim, Boden-Albala, Hauser, & Sacco, 2005; Qureshi, Mendelow, & Hanley, 2009; Cohen-Gardol & Bohnstedt, 2013; DeRooij, Linn, van der Plas, Algra, & Rinkel, 2007; Lawton & Vates, 2017). Furthermore, it has been found that people from Indigenous backgrounds are more than twice as likely to experience haemorrhagic strokes, as compared to non-indigenous people (Australian Institute of Health and Welfare, 2016; Schieb, Ayala, Valderrama, & Veazie, 2014; You, Condon, Zhao, & Guthridge, 2015). Furthermore, lower socioeconomic background, an interrelated factor in respect to the abovementioned ethnic and Indigenous groups, appears to place people at higher risk of developing cerebrovascular conditions such as cerebral aneurysms (Chen, McKevitt, Rudd, & Wolfe, 2014).

Finally, some medical comorbidities are also known to contribute to the development of cerebral aneurysms and increase the risk of an aSAH. One medical condition known to increase risk of cerebral aneurysm development is polycystic kidney disease (PKD) (Flahault, et al., 2016). PKD is known to involve the risk of cerebral aneurysm due to complications of the disorder, namely hypertension (Flahault, et al., 2016). A further risk factor is that of familial genetic heritability, which has been identified as an important predictor for the development of cerebral aneurysm's, particularly in first degree relatives (Greenberg, 2010). Currently, it is recommended that if two or more first-degree relatives have developed a cerebral aneurysm or experienced an aSAH, it may be appropriate for all immediate family members to be pre-screened for risk (Bor, Rinkel, van Norden, & Wermer, 2014). However, it is pertinent to note that presently there are no formal risk screening guidelines in respect to cerebral aneurysms or aSAH in Australia.

It is not uncommon for people who experience an aSAH to be unaware that they have a cerebral aneurysm until after it ruptures. Initial symptoms of an aSAH generally involve severe headache, often regarded as 'the worst headache ever experienced', dizziness, sensitivity to light (i.e., photophobia), blurred vision and nausea (Greenberg, 2010; Macdonald & Schweizer, 2017). Depending on the location of the cerebral aneurysm and subsequent bleed into the brain, people may experience a range of additional symptoms including vomiting, collapse, seizures and unconsciousness, in addition to those previously mentioned (Greenberg, 2010). This is the result of increasing intracranial pressure, subsequent to the build-up of blood within the brain (i.e., subarachnoid space) caused by the aSAH (Macdonald & Schweizer, 2017; Al-Khindi, Macdonald, & Schweizer, 2010). If not promptly treated the risk of brain damage and potential for death increases (Connolly, et al., 2012). Focal brain damage occurs due to the toxic effects of accumulated blood, the disruption caused to the cerebral blood circulation

(Lincoln, Kneebone, Macniven, & Morris, 2012) and subsequently intraventricular and intracerebral haemorrhage. In order to increase chances of survival, immediate transportation to hospital via ambulance is required, to ensure prompt medical assessment and intervention from a specialist neurosurgical team (Connolly, et al., 2012).

Initial assessment on arrival at hospital involves patient observation utilising a medical assessment tool such as the Glasgow Coma Scale (GCS) (Teasdale & Jennett, 1974). This scale assesses functioning and level of consciousness as well as acute clinical presentation (Teasdale, et al., 1988). The predominant aim of treatment is to stop the haemorrhage within the brain, by sealing off the aneurysm from the main circulation (Greenberg, 2010; Van Gijn, Kerr, & Rinkel, 2007). Currently, the two main treatment choices comprise cerebral clipping (CC) of the aneurysm via a craniotomy, or endovascular coiling (EC) which is a non-invasive angiographic procedure (Van Gijn, Kerr, & Rinkel, 2007; Rabinstein, Lanzino, & Wijdicks, 2010). Cerebral clipping involves a craniotomy, where the skull is opened to expose the brain and a metal 'peg like' clip is inserted into the brain, in order to clamp the neck of the offending aneurysm, resulting in a cessation of the haemorrhage (D'Souza, 2015). Comparatively, endovascular coiling involves the insertion of a catheter containing platinum coils into the aneurysm, via the femoral artery, in order to pack the ruptured aneurysm (Connolly, et al., 2012). Endovascular coiling, therefore, is like other angiographic procedures most often involved in cardiac conditions.

Larger aneurysms, particularly if located in the middle cerebral circulation, along with patient demographics such as older age and previous cerebral aneurysm or aSAH diagnoses, are generally treated with cerebral clipping (Connolly, et al.,

2012) due to their location and size. Despite prompt medical attention being received, additional post-surgical complications may arise, some with significant impacts on mortality, notably being vasospasm.

Vasospasm is defined as the irritation of the internal walls of the cerebral arterial system caused when protein-containing blood clots, originating from the haemorrhage, move around the brain via the cerebrospinal fluid (Inagawa, 2016; Greenberg, 2010; Frontera, et al., 2009). This arterial irritation induces further medical complications that severely increase mortality rates post aSAH. As a result, vasospasm is regarded as the leading cause of post-surgical fatality after an aSAH, occurring in approximately 7–14% of people (Inagawa, 2016; Greenberg, 2010). A further complication after aSAH is hydrocephalus; therefore, it is possible that not only do people have to adjust to the experience of the initial threat to their mortality at onset of aSAH, but they may also continue to fear for their survival due to the treatment received and risk of developing vasospasm, hydrocephalus and infection. The potential for these additional complications to occur is important to note in the context of overall recovery, as these factors may also influence any symptomology experienced after the initial haemorrhage.

Current Australian treatment guidelines suggest an inpatient hospital stay in a specialist neurological high dependency or intensive care unit of more than two weeks to ensure that risk factors such as TIA, re-bleeding, hydrocephalus and vasospasm are carefully monitored and treated should they occur (National Stroke Foundation, 2010; Rabinstein, Lanzino, & Wijdicks, 2010). For some time, treatment guidelines in respect to post-stroke treatment have posited the need for urgent adjunct medical intervention via intravenous administration of medications (National Stroke Foundation, 2010). There is an increased risk of TIA after aSAH due to the movement of coagulated blood out of the cerebral circulation. Ongoing MRI and neurosurgical reviews, at intervals determined by the individual's initial presentation, extent of aSAH, treatment received and medical opinion, are recommended due to the ongoing risk of fatality, previously reported to be 44% within first 30 days (Broderick, Brott, Duldner, Tomsick, & Huster, 1993). Furthermore, these treatments are viewed as continual and invasive in the initial weeks after an aSAH and may have the potential to cause further distress to people already struggling to understand what has occurred.

After an aSAH has been treated, further factors may influence recovery outcomes and the likelihood for complications to occur post-surgery. Firstly, the impact of the haemorrhage, which is determined by the location of the aneurysm and extent of the haemorrhage, as this may assist to determine the resultant physical and cognitive deficits (i.e., a potential indicator of the extent of damage to brain tissue) (Buunk, et al., 2016; Vieira, et al., 2011). Secondly, the type of treatment received (i.e., endovascular coiling or cerebral clipping), as both have different impacts upon the physical body. For example, people who have been treated via an invasive craniotomy often require longer inpatient stays due to the risk of wound infection (Bowles, 2014), whereas patients who have received endovascular coiling as a treatment may experience fewer physical side effects as a result, due to the less invasive nature of the procedure. Thirdly, the experience of any post-surgical complications such as vasospasm, secondary TIA or intracranial aneurysm, wound infection (i.e., post craniotomy), and re-bleeding from the aneurysm may further complicate or impact negatively on the recovery experience (Connolly, et al., 2012). In conclusion, secondary complications, as previously discussed, have the potential to increase mortality as well as affect inpatient stays due to extended treatment requirements and further monitoring that may be required.

Despite similarities in people's overall presentation, it is important to note that any subsequent brain damage may not provide a comprehensive picture of functioning if purely defined by the specific neuroanatomical structures impacted. This is because despite similarities, there are also unique individual differences (i.e., variability in visual disturbances, mood, fatigue, headache, mobility), in post-aSAH outcomes, which may also need to be taken into consideration (Lincoln, Kneebone, Macniven, & Morris, 2012). This is important to be aware of in all conditions involving physical impact on the brain. None more so than in aSAH, where people may experience a myriad of unique individual symptoms and outcomes. These individual presentations may influence recovery and are important to acknowledge and include as part of the overall context when investigating recovery outcomes and experiences.

As previously discussed, socioeconomic factors including finances may play a role in access to treatment and rehabilitation after an aSAH. ASAH has been found to result in an elevated level of economic burden on individuals, their families and rehabilitation services (Dodel, et al., 2010). A recent German study (*N* = 101) found detrimental patient outcomes and substantial medical and rehabilitation costs in the first year after an aSAH (Ridwan, et al., 2017). The study found that rehabilitation costs were higher for people who had been treated with cerebral clipping (€20,290) and of longer duration (total days = 54.4) compared to those who had received endovascular coiling (€11,771) over a shorter duration (total days = 40.5) (Ridwan, et al., 2017). This may be since cerebral clipping is more invasive, involving ongoing treatment for wound management and possibly more severe impairments because only large and complex cerebral aneurysms are generally treated in this manner. Therefore, it appears that there are negative impacts on financial resources at both a macro level (i.e., hospitals, community health, rehabilitative services) and an individual micro level (i.e., ongoing treatment and rehabilitative costs, inability to return to work). As a result, it is possible that the ongoing financial burden after an aSAH may also have the potential to negatively impact the rehabilitative process and subsequent outcomes. Also, the type of treatment received after an aSAH (i.e., cerebral clipping or endovascular coiling) may be a key factor influencing recovery due to its potential to impact on psychosocial functioning and re-engagement with family and community.

As established, recovery after an aSAH is an individual process, guided by the unique needs of each person, and determined by the treating medical team in the acute treatment setting. Generally, in Australia, initial rehabilitative intervention commences within 24 hours of receiving interventional treatment post aSAH. Subsequently, recovery comprises several factors, which when combined may provide an indication of long-term outcomes post aSAH. Rehabilitative recovery while in an acute inpatient setting generally comprises a multidisciplinary approach involving multiple allied health professionals such as physiotherapists and occupational therapists (National Stroke Foundation, 2016). Dependent upon an individual’s ongoing difficulties, provision of support from other professionals such as ophthalmologists for vision impairments, speech pathologists for communication or dysphagia difficulties or social workers for support organising community supports (i.e., personal care, respite, shopping on discharge) may also be provided (National Stroke Foundation, 2016).

National stroke treatment guidelines recommend that all patients be provided with a detailed hospital discharge plan (National Stroke Foundation, 2010). Recently, it appeared that evidenced-based practice (EBP) treatment guidelines, endorsed by the National Health and Medical Research Council (NHMRC), do not appear to have been followed by more than half of the Australian stroke treatment facilities audited. For example, 39% of services reviewed reported the absence of a specialised interdisciplinary team, in addition to limited access to stroke specific education and development, with over two-thirds of services having no processes for the transfer or follow-up of patients after discharge. This is concerning, as it is recognised that most patients require ongoing support during recovery after stroke-related disorders. Most importantly, ongoing support is imperative for those patients who may have experienced impairments, yet this does not appear to be occurring. This inconsistency in treatment and ongoing support may subsequently mean that people are at risk of not only experiencing negative recovery outcomes, but also that people may be enduring a more protracted rehabilitative period.

The importance of health information provision, in order to improve outcomes and health literacy, cannot be underestimated as only half of the Australian patients recently surveyed reported that they had received education and information in respect to the cause of their stroke, recovery, hospital treatment options and secondary prevention prior to discharge (National Stroke Foundation, 2016). It is known that when detailed information is provided after stroke, there is the potential to reduce levels of anxiety and depression (Smith, et al., 2008). Adding to the poor audit results, only 51% of people were provided with stroke risk factor modification advice (i.e., lifestyle and pharmacological changes to reduce likelihood of further strokes), and one in five were discharged without receiving recommended blood pressure or cholesterol lowering medication (National Stroke Foundation, 2016). This is despite the fact that patient education is recognised as being pivotal during all stages of the post-stroke experience, none more so than in respect to ongoing treatment, supports, recovery and risk reduction (Cameron, 2013). This lack of vital information and support after a life-threatening condition such as an aSAH may also have the potential to negatively affect overall recovery outcomes; particularly as half of stroke survivors are at risk of experiencing another stroke and commencing anti-hypertensive medication is critical in these patients in order to improve long-term health and reduce the likelihood of secondary recurrence (Luders, 2007). Of more concern is that if this is the manner in which the majority of ischaemic stroke patients have been treated, it is possible that people who have experienced aSAH may also be experiencing similar issues, although this continues to remain unexamined.

Despite the comprehensive multidisciplinary support that is currently provided in large tertiary stroke settings in Australia, the inclusion of psychologists as part of the assessment and treating team after an aSAH appears to be either limited or non-existent. In Australia, social workers are involved in 94% of acute stroke referrals, rather than clinical psychologists which only receive 41% of referrals, subsequently providing most of the psychological support to inpatients (Stroke Foundation, 2019, p. 33). It appears that the main contribution of psychology supports is currently provided is delivered by neuropsychologists, should the need for assessments in respect to functional impairments (i.e., cognition, executive functioning and memory) be required. Notably, this seems to be limited to people with more severe post-aSAH presentations involving significant cognitive impairment. This is in contradiction to the World Stroke Organization (WSO) guidelines, which include the Global Stroke Bill of Rights in 2014, devised to address shortfalls in respect to stroke assessment, treatment and recovery (Damrow, et al., 2014, p. 964). The Stroke Bill of Rights provides a comprehensive list of rights incorporating biological, psychological and social requirements of stroke patients across all phases from diagnosis through to recovery. The Bill of Rights posited that all stroke survivors should:

> receive psychological and emotional support in a form that best meets their needs, and be provided with information, and be fully informed about what happened to them, and support to return to work, and other activities as they choose, as well as be connected to other stroke survivors to obtain support during recovery. (Damrow, et al., 2014, p. 964).

Although the current provision of existing allied health supports in Australian hospitals is important and necessary, assessment and intervention by a clinical psychologist may be a vital factor that is not currently being included as a part of the recovery and rehabilitative process. Despite this, the World Health Organisation (WHO) and the Stroke Foundation of Australia recognise the importance of assessing and supporting psychological recovery as part of the rehabilitation process (National Stroke Foundation, 2010; World Health Organization, 2014b). Of note, section 2.12.1E of the United Kingdom national guidelines for stroke stipulates the importance of “screening for mood and cognitive disturbances within six weeks of stroke, in the acute phase of rehabilitation and at transfer to post-acute services, as well as at six- and 12-months post stroke, utilising validated tools and observations over time” (Royal college of physicians, 2016, p. 27). Amplifying this concern is the fact that people who have experienced an aSAH are known to be at high risk of also experiencing ongoing psychological sequelae, which may be having a detrimental impact on overall recovery (Vetkas, Lepik, Eilat, Ratsep, & Asser, 2013).

Furthermore, there appears to be an acknowledgement that the psychological recovery period post stroke comprises not just the immediate period, but is rather an ongoing long-term experience, similar to functional status (Arntzen, Borg, & Hamran, 2015; Dhamoon, et al., 2009). Consequently, it may be possible that people are experiencing psychological disorders that are not being promptly assessed or treated, which in turn may impact all aspects of recovery after an aSAH.

1.5. Adverse Psychological Outcomes after Aneurysmal Subarachnoid Haemorrhage

As previously discussed an aSAH, like any other medical emergency, has the propensity to effect people emotionally and psychologically (Vetkas, Lepik, Eilat, Ratsep, & Asser, 2013). It is evident that even with improved rates of survival, people who have experienced an aSAH continue to suffer from a range of negative psychological sequelae (Vetkas, Lepik, Eilat, Ratsep, & Asser, 2013). After an aSAH, people have been found to be at a higher risk of developing depression (Morris, Wilson, & Dunn, 2004) and anxiety (Von vogelsang, Forsberg, Svensson, & Wengstrom, 2014). This may be attributed to several factors including ongoing protracted recovery, adjusting to any long-term changes to physical and cognitive functioning, and changes in interpersonal relationships and levels of independence. Furthermore, as previously discussed the current lack of psychological assessment and treatment may also be a playing a role in why psychopathologies have not been detected.

There has been limited research specifically investigating psychological outcomes after an aSAH, ischaemic stroke and other traumatically induced forms of SAH[2] such as acquired brain injury (ABI), but research has to date provided some insight into what may possibly be occurring for these patients. A retrospective cohort study of West Australian stroke patients found that one in three (36.6%) developed a mental health disorder including depression (5.5%) and psychotic disorders (6.7%) within six months of experiencing a stroke and were at greater risk of mortality some 10 years post stroke (Almeida & Xiao, 2007). Some people appear to experience psychopathologies for a protracted amount of time post stroke. This was discovered by a recent Swedish study that investigated functional status in stroke survivors (*N* = 145), some 10 years post stroke, and found that 28% of respondents continued to experience difficulties with anxiety and/or depression (Jonsson, et al., 2014). This study appears to reveal that more elevated levels of anxiety and depression are experienced, as compared to the previous Australian study. This may be attributed to several factors including sample size and cultural differences, as well as the individual impact of the stroke experience.

The impact of an aSAH can include ongoing impairment across several areas. Difficulties can include deficits in areas such as cognitive abilities, memory and attention, sensory (i.e., vision, hearing, tactile), speech and mobility (Passier, et al., 2010). It is not uncommon for up to 20.6% of survivors to report ongoing

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[2] SAH- Subarachnoid haemorrhage

headaches, and 14.9% to report ongoing memory difficulties some two years post aSAH (Chen, Mangubat, & Ouyang, 2016). A recent study found that people who had experienced an aSAH (*N* = 90) were also at risk of experiencing impairments in executive functioning (Buunk, et al., 2016). Although these findings should be interpreted with caution due to the small sample sizes utilised, they still provide important insights into the ongoing impacts on functioning after an aSAH. For example, the areas of the brain impacted by executive functioning deficits, such as the prefrontal cortex, play a role in social interactions, organisation and emotional regulation. This is important as this may mean that several psychosocial areas have the potential to be impacted after an aSAH.

Further complicating aspects of recovery, it is also known that after an aSAH people experience elevated levels of fatigue for prolonged periods. This may negatively impact overall functioning and the ability to re-engage with social relationships and activities. This was highlighted by a systematic review (*N* = 13) which found that fatigue was experienced in 71% of people after an aSAH (Kutlubaev, Barugh, & Mead, 2012). Fatigue has also been found to play a role in the development of sleep disorders and depression after aSAH (Kutlubaev, Barugh, & Mead, 2012; Vetkas, Lepik, Eilat, Ratsep, & Asser, 2013). Consequently, psychological functioning may also be negatively impacted, due to commonly experienced aspects, such as fatigue, creating a cycle of difficulties post aSAH which appear to have been currently overlooked.

Furthermore, long-term psychosocial impacts are also experienced, including the inability to engage in employment (14%), breakdown of relationships, physical conditions (i.e., headaches, fatigue) and ongoing cognitive difficulties (49%) (i.e., attention, memory and concentration) (Wermer, Kool, Albrecht, & Rinkel, 2007).

The ability to return to work appears to be an ongoing problem with up to 50% of people unable to engage in employment due to an increased dependence on others to complete daily activities (Powell, Kitchen, Heslin, & Greenwood, 2004). Additional factors contributing to high unemployment levels include ongoing difficulties with mood, memory, and physical mobility limitations (Quinn, et al., 2014). The inability to re-engage in work may also limit the level of social interactions that a person can be involved in, which further isolates people who are already trying to manage with a variety of symptomology.

Like other psychosocial aspects, health-related quality of life (HRQOL[3]) may be impacted for a long duration post aSAH. A German study (*N* = 253) concurred that HRQOL may be impacted for a period of up to 10 years subsequent to an aSAH (Tjahjadi, et al., 2012). This means, that like other aspects of recovery, if factors reducing HRQOL are not adequately addressed there may be a potential for long-term overall functioning to be negatively impacted. This appears to create a vicious cycle whereby post-aSAH recovery symptomology has the potential to negatively influence HRQOL that may in turn also negatively affect the overall rehabilitation trajectory and prolong the duration. This is concerning, as it appears that these major areas of life (i.e., relationships, employment and sleep), which all contribute to a person's ability to live an independent, happy, healthy and productive life, may continue to be problematic over a protracted period after an aSAH. It is recognised that people who experience an aSAH are at risk of experiencing depression, PTSD and a diminished QOL, even if they have enjoyed what is termed as a good neurological and physical recovery (Baisch, Schenk, &

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[3] HRQOL- Health related quality of life

Noble, 2011; Kreiter, et al., 2013; Vetkas, Lepik, Eilat, Ratsep, & Asser, 2013). It also appears, as previously mentioned in stroke studies, that these concerns do not diminish over time post aSAH. It has been discovered that even after durations up to 13 years post aSAH, people still report ongoing difficulties in areas such as self-care, pain and mobility, as well as anxiety and depression (Von Vogelsang, Burstrom, Wengstrom, Svensson, & Forsberg, 2013).

Other studies have identified possible predictors for these negative physical, psychosocial and psychological outcomes. For example, the location of the cerebral aneurysm and subsequent aSAH appears to play a role in HRQOL reduction, particularly if the haemorrhage is located in the anterior or middle cerebral arteries (Visser-Meilly, Rhebergen, Rinkel, van Zandvoort, & Post, 2009). This is concerning, given that, as previously mentioned, the most common area of the brain to develop an aSAH is the anterior region (Fennell, Kalani, Atwal, Martirosyan, & Spetzler, 2016; Greenberg, 2010). This region of the brain is responsible for the regulation of personality attributes, as well as executive functioning. This means that any deficits in this area may have more profound effects on overall behaviour, organisational skills and personality in addition to any other physical or cognitive impairments that may have been sustained. Furthermore, EC[4] treatment was found to result in better HRQOL as compared to CC (Visser-Meilly, Rhebergen, Rinkel, van Zandvoort, & Post, 2009). This is possibly due to the less invasive nature of the procedure, as compared to clipping which, as previously mentioned, involves an open craniotomy, resulting in scarring, disfigurement and additional pain. Consequently, these ongoing

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[4] EC – Endovascular coiling; CC- Cerebral Clipping

biopsychosocial difficulties may negatively influence overall recovery after an aSAH. Despite previous studies having investigated a number of factors influencing psychological recovery after an aSAH, there may be other unique factors that have yet to be explored. This may be a crucial omittance that could potentially assist psychological recovery after an aSAH, yet this has not been addressed.

Findings from an Australian stroke audit reports of acute services, found that 50% of people who were assessed were identified as having a mood disorder (i.e., depression or anxiety) and were not provided with any further psychological assessment or care (National Stroke Foundation, 2016) subsequent to their stroke. Of further concern, only 37% of stroke patients with an identified mood impairment were assessed by a psychologist, with this inability to assess psychological impacts of stroke being attributed to inadequate staffing levels (National Stroke Foundation, 2016). In addition, less than 49% of hospitals audited reported that a clinical psychologist was actively involved in rehabilitation management of patients with stroke and only 43% reported the presence of a neuropsychologist (National Stroke Foundation, 2016). Of the limited assessments conducted, it is concerning that with the significant level of reported mood disorder being experienced in this population, a clinical psychologist is attending on less than 50% of patients. This is despite the fact that previous studies have found that mood disorders may negatively alter and prolong rehabilitation outcomes (Katter & Greenglass, 2013). Combined with the current difficulties in Australia, in respect to a limited availability of clinical psychologists conducting assessments with this population, as part of the rehabilitative and treatment processes, this may infer that people are living with ongoing levels of distress that are not being appropriately managed. This audit report therefore implies that the current management of psychological recovery after stroke in Australia is inadequate, and that even when mood disorders are identified, further treatment and support does not appear to be occurring (National Stroke Foundation, 2016). This finding suggests people may be having to navigate their own psychological recovery after stroke, at the same time as juggling difficulties in other areas of functioning. It appears that people may also not be receiving important post stroke information or treatment in order to support their rehabilitation during the recovery phase.

As previously stated, if mood and other psychological issues are not adequately assessed and managed, overall rehabilitation may also be negatively impacted. Supporting this notion, a recent Australian qualitative study (*N* = 23) that utilised semi-structured interviews investigated the trajectory of psychological distress in stroke survivors (White, et al., 2012). Due to the study being qualitative, its generalisability is limited; however, it does provide important observations related to psychological requirements of people who have had a stroke, including that psychological distress is an important area for treating professionals to monitor over the long-term post stroke, and that the provision of appropriate psychological assessment and intervention in order to improve mental health outcomes is also important (White, et al., 2012). It appears that psychological input after stroke-related disorders such as an aSAH is a vital component of all recovery intervention plans, yet on current Australian statistics this is occurring in less than half of these patients. Furthermore, it appears that only one-third of stroke patients received an assessment for overall well-being once discharged from hospital (National Stroke Foundation, 2016).

Assessment of overall well-being after stroke is important as it may provide a baseline from which to provide intervention in order to reduce the negative impact of an aSAH in areas of life satisfaction, global functioning and relationships. In respect to relationships, the Australian audit report of acute stroke services found that only 15% of patients receive education and support in respect to their intimate relationships post stroke (National Stroke Foundation, 2016). As sexual expression is important for overall well-being (Lee, Vanhoutte, Nazroo, & Pendleton, 2016) and positive mental health (DeLamater, 2012), it is concerning that this area of patients' lives is also not being acknowledged and supported. It is possible that given some aSAH patients may have experienced their haemorrhage during periods of physical exertion such as exercise or sexual intercourse (Vlak, Rinkel, Greebe, Van der Bom, & Algra, 2011), there may be further subsequent negative mental health impacts being experienced. For example, there may be fears or anxiety around recommencing intimate relationships due to a concern of recurrence of an aSAH.

Overall, these issues highlight a few concerns. Firstly, that people may be navigating their own recovery once discharged with little professional support. Secondly, that overall rehabilitation may be negatively impacted if a comprehensive biopsychosocial, noting psychological impact and sequelae in the form of assessment and treatment is not conducted. Finally, the role of well-being, and social aspects comprising intimate relationships, life satisfaction and overall well-being, may be key factors in respect to psychological recovery that is also not currently being addressed. Furthermore, levels of anxiety and depression were found to be related to psychosocial factors such as the inability to engage in employment and social interactions which have the potential to impact long-term functioning (Morris, Wilson, & Dunn, 2004). Perhaps, a holistic view of recovery that attends to mood and HRQOL factors, in addition to physiological impairments, may best serve people, and result in positive post-stroke recovery outcomes being achieved (Theofanidis & Gibbon, 2016). As aSAH is a subset of stroke, it can only be surmised that these same issues may also be negatively influencing the psychological recovery of these patients as well. However, as there may be further contributing factors influencing psychological recovery after an aSAH which due to not being previously investigated continue to remain unclear. It may also be possible that fear and uncertainty in respect to prognosis and possibility of cerebral aneurysm recurrence may also have the potential to elicit ongoing psychological distress.

People who experience an aSAH are faced with a life-threatening medical condition that has the potential to threaten their mortality. Subsequently, they may also experience similar psychological outcomes as people who have experienced other traumatic events (i.e., disasters, abuse, assault, etc.). Supporting this notion, it has been found that people who experienced an aSAH are at higher risk of developing PTSS (Powell, Kitchen, Heslin, & Greenwood, 2002).

1.6. Post-traumatic Stress Symptoms

Experiencing a life-threatening medical condition with little warning is a potentially traumatic experience. Trauma has been defined as “the damage or injury that is caused by the experiencing and/or witnessing of threatening events such as abuse (i.e., sexual, physical, and emotional), war, illness, drug addiction, loss of a loved one, and disaster (for example natural disasters, terrorism)” (Kastenmuller, Greitemeyer, Epp, Frey, & Fischer, 2012, p. 477). Trauma, therefore, has the potential to result in negative psychological outcomes (Kastenmuller, Greitemeyer, Epp, Frey, & Fischer, 2012). PTSS is defined as the pre-morbid symptomology that, if severe enough and experienced for a duration of one month or more, has the potential to develop into PTSD. The *Diagnostic and Statistical Manual-Fifth Edition (*DSM- 5*)* (American Psychiatric Association, 2013) defines PTSD as a clinical anxiety disorder occurring after intensely traumatic and distressing events. The diagnostic criteria for PTSD states that: a person must have had “exposure to actual or threatened death, serious injury, or sexual violence” (American Psychiatric Association, 2013, p. 271). Diagnostic criteria for PTSD stipulates that a person must be experiencing “avoidance of reminders of the event, recurrent and intrusive thoughts of the event, numbing and arousal” connected to the trauma related event (Australian Centre for Posttraumatic mental health, 2012, pp. 13-14). Australian trauma treatment guidelines state that people who have experienced a severe traumatic event are generally symptomatic within a fortnight after the event and are likely to experience “emotional upset, increased anxiety and sleep an appetite disturbances, in addition to fear, sadness, guilt or anger” (Australian centre for Posttraumatic Mental health, 2013, p. 22). PTSS is defined as the pre-morbid symptomology that, if severe enough and experienced for a duration of one month or more, has the potential to develop into PTSD.

From a schematic theoretical perspective, PTSD eventuates when the trauma experience does not match currently existing inner models (Cahill & Foa, 2007). Subsequently, this incongruence causes information to be processed in two different ways. Firstly, information may alter existing schemas in order to assess and formulate adaptive actions to manage the traumatic event (Cahill & Foa, 2007). Alternately, there may be an attempt to avoid reliving the distress experienced (i.e., PTSD symptomology), resulting in the development of avoidance symptoms (Cahill & Foa, 2007). Consequently, avoidance prevents a successful resolution between pre-existing and current schematic information, eventuating in PTSD symptomology (Cahill & Foa, 2007). Janoff-Bulman (1992) further surmised that trauma has a negative effect on pre-existing assumptions about the world, resulting in psychopathological outcome due to a disruption of previously held beliefs about how the world operates (Cahill & Foa, 2007). For example, there is an assumption that traumatic events only happen to others, and that the world is a safe place. However, when this pre-existing belief is challenged a person's entire world view is shattered.

Trauma that is experienced as a result of a medical condition, and its subsequent treatment, comprises several distinct factors. For example, stressors include the necessary invasive surgery and lifesaving medical treatments which may result in a compounding of pre-existing stress levels. Little research exists specifically investigating aSAH and the trauma experienced as a result of treatment; however, a previous systematic review found that up to 59% of people who had spent time in an intensive care unit (ICU) for critical cut-off illnesses such as stroke, aSAH and myocardial infarction had experienced symptomology consistent with the *Diagnostic and Statistical Manual of Mental Disorders* (4th edition; DSM-IV) (American Psychiatric Association, 1994) diagnostic criteria for PTSD (Tedstone & Tarrier, 2003). Perhaps being an inpatient in an intensive care unit is a stressful experience in and of itself, regardless of a specific medical diagnosis. Conversely, individual diagnoses such as aSAH may be the prominent precursor to post traumatic sequelae being experienced. This remains difficult to determine, as the previous study did not compare the outcomes for different medical conditions, therefore other factors (e.g., treatment type, previous trauma history, pre-existing medical conditions) may have also contributed to these findings. Despite the level of traumatic stress attributed to ICU and critical illness treatment experience being inconclusive, the research has indicated that stroke survivors may experience PTSS or PTSD due to their condition.

PTSS involves symptomology including re-experiencing, avoidance and hypervigilance, which are commonly associated with PTSD, and may also be viewed as evolutionary defence mechanisms enacted to enhance and ensure survival (Baldwin, 2013). As a result, what we refer to today as mental health conditions may have originally functioned as adaptations (i.e., traits that historically served a function to increase fitness). Traumatic experiences involve complex neurobiological responses. Trauma activates the limbic networks resulting in a variety of symptoms (Baldwin, 2013). The purpose of neural activity in response to stress is to select optimal defences for survival. Dysregulation contributes to the connection between traumatic experiences and variety of physical issues. This means that physical disorders sensitive to stress stem from psychobiological reactions, even if the eliciting stressor is purely psychological (Baldwin, 2013). The inference that trauma symptomology is caused by psychobiological processes, which have the potential to act in either a negative or positive manner, enhances our understanding of these disorders. Many for example regard pain as a negative experience. However, from an evolutionary perspective, pain is regarded as a primitive function that acts to either defend or induce repair, with the eventual goal being to return the individual to normal health (i.e., homeostasis) (Lyon, Cohen, & Quintner, 2011).

It is therefore possible that an evolutionary perspective of PTSD which posits that symptomology serves an important adaptive function may provide a pertinent explanation for those people who have experienced trauma as a result of their aSAH (Cantor, 2005).

1.6.1. Post-traumatic Stress and Aneurysmal Subarachnoid Haemorrhage

Stroke is a life-threatening medical emergency with the potential to result in severe physical and cognitive disablement, loss of bodily and communicative function and death. The most cited feelings by survivors directly after experiencing a stroke include “shock, fear, uncertainty and desperation” which often persists throughout the recovery phase (Edmondson, 2014, p. 5). In addition, survivors have reported a feeling of disillusionment at learning that any cognitive or physical disabilities experienced may not be reversible by medical intervention. Over time, survivors have reported a sense of fear of recurrence of their stroke as well as the inability to maintain control over their life in areas such as interpersonal relations, self-identity and planning for the future (Edmondson, 2014). A recent racially diverse American cross-sectional study ($N = 535$) found that 18% of people met the clinical cut-off for PTSD after stroke, with factors such as younger age at onset, recurrent stroke and higher level of disability being predictive. PTSD was also associated with a higher biopsychosocial burden severely affecting domains including QOL (Goldfinger, et al., 2014).

Another important aspect is duration of time post onset of stroke with a study ($N = 1138$) finding it to be an important factor related to the prevalence of PTSD in American survivors of stroke and TIA (Edmondson, et al., 2013). Using a random effect model the estimated rate of PTSD was 23% (95% CI: 16–33%) within one year of stroke/TIA and 11% (95% CI: 8–14%) after one year post stroke/TIA (Edmondson, et al., 2013). These results indicate that one in four stroke/TIA patients developed significant PTSD symptoms as a result of their stroke/TIA (Edmondson, et al., 2013), with some change being exhibited, dependent on time duration post stroke. Further supporting the notion that PTSD may occur as a result of stroke, a small cross-sectional study (*N* = 49) of Swiss haemorrhagic stroke patients (mean age 51.4 years, 16 females and 33 males) found that 31% met PTSD symptom cut-off score as measured by the Impact of Events Scale (IES) (Horowitz, Wilner, & Alvarez, 1979). Notably, these results must be interpreted with caution due to small sample size and the use of a screening tool for traumatic stress symptomology, rather than a clinically diagnostic tool for PTSD; however, they provide further insights into the potential for stroke-related disorders to result in trauma psychopathology.

It is interesting to note that regardless of stroke type (i.e., ischaemic or haemorrhagic), there is a possibility of the condition inducing a traumatic stress response. A previous pilot study (*N* = 40) found that people who had experienced a non-disabling ischaemic stroke experienced PTSD symptomology some six months post-stroke experience, with women more likely to experience PTSD as compared to men (mean age 52 years, 65% of participants were male) (Favrole, et al., 2013). Although these findings must be interpreted with caution, they assert that gender may also play a role in the development of PTSD after stroke; however, this requires further investigation to better understand its influence. Furthermore, people who have experienced a TIA are at increased risk of experiencing sub-clinical anxiety and depressive symptomology, which has been associated with maladaptive coping strategies, in addition to PTSD (Kiphuth, Utz, Noble, Kohrmann, & Schenk, 2014). Despite these findings, there have been limited studies specifically investigating whether people who have experienced an aSAH are at risk of developing PTSS or subsequent PTSD. Results to date have been few and often variable, therefore further investigation is necessary in order to better understand what might be happening for this population.

One of the earliest small scale studies of PTSD in aSAH patients (*N* = 28), conducted by a U.K. clinical psychologist, found that 50% of people met the diagnostic criteria for anxiety as detailed in the DSM (3rd edition, Revised; DSM-III-R) (American Psychiatric Association, 1987) and 32% met the diagnostic criteria for PTSD (DSM-III-R) (American Psychiatric Association, 1987), some six months post aSAH (Berry, 1998). The study was one of the first to comprehensively evaluate this population. Supporting this earlier finding, an earlier small cross-sectional study (*N* = 60) found that 36.7% of people who had experienced an SAH met the diagnostic criteria for PTSD, citing that post-stroke events such as the potential for loss of life and/or disability, memory loss connected to SAH, realisation that life could have irreversibly changed, fear and stress at waking from coma/unconsciousness in an unrecognisable place (i.e. hospital) and being unsure of what was happening to them were all contributing factors (Baisch, Schenk, & Noble, 2011) Furthermore, studies have extended these initial findings, reporting that up to 60% of people present with clinical symptomology of PTSD, after an aSAH, particularly in the domains of avoidance of reminders and ongoing intrusive thoughts (Powell, Kitchen, Heslin, & Greenwood, 2002). Of interest, the third diagnostic criteria for PTSD being ‘numbing’ was not found to be as widely experienced when compared to avoidance and recurrent intrusive thought symptomology (Powell, Kitchen, Heslin, & Greenwood, 2002).

It has previously been found that there may be a PTSD prevalence of between 18% and 37% for a duration of up to 18 months post aSAH (Visser-Meilly, et al., 2013). This is concerning, as it suggests PTSD is experienced at significant levels for a long duration of time. Furthermore, it is acknowledged that additional factors such as the number of strokes experienced, level of negative affect and cognitive appraisals are also significant predictors of PTSD symptom severity after stroke (Merriman, Norman, & Barton, 2007). Given this, it may also be important to include these aspects when assessing PTSD symptomology in people who have experienced an aSAH in order to obtain a more comprehensive view of their presentation. Consequently, there appears to be some variance in the experience of PTSS and PTSD, dependent upon several predictive and sustaining factors (i.e., emotional regulation, rumination style, duration of time since aSAH, previous number of stroke/aSAH experienced). Further research investigating the potential for an aSAH to result in traumatic stress is clearly warranted, in order to better understand its impact.

1.6.2. Depression after Stroke

Depression has been found to be experienced by people who have been diagnosed with a variety of medical disorders and conditions including systemic lupus erythematosus (SLE) (Zhang, Fu, Yin, Zhang, & Shen, 2017), cancer (Cardosa, Graca, Klut, Trancas, & Papoila, 2016), joint replacement (Scott, Mathas, & Kneebone, 2016) and stroke (Mitchell, et al., 2017). Depression that is diagnosed after a stroke is referred to as post-stroke depression (PSD) (Ferro, Caeiro, &

Santos, 2009). PSD is a common clinical consequence after stroke. Prevalence for PSD ranges from 9% to 26% and appears to be dependent upon factors such as the duration of time since stroke (i.e., 52% in the acute phase, and 55% after a period of two years) (Ferro, Caeiro, & Santos, 2009). PSD symptomology comprises low energy, fatigue, deficits in attention and concentration, reduced appetite and sleep disturbance, depressed mood and overall anhedonia (Ferro, Caeiro, & Santos, 2009). PSD has previously been found to be associated with a reduction in QOL, cognitive impairment and increased mortality. Risk factors for developing PSD include gender (i.e., being female), previous history of stroke or depression and experiencing severe disablement because of stroke (Salter, 2007). PSD is regarded as a serious complication with the potential to negatively impact on clinical outcomes. PSD can be experienced in the acute phase after stroke (i.e., within three weeks of event); however, is often not regarded as a priority for assessment or diagnosis due to the comorbid clinical features experienced post stroke, such as sleep difficulties, communication impairments, dietary changes, fatigue and mobility impairment, which appear to take precedence as part of initial medical treatment protocols (Nakase, Tobisawa, Sasaki, & Suzuki, 2016). Earlier studies have found that the stroke location within the brain might also play a role in the development of depression, with higher levels of PSD being significantly associated with left hemisphere stroke as compared to right hemisphere stroke (Rashid, Clarke, & Rogish, 2013). As previously stated the aSAH location with the brain may be a key factor as well; however, this has not been extensively investigated in connection with PSD.

Most notably, despite the high incidence of anxiety and depression after stroke, there currently exists limited knowledge in respect to assessment, management and pharmacotherapy treatment (i.e., dosage, side effects, treatment cessation) (National Stroke Foundation, 2010, p. 107). Current treatment recommendations suggest that all stroke survivors and their carers should be provided information in respect to the possible development of mood disorders, during all stages of recovery. In addition, all stroke patients should be advised to contact a health care professional should they experience any mood changes that persist for two weeks or longer and interfere with daily activities (National Stroke Foundation, 2010).

A previous U.K. audit conducted by the Royal College of Physicians found that subsequent to discharge, only 54% of stroke patients had been reviewed in respect to their mood (Lincoln, Kneebone, Macniven, & Morris, 2012, p. 327). The audit also found that despite overall rates of screening for mood increasing from 13% of patients to 44% since the previous audit, only half of the overall patients were assessed for mood, despite training being provided to doctors (Lincoln, Kneebone, Macniven, & Morris, 2012, p. 327). As previously discussed, this result seems to indicate that active engagement with screening tools does not appear to be occurring in the U.K., despite availability of training for staff. This is concerning, particularly given the recent results investigating the impact of depression after stroke. Subsequently, an earlier meta-analysis and review ($k = 13$, $N = 59{,}598$) highlighted the detrimental effect that depression has on overall recovery in the long term after stroke, as well as mortality ($OR = 1.22$, 95% CI: 1.02, 1.47) (Bartoli, et al., 2013). Diagnostic tools for PSD screening have posed some difficulty. For example, the Beck Depression Inventory (BDI) (Beck, Ward, Mendelson, Mock, & Erbaugh, An inventory for measuring depression, 1961) and BDI-II (Beck, Steer, & Brown, 1996) appear to be too complex for use in stroke patients with severe impairments (Lincoln, Kneebone, Macniven & Morris, 2012).

However, the Center for Epidemiologic Studies Depression Scale (CESD) (Eaton, Smith, Ybarra, Muntaner, & Tien, 2004) or Brief Assessment Schedule Depression Cards (BASDEC) (Adshead, Cody, & Pitt, 1992) have been found to be more accurate at identifying major depression as compared to the Beck Depression Inventory Fast Screen (BDIFS) (Beck, Steer, & Brown, BDI Fastscreen for medical patients, manual, 2000) (Lincoln, Kneebone, Macniven, & Morris, 2012). The revised CESD (the CESD-R) (Eaton, Smith, Ybarra, Muntaner, & Tien, 2004) has been chosen to assess mood in the participants of this study. The complexity around assessment in current guidelines for treatment of mood disturbance after stroke acknowledge that considerable challenges in respect to the "assessment and management of depression after stroke" continue to exist (National Stroke Foundation, 2010, p. 107). Therefore, it appears that assessing mood after stroke is an important aspect of recovery; however, this does not currently appear to be actively followed up.

1.6.3. Depression after an Aneurysmal Subarachnoid Haemorrhage

Mood disorders such as depression and their ongoing impact after an aSAH do not appear to be well understood. Of the limited research previously conducted, results have shown that people who have experienced an aSAH are at an increased risk of developing mood disorders such as depression (Morris, Wilson, & Dunn, 2004). Some 12.6% of people report that they continue to experience significant depressive symptoms and an overall negative view of their life overall some two years post aSAH (Chen, Mangubat, & Ouyang, 2016). A previous qualitative study of aSAH patients (*N* = 20) found that those who were suffering from depression also reported a more pessimistic view of their recovery overall

(Hedlund, Zetterling, Ronne-Engstrom, Ekselius, & Carlsson, 2010b). Even though these findings cannot be generalised due to the qualitative methodology utilised, these insights are important as depression may have the potential to negatively influence rehabilitation outcomes.

Furthermore, aSAH survivors who experience significant mood and executive functioning difficulties report a protracted experience, with many living with ongoing depressive symptomology, resulting in reduced HRQOL, some five to 10 years after their initial aSAH (Chahal, Barker-Collo, & Feigin, 2011; Quinn, et al., 2014). An earlier American prospective study (*N* = 216) utilised multivariate analyses to investigate depression and its impact on QOL at periods of three months and 12 months post aSAH (Kreiter, et al., 2013). The study found that 26% of respondents reported being depressed at three months post aSAH and 47% reported being depressed at 12 months (Kreiter, et al., 2013). This is concerning, as it appears depression may have the potential to evolve into an ongoing dysthymic presentation over time for some aSAH survivors. Given findings from studies that have investigated PSD, it may also be possible that people who experience an aSAH continue to live with elevated levels of mood symptomology. Further investigation is warranted to better understand the impact of mood disorders such as depression after an aSAH, particularly as it appears that depression may have the potential to affect overall rehabilitation outcomes.

Previous stroke studies have highlighted that mood disorders also affect QOL. It is known that depression has a significant negative impact on SWB in respect to other cardiovascular conditions (Steptoe, Deaton, & Stone, 2015). It is also known that people who report reduced SWB are at higher risk of experiencing physical illness (Steptoe, Deaton, & Stone, 2015). Given that aSAH impacts the body’s arterial system it is possible that, like other cardiovascular and circulatory disorders, people may also experience reduced SWB in addition to mood disorders after an aSAH. Few studies have specifically investigated SWB and stroke or more notably, aSAH. Consequently, not only does there appear to be an interrelationship between the experience of recovery and mood, the overall well-being enjoyed by people after an aSAH also appears to be negatively impacted. Despite these findings, there have been limited studies that have specifically investigated depression and its relationship with other SWB outcomes after an aSAH.

1.7. Well-being

The biopsychosocial model (BPM) of health posits that there are both positive and negative psychosocial influences in respect to disease or disorder (Engel, 1977; 1980). BPM suggests that there is an interrelationship between biological, psychological and social factors across the antecedent, maintenance and recovery phases of illness. Subsequently, the model posits that health is “not just the absence of disease, but also the presence of well-being” (Hasler, 2016, p. 255). Hence, this model, which continues to be utilised across many disciplines such as medicine, nursing and psychology, acknowledges the vital role that well-being plays in respect to recovery from disease or disorder. Supporting this notion, a recent worldwide report confirmed that “positive affect, autonomy, generosity and social support were highly correlated to QOL and well-being” (Helliwell, Layard, & Sachs, 2016, p. 6).

Eudemonic well-being has subsequently been defined as the way in which an individual evaluates the overall functioning of their life (Keyes & Annas, 2009).

Components that comprise eudemonic well-being include “self-acceptance, personal growth, purpose in life, positive relations, environmental mastery and autonomy” (Boehm & Kubzansky, 2012, p. 656). Although interrelated, these domains refer to uniquely different areas of eudemonic well-being. Firstly, eudemonic well-being is concerned with the ability to have a life purpose in order to achieve goals and obtain a sense of meaning in respect to one’s life. Secondly, eudemonic well-being is concerned with positive relationships with others and the self (i.e., self-acceptance), as well as being able to acknowledge both the negative and positive aspects of the self (Ryff, 1989). Thirdly, eudemonic well-being concerns the importance of conducting mutually respectful relationships with an ability to embrace the needs of others. Fourthly, eudemonic well-being involves exhibiting a competency to navigate and fit into one’s environment and, finally, it includes the ability to maintain self-control in respect to behaviour without being influenced by others (Boehm & Kubzansky, 2012). As such, positive psychological well-being has been defined as a broad conceptualisation of eudemonic well-being, that encompasses aspects such as positive emotions, cognitions and life satisfaction that are helpful in evaluating an individual’s overall view of their life (Boehm & Kubzansky, 2012).

In contrast, hedonic well-being is more concerned with how an individual assesses their life satisfaction according to their feelings (Boehm & Kubzansky, 2012). Hedonic well-being is regarded as a process of adaptation. Hedonic adaptation posits that base levels of well-being exist, which people return to, regardless of environmental or life circumstances. Hedonic well-being is otherwise regarded as the happiness set point. This set point is viewed as a type of homeostatic system that brings an individual back to a central point, as genetically predetermined.

This set point is regarded as the hedonic treadmill. Both eudemonic well-being and hedonic well-being have overlapping features as evidenced by research into concepts such as optimism, into which elements of both play a key role (Boehm & Kubzansky, 2012). Despite this, there has been some deliberation as to whether eudemonic well-being and hedonic well-being should be viewed as conceptually separate (Kashdan, Biswas-Diener, & King, 2008). The consensus is that they are distinctively different and should continue to be assessed individually (Linley, Maltby, Wood, Osborne, & Hurling, 2009; Chen, Jing, Hayes, & Lee, 2013). In summary, it appears that hedonic well-being is a predetermined biological set point, which provides an anchor for people to return to throughout life. It is also acknowledged that well-being fluctuates throughout the day and is impacted by whatever positive or negative events a person experience. Others have posited that hedonic well-being maintains itself in a comparable way to an enduring personality trait. Therefore, an individual's level of happiness has the capacity to change, and as such, adaptation is not inevitable to change due to the existence of the set point (Lucas, 2007). The most widely researched theory of hedonic well-being is subjective well-being (SWB).

1.7.1. Subjective Well-being

For centuries, early Greek philosophers posited the idea that happiness and well-being are individual, according to one's subjective experiences (Wu, 2001). The Organisation for Economic Co-operation and Development (OECD) regards SWB as a vital measure of life evaluation and overall well-being (OECD, 2013). Diener (1984) posits that SWB incorporates self-reflective domains such as happiness, optimism, health and life satisfaction are necessary for individuals to enjoy a healthy, fully functioning, meaningful and engaged life. SWB is concerned with how a person thinks and feels about their life (Diener, 2009). Firstly, SWB considers a person's values, their overall satisfaction with life and attainment of their goals in order to live according to their values. Secondly, SWB can consider people's values, and give a summary of whether their lives fulfil these standards, because individuals' own views of their well-being reflect their personal values. Subsequently, SWB is viewed as an evaluative mechanism in which individuals self-report their "fulfilment of basic human needs, which reflects whether or not they are living in accord with evolutionary imperatives and human needs, and also represents judgements based on the particular norms and values of each culture" (Diener & Suh, 2000, p. 4).

A previous global study comprising 97 different countries found perceived control of life circumstances and attaining financial wealth were predictors of SWB, most notably in respect to the domains of happiness and life satisfaction (Minkov, 2009). Interestingly, previous studies in respect to SWB and health have found that the actual health condition (i.e., disorder or illness) was not necessarily of concern, but the limitations of the condition and what it allowed or prevented the person from doing were of most concern (Diener, 1984). Similarly, psychosocial concerns including the inability to find work, reduced social support and relationship dissolution were found to be strongly negatively associated with SWB in people experiencing poor health outcomes (Dolan, Peasgood, & White, 2008). Conversely, findings suggest that those people who report higher levels of SWB were found to enjoy longer life spans, more enriched and overall enjoyment connected to relationships, and more productive and successful financial working lives (Oishi, 2010). Interestingly, a global study investigated SWB across diverse cultural norms and discovered that those who reported higher SWB also utilised higher levels of internal motivation to engage in forward action in their lives (Oishi, 2010). SWB has been extensively researched in respect to its relationship with depression (Perez-Garcia, Olivan, & Bover, 2014), QOL (Oberje, Dima, Van Hulzen, Prins, & DeBruin, 2014) and cancer (McDonough, Sabiston, & Wrosch, 2014; Persoskie, Ferrer, Nelson, & Klein, 2014). Results suggest that SWB is often negatively impacted, particularly in respect to overall life satisfaction. This may be important to understand in respect to psychological recovery after an aSAH, as it may be possible that those who self-report higher SWB will be more motivated and actively engaged in their rehabilitation as compared to those who may require more external motivation from health professionals to participate fully in their recovery.

In respect to stroke, a previous prospective Norwegian study investigated SWB in ischaemic stroke patients (median age 74 years) at one year post stroke and found that stroke patients (*n* = 60) reported lower levels of SWB, as compared to the control group (*n* = 419, median age 75 years). Most notably, SWB appeared to be lower if people were left with motor impairment difficulties post stroke (Wyller, Sveen, Sodring, Pettersen, & Bautz-Holter, 1997). It is important to note that due to the small sample size in respect to stroke patients it is difficult to draw conclusions, other than the myriad of diverse physical impairments that may be experienced after stroke may also influence levels of self-reported SWB. Similarly, an earlier small longitudinal study (*N* = 67) of Canadian stroke survivors found those people who were supported and encouraged to reconnect with pre-stroke social activities reported higher levels of positive adaptation post stroke (Davis, Egan, Dubouloz, Kubina, & Kessler, 2013). Of note, increases in

SWB were reported in domains such as health overall functioning and well-being (Davis, Egan, Dubouloz, Kubina, & Kessler, 2013). Furthermore, a longitudinal study of American stroke patients (*N* = 917) at three months post discharge from hospital found that positive affect on discharge was significantly associated with lower pain ratings (*OR* = 0.87, 95% CI: 0.81, 0.92) (Berges, Seale, & Ostir, 2011). As positive affect is a domain of SWB, people who experience higher overall SWB may also experience reduced pain after stroke. This may also be a crucial factor in respect to overall recovery outcomes, although this remains unclear.

Furthermore, a previous six-year prospective cohort study found a relationship between the advent of stroke and hedonic well-being, with results indicating that participants (*N* = 2478) reporting that emotional well-being was associated with a 26% risk reduction (Ostir, Markides, Peek, & Goodwin, 2001) (Boehm & Kubzansky, 2012). The study found that positive affect was related to a decreased risk of stroke as compared to higher ratings for depression being related to an increased risk of experiencing stroke (Ostir, Markides, Peek, & Goodwin, 2001). This may be important in respect to people's fears of recurrence, which may also be a contributing factor to negative outcomes. There do not appear to be any studies that have utilised measures of SWB in respect to aSAH. As such, this study will be the first to comprehensively measure SWB in this population.

1.7.2. Post-traumatic Stress Symptoms, Depression and Subjective Well-being

It is known that a relationship exists between post-traumatic stress symptomology, and depression, resulting in a negative impact on HRQOL (i.e., well-being) (Bajor, et al., 2013). PTSD and sub-clinical PTSS are associated with higher rates of depression and anxiety in people who have experienced ischaemic stroke (Kreiter, et al., 2013; Sembi, Tarrier, O'Neill, Burns, & Faragher, 1998). Similar to other stroke patients, aSAH survivors have also been found to experience PTSS, as well as comorbid disorders such as depression, and experience lower QOL and well-being (Meyer, et al., 2010; Morris, Wilson, & Dunn, 2004; Noble, 2009; Passier P. E., Visser-Meilly, Rinkel, Lindeman, & Post, 2013; Powell, Kitchen, Heslin, & Greenwood, 2002; Rinkel & Algra, 2011; Visser-Meilly, Rhebergen, Rinkel, van Zandvoort, & Post, 2009). Recurrent and intrusive thoughts, associated with PTSD, increase the likelihood for these patients to develop other psychological disorders such as depression. In conditions such as ABI[5], which are often caused by a traumatic form of SAH[6] people have reported experiencing higher levels of subjective distress (Cantor, Ashman, Schwartz, Gordon, Hibbard, Brown, et al., 2005). This has been attributed to the inability of ABI[7] patients to adjust to their new identity in respect to their post-injury life (Gracey, et al., 2008).

Consequently, because of these negative psychological impacts, it is possible that SWB is also affected, although SWB and its connection to negative psychological outcomes has not been previously investigated, as aSAH generally affects people at a much younger age than ischaemic stroke. Therefore, aSAH-related PTSS and depression might have the potential to seriously affect people, most often women,

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[5] ABI – Acquired brain injury

[6] SAH- Subarachnoid haemorrhage

[7] ABI- Acquired brain injury

at a time when they are busy raising children or building their professional careers.

1.8. Post-traumatic Growth

1.8.1. What is Post-traumatic Growth?

Theorists across diverse domains such as philosophy, theology and literature have long posited that positive change can be derived from traumatic events (Prati & Pietrantoni, 2009). Nietzsche was one such theorist credited with stating that great strength is derived as a result of great suffering (Nietzsche & Large, 1998). Existential and humanistic psychological schools of thought also posit the ability to obtain strength or positive psychological outcomes from negative events. For example, from an existential standpoint, Frankl (2017) wrote about the importance of evaluating life meaning during his own experiences as an internee in German concentration camps during World War II. Similarly, from a humanistic standpoint, Maslow posited that confrontations with tragedy were often precursors to self-actualisation (Burns, 2010). Of note, both theorists highlighted the importance of meaning in understanding and confronting difficult life experiences with a view to seeing trauma as more of an opportunity to grow, learn and lead a happy life (Burns, 2010). Burns (2010) posited that when people have purpose, direction or goals to be living for they report feeling happier and more content. In contrast, a lack of meaning is a causal factor in the development of negative psychological outcomes such as depression (Burns, 2010). Meaning derived from adversity may also play a vital role in respect to recovery in mental health (Clarke, Oades, & Crowe, 2012). It seems that existential awareness may invoke the necessary change required to assist people to move forward with their lives.

This appears to be the result of people embracing both the negative and positive aspects of life, meaning and learning in order to grow. Positive psychological meaning after adversity may therefore have the propensity to assist people in building deeper self-awareness (Joseph, 2012). It has been found that the ability to make sense and obtain meaning after a traumatic experience may also be an important factor in the development of positive psychological growth (Park, Riley, & Snyder, 2012; Kastenmuller, Greitemeyer, Epp, Frey, & Fischer, 2012).

Recently, there has been increased interest in researching the potential for beneficial psychological gains that may occur after trauma. Consequently, positive psychological growth has been described in a number of ways such as adversarial growth (Linley & Joseph, 2004) or benefit finding (Affleck & Tennen, 1996), whereas others describe this concept as stress-related growth (Park, Cohen, & Murch, 1996). Currently, the most extensively researched conceptualisation is known as post-traumatic growth (PTG) (Tedeschi & Calhoun, 1996; Tedeschi & Calhoun, 2004a). PTG is defined as the subjective experience of positive psychological change that results from struggling with a traumatic, life-challenging event (Hallam & Morris, 2013; Tedeschi & Calhoun, 1996; Tedeschi & Calhoun, 2004a; Zoellner & Maercker, 2006). PTG is elicited when an individual experiences significant distress at a level that causes several things to occur. Firstly, the traumatic event must incite automatic rumination and subsequent deliberate rumination in the days and weeks following. Deliberate rumination is defined as a cognitive process involving ongoing active reviewing of the factors involved in an event such as the impact of the event, the derived meaning from experiencing the event, and proactive ways in which people can move on with their lives (Rendon, 2015). Secondly, the individual must be able to activate coping mechanisms as a way of reducing their distress (Rendon, 2015). Previous findings concur that meaning in one's life is an important influencing factor for QOL and is also positively related to PTG (Cann, Calhoun, Tedeschi, & Solomon, 2010).

Of note, PTG appears to be associated with factors such as optimism, spirituality and positive coping styles (Shand, Cowlishaw, Brooker, Burney, & Ricciardelli, 2015). However, PTG differs from optimism and resilience. For example, optimism is a relatively stable concept that involves a positive perception of the future (Carver, Scheier, & Segerstrom, 2010). Higher levels of optimism have been found to relate to increased levels of SWB, notably during times of adversity. In conceptual and clinical terms, PTG requires an active effort to find the positive in the negative, which suggests this is intentional and continuous over time. By contrast, optimism is devoid of any proactive connotation oriented towards improvement (Sumalla, Ochoa, & Blanco, 2009). Similarly, resilience refers more to a pattern of positive adjustment and functioning after the experience of a traumatic event (Bonanno, 2012). Unlike PTG, resilience is recognised as a brief ability that is utilised as is required, whereas PTG refers to a more long-term cognitive change which elicits positive psychological growth across all multiple levels of functioning, particularly psychological (Tedeschi & Calhoun, 1998). Consequently, people who experience PTG acknowledge positive life changes across several psychosocial domains (Tedeschi & Calhoun, 2004d). For example, some people may seek a greater connection with spirituality; others may seek to give more of themselves to others who they deem less fortunate, in order to find their place in the world, and obtain greater understanding of their life journey (Tedeschi & Calhoun, 2004d). PTG also influences stronger and improved interpersonal familial relationships (Tedeschi & Calhoun, 2004d). One of the ways in which this may be achieved is through self-disclosure. Self-disclosure assists a person to disseminate what has occurred to them as well as provide an opportunity for people to understand and express their vulnerability to others and subsequently utilise their social supports (Tedeschi & Calhoun, 1996). As such, PTG appears to provide an opportunity to address trauma experiences in a proactive and assertive way (Tedeschi & Calhoun, 1996).

PTG is not inferring that there are only good outcomes from trauma, but rather that along with psychopathology, trauma also has the potential to positively transform people. This is because when people face their own mortality, particularly in the context of trauma such as an aSAH, they are reminded of their own fragility. This realisation forces people to cognitively engage with existential questions around their life purpose, death and the value with which they hold in several life areas (i.e., relationships and spirituality). Although ruminating on traumatic events may be uncomfortable for some people, it is regarded as a necessary process in order to reconstruct these important life evaluations (Tedeschi & Calhoun, 2004c). It appears that the specific details pertaining to the trauma are not as important in the development of PTG. Rather it is the impact of the event, which needs to ‘shake a person to the core’ for PTG to develop (Janoff-Bulman, 1992). Therefore, it is not just the trauma itself, but it is the struggle with the aftermath of the trauma that results in PTG (Tedeschi & Calhoun, 2004c). Consequently, it may be surmised that traumatic events function as a catalyst for growth which results in people also finding a new life narrative (Janoff-Bulman, 2004). Currently, two predominant models of PTG are recognised in the literature: the transformational model conceptualised by Tedeschi and Calhoun (1996) and the organismic valuing model (Joseph and Linley, 2005; 2006). Both models, in addition to an alternative third model, will now be discussed in more detail.

1.8.2. Models of Post-traumatic Growth

From the outset it is important to note that each model of PTG has a different emphasis; however, all share the common premise that "experiencing a highly stressful or traumatic event shatters an individual's self-views and world views, and a meaning-making or cognitive-affective process occurs in order to adapt or rebuild one's views, resulting in perceptions of growth" (Grace, Kinsella, Muldoon, & Fortune, 2015, p. 3). As such, the primary focus is not the event but rather the process of rebuilding, re-evaluation and reintegrating the experience of trauma into a new schematic view of the world that is vital in the development of PTG (Janoff-Bulman, 1992). This rebuilding process commences with accommodation (Joseph, 2011). Accommodation allows existing assumptions to be modified in order to understand the new knowledge that has been acquired as a result of the traumatic experience (Janoff-Bulman, 1985). This differs from assimilation, whereby a conscious effort is involved in order to incorporate new information into existing assumptive schematic views [Joseph, 2011]. Therefore, successful development of PTG is not regarded as a simple return to pre-existing assumptions, but an integrated positive assumptive world view that has absorbed and incorporated the trauma that has been experienced (Janoff-Bulman, 1992).

Janoff-Bulman (1992) regards the experience of trauma as being incompatible with pre-existing assumptive views of how the world should function on a schematic level. These assumptive views include the belief that the world is a safe place, where other people act in a benevolent way and where negative events only happen to bad people (Janoff-Bulman, 1992). As a result, when a traumatic event is experienced, a shattering of these firmly held schematic world views occurs (Janoff-Bulman, 1985). Consequently, psychological distress is experienced due to the shattering of the assumptive self (Janoff-Bulman, 1989). All previously held assumptions about the way in which the world functions have been destroyed and an incongruence develops between the traumatic pain experienced and its revelation that there is now an inconsistency between previous understanding and this new distressing experience (Janoff-Bulman, 1992). For those that struggle with the resulting incongruence, there is a higher risk of experiencing post-traumatic stress, whereas those people who are able to successfully integrate and rebuild their assumptive world view and emerge from the traumatic experience with a new schematic understanding of their world may be viewed as initiating the development of PTG (Tedeschi & Calhoun, 2004b).

Of the two predominant models of PTG, theoretical underpinning as described by Janoff-Bulman (2004) posits that assumptive worlds allow for important schematic changes, which subsequently result in long-term cognitive change (i.e., PTG). This experience involves a positive reappraisal resulting in psychological strength being attained because of going through distress. This new reappraisal does not ignore the suffering that has been experienced but embraces a comprehensive understanding of the trauma which values both the negative and positive aspects involved (Tedeschi & Calhoun, 2004a). Positive growth is attained by an acknowledgement of what has been suffered because of the trauma experience (Janoff-Bulman, 2004). Subsequently, shattered assumptions theory (Janoff-Bulman, 2004), a social cognitive model of trauma, posits an assumption laden world view, courtesy of schematic views held, which others (Zoellner &

Maercker, 2006) refer to as illusory, yet are powerful enough to act as a motivating factor for overcoming suffering and difficulties throughout life (Brewin & Holmes, 2003).

Critics of PTG believe further research needs to be conducted in order to determine if the concept infers long-term cognitive change or is rather activated as a short-term coping mechanism. Those who argue against PTG as a long-term facilitator of growth posit that there is a paucity of research utilising different methodologies which may act to provide clarification and explain this concept further. For example, some believe that there continues to be a lack of longitudinal or qualitative studies (Zoellner & Maercker, 2006) while others feel that there is a need for disease-specific theoretical models of PTG (e.g. cancer), as there may be unique differences in the experience of PTG in different populations (Morrill, et al., 2008). Conceptually, real growth takes place through suffering; this implies a life learning process in which relational aspects play a key role. Thus, growing involves seeing yourself in a different way, because you see others and the world in a different way (Joseph, 2011). As a result, growth, as a positive identity change, essentially has been linked to meaning making processes in addition to the accommodation of previously held beliefs, in order to foster a new way of understanding and relating, following illness (Barskova & Oesterreich, 2009).

PTG is conceptualised as a multidimensional construct that involves long-term change in areas such as goals, identity, world view and beliefs (Zoellner & Maercker, 2006). Building on Janoff-Bulman’s conceptualisation of trauma, the transformational model posits that PTG is an outcome variable that results after a specific growth process (Tedeschi & Calhoun, 2004a). For growth to occur, several processes need to happen. Firstly, a traumatic event of ‘seismic’ proportions needs to occur to such an extent that the person’s world is ‘shaken up’ and destroyed. Secondly, this seismic shift must result in a person’s individual beliefs and goals being destroyed to such an extent as to change their world view (Janoff-Bulman, 1992). Thirdly, the emotional distress experienced after trauma involves a process of rumination in order to understand the experience as well as reduce distress in the long term. Rumination also acts to assist a person to cognitively process and find new meaning with the result being the development of PTG. As such, PTG is an adaptive experience that results in an increased level of psychological functioning and enhanced life awareness (Zoellner & Maercker, 2006). This new awareness results in a recognisable difference in post-crisis functioning in areas such as life meaning, appreciation with life, improved relationships and deeper spiritual connection (Zoellner & Maercker, 2006).

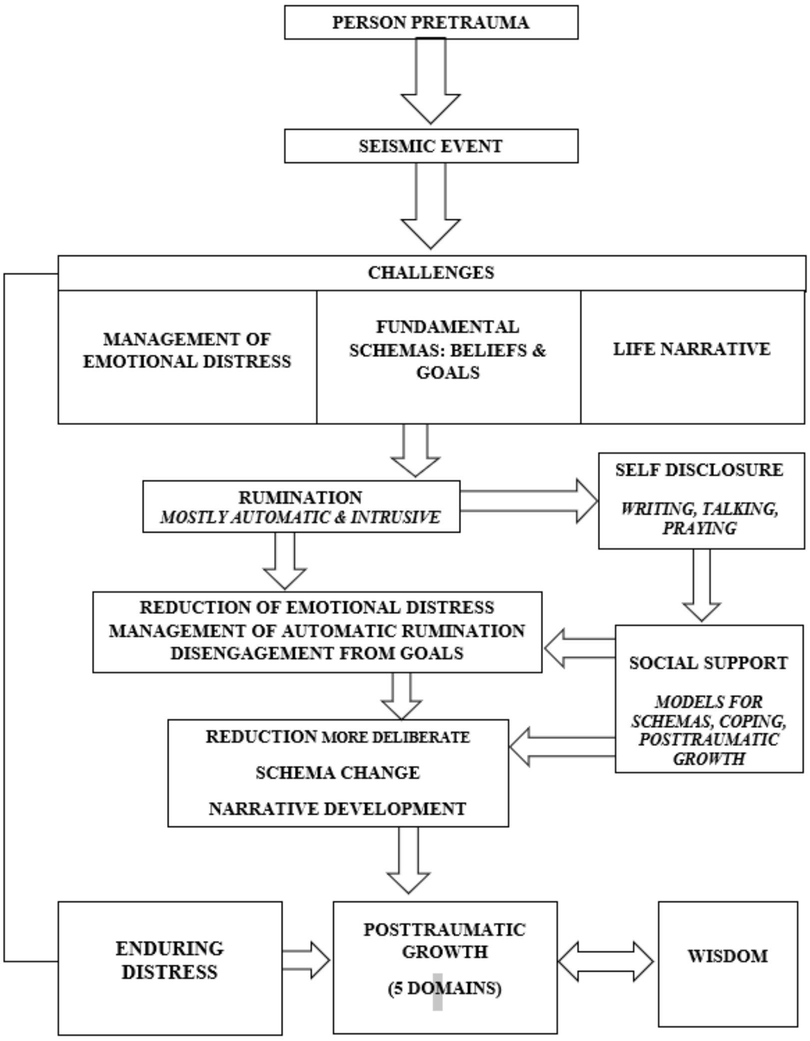

Figure 1: Model of post-traumatic growth – Tedeschi and Calhoun (2004a)

As such, the transformational model (see Figure 2) as posited by Tedeschi and Calhoun (2004a) views PTG as a long-term cognitive change involving a shattering of assumptive worlds, followed by rumination and meaning making, and influenced by the provision of social support, resulting in a disruption to pre-existing core beliefs, eventuating in positive growth.

An earlier cross-sectional study investigated these two PTG theories in carers of people who had experienced stroke (Hallam & Morris, 2013). The study found that the transformational model explained 49% of the variance in PTG experienced, as compared to more person-centred models that posited internal locus of control mechanisms and approaches to coping as being key factors (Hallam & Morris, 2013). Despite this, researchers continue to utilise different models of PTG in order to determine which model comprehensively explains this concept.

Comparatively, organismic valuing theory (OVT), which underpins the personality-based model of PTG, infers that positive change after traumatic stress is a normative process utilising existing personality and cognitive abilities, resulting in positive growth (Joseph & Butler, 2010). Despite sharing similar aspects with the transformational model (e.g., assumptive world views) this model of PTG is underpinned by a more person-centred or humanistic approach, whereby trauma induces a breakdown in self-structure; however, individuals also possess innate abilities to positively grow (Joseph & Linley, 2005; 2006). This breakdown after the experience of trauma also involves shattering of assumptions and cognitive processing like the transformational model. However, there is a difference, in that motivation is acknowledged as being important in the ability to process new information in order to improve psychological functioning and induce growth (Joseph & Linley, 2005; 2006). For growth to occur a person's pre-existing assumptions are either confirmed or disconfirmed after trauma (Joseph & Linley, 2005; 2006). Those that are able to disconfirm assumptions have to assimilate the trauma experience into their pre-existing world views in order to accommodate post-trauma information (Joseph, 2011). Comparatively, those that can confirm their pre-existing assumptions may struggle to successfully accommodate their traumatic experience (Joseph & Linley, 2005; 2006).

Therefore, it is acknowledged that accommodation rather than assimilation is a crucial factor in the development of PTG (Joseph & Linley, 2005; 2006). As such, the OVT model posits that a person is intrinsically motivated to grow positively after trauma (Joseph, 2012). Trauma involves the smashing of aspects such as relationships and self-identity (Joseph, 2012). People who are resistant to growing from their trauma experience, who attempt to go on with their lives as if nothing had happened to them, are at risk of living with ongoing vulnerability and distress (Joseph, 2012). Comparatively, those that embrace the traumatic experience and use it as a mechanism for rebuilding their lives experience life with a renewed sense of positivity and meaning (Joseph, 2012).

The transformational model (Tedeschi & Calhoun, 2004a) will be utilised for this study in order to allow the investigation of the unique interrelationships that are involved after the experience of an aSAH. Self-compassion will be included as an additional predictor of PTG due to its innate adaptive responsory ability and the need to investigate whether the experience of aSAH may impede the ability for some people to experience self-compassion. Therefore, in order to better understand how PTG is experienced in relation to the complexity of aSAH recovery, the transformational model will provide the theoretical framework for this study.

1.8.3. Post-traumatic Growth and Health Conditions

It is acknowledged that for some people, experiencing a life-threatening health condition has the potential to induce psychological distress (Barskova & Oesterreich, 2009). Despite this, some people also report being able to look back at their health challenge in a positive way and reflect at how far they have come since their initial diagnosis (Barskova & Oesterreich, 2009). As such, life-threatening trauma has the potential to provide a valuable learning experience (i.e., meta-learning), as well as being an impetus to obtain greater meaning and perspective in life. Some have suggested that this is because experiencing one's own mortality and the ensuing existential crisis which may unfold forces a search for meaning in the suffering (Yalom, 1980). Theorists acknowledge this view, highlighting that PTG contains existential components, namely uncertainty pertaining to life and existence, a sense of awareness in respect to emotions, flexibility to change according to circumstances, and responsibility for the consequences of life choices (Joseph, 2012). In the context of aSAH, with variabilities across domains from diagnosis, treatment and rehabilitation, these factors may be important to understand.

PTG has been experienced after a variety of medical diagnoses including human immunodeficiency virus (HIV) (Sherr, et al., 2011; Siegel & Schrimshaw, 2000), myalgic encephalomyelitis (i.e. chronic fatigue syndrome) (Arroll & Howard, 2013), leukaemia (Danhauer, et al., 2013), cancer (Sumalla, Ochoa, & Blanco, 2009; Tomich & Helgeson, 2012; Balfe, et al., 2016; Shen, et al., 2015), spinal injuries (Kunz, Joseph, Geyh, & Peter, 2016) and ABI[8] (Silva, Ownsworth, Shields, & Fleming, 2011; Jones, et al., 2010; Rogan, Fortune, & Prentice, 2013). A consistent query in the field has been whether PTG develops differently depending upon the diagnosis or trauma being experienced. One qualitative systematic review (*N* = 57) investigated PTG in a variety of health conditions such as cancer, HIV, myocardial infarction, rheumatoid arthritis, multiple

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[8] ABI – Acquired brain injury; HIV- Human immunodeficiency virus

sclerosis, diabetes and kidney dialysis (Hefferon, Grealy & Mutrie, 2009), and found that there may be unique illness-related aspects to PTG which may vary according to diagnoses being experienced. The review discovered four pertinent themes: a reappraisal of life and priorities, trauma induced self-development, existential re-evaluation, and a greater appreciation of the physical body. These are consistent with our understanding of how PTG develops, however further investigation is deemed necessary to determine if each medical presentation elicits a unique experience of PTG (Hefferon, Grealy, & Mutrie, 2009). With only one ischaemic stroke participant included in this review, and given the qualitative nature of the study, it is not possible to generalise these results. However, given these initial findings it may be possible that PTG is experienced in unique way in respect to aSAH as well, yet this needs further investigation.

The unique experience of PTG in the context of aSAH may be important, as another longitudinal study of U.K. spinal cord injury patients (*N* = 87) from 12 weeks post injury through to 10 years post injury, found the development of PTG was related to higher levels of psychological distress (Pollard & Kennedy, 2007). This finding was attributed to the ongoing nature of spinal injury, whereby ongoing distress is a common experience due to the uncertainty and then finality of the diagnosis. This finding needs to be interpreted with caution due to small sample size and the fact that only 43% of the original sample completed the 10-year follow-up (Pollard & Kennedy, 2007).

Comparatively, in the context of aSAH, duration of time post the experience may also be an important factor in the development of PTG. Conversely, other findings depict a different view, as indicated in a previous German longitudinal study of colorectal cancer survivors (*N* = 483) (Jansen, Hoffmeister, Cahng-Claude, Brenner & Arndt, 2011). PTG was still evident in 46% of participants some five years post diagnosis (Jansen, Hoffmeister, Cahng-Claude, Brenner, & Arndt, 2011). This finding suggests that PTG is experienced for a long duration after cancer.

It is important to note, however, that psychological growth is not necessarily an inevitable outcome after trauma (Ownsworth & Fleming, 2011). Distress can often be endured without the person understanding its meaning or drawing psychological benefits (Ownsworth & Fleming, 2011). This view was supported by an earlier study of ABI[9] patients which found that those people who had experienced a higher level of difficulty in respect to subjective impairments reported higher levels of PTG some six months post discharge (Ownsworth & Fleming, 2011). PTG was mainly experienced in respect to greater life appreciation. This finding suggests that meaning making processes that influence the development of PTG may be important after an ABI. More importantly, it also highlights that higher levels of distress may be crucial in the re-evaluation process during the early recovery period after an ABI (Ownsworth & Fleming, 2011). As a spontaneous aSAH also has the potential to impact cerebral functioning, dependent on CA rupture location, the development of PTG may also be experienced differently as in ABI patients, as compared to other populations where other conditions such as cancer, cardiac and spinal cord injuries have occurred. Similarly, a previous study of ischaemic stroke patients (*N* = 40, mean age 62.9 years, 15 women and 25 men) some nine months post ictus found that the ability to derive meaning from their experience was an important factor

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[9] ABI – Acquired brain injury

associated with positive adaptation and improved psychological functioning (Brink, et al., 1982). Some 50% of participants reported that they had derived meaning in areas such as a greater life appreciation, pacing themselves, and enriched familial and partner relationships (Brink, et al., 1982). These findings are important as they appear to link important factors relating to post-stroke influences and aspects of PTG. However, due to the short duration of time post event, the findings need to be interpreted with caution as compared to findings conducted with participants over a longer duration. Perhaps these domains may also be a key factor in PTG development for people who have experienced an aSAH as well. Currently, there has been no study that has investigated whether this may be the case. However, in respect to brain-related disorders, further factors have emerged courtesy of a previous study of brain meningioma patients (Ownsworth & Fleming, 2011). The study found that higher self-reported PTG was associated with intrusive tumour-related symptoms, avoidance of the situation they had experienced and depressive symptomology (Ownsworth & Fleming, 2011). As people who have experienced an aSAH also experience ongoing symptoms, as well as difficulties with mood, it may be possible that this population may also experience similar avoidance connected with their cerebral aneurysm rupture. Furthermore, specific aSAH-related symptoms may also be an important factor in the development of PTG, yet this remains unclear.

These findings are also consistent with aspects of PTG conceptualisation, which posit that the initial period post trauma involves elevated levels of distress in order to derive meaning from the experience and growth as a long-term benefit (Ownsworth & Fleming, 2011). Similarly, they posit different aspects of disorder specific symptomology, which may also influence the development of PTG, dependent upon medical trauma being experienced. As aSAH is a subset of stroke, any trauma experienced after this diagnosis may also involve an existential crisis that elicits a search for understanding of what this threat to mortality may mean for the person involved.

1.8.4. Post-traumatic Growth and Aneurysmal Subarachnoid Haemorrhage

As there has been limited investigation in respect to PTG and aSAH, as previously mentioned, literature has been drawn from other forms of SAH such as ABI, traumatic brain injury (TBI) and ischaemic stroke studies. Of the studies conducted to date, it appears that people who have experienced an ABI, TBI or ischaemic stroke have the potential to develop PTG. This is evidenced by earlier longitudinal studies that found that people who had experienced a TBI reported positive psychological gains at durations between 11- and 13-years post event (Joseph, Williams, & Yule, 1993; Powell, Gilson, & Collin, 2012). Similarly, a previous meta-analysis (*N* = 8) investigated PTG after the experience of an ABI, with stroke participants (*n* = 4) being included, however specific types of stroke were not provided (Grace, Kinsella, Muldoon & Fortune, 2015). Results found that people who experienced an ABI also developed PTG, and that this growth was predicted by demographic and psychosocial factors such as age, educational attainment level, engagement with employment, positive interpersonal relationships and reduced levels of depression (Grace, Kinsella, Muldoon, & Fortune, 2015). Perhaps people who have experienced an aSAH may also experience PTG uniquely, particularly given that for aSAH it is middle aged women who are predominantly impacted. These findings were supported by a further small cross-sectional study of U.K. ABI patients (*N* = 52) who reported that they had experienced PTG in domains such as improved interpersonal relationships, increased personal strength, increased life appreciation, openness to new experiences and possibilities, and increased involvement in spiritual aspects of life. Participants reported that they continued to experience PTG some 10–12 years post their ABI (Powell, Ekin-Wood, & Collin, 2007). Of note, positive psychological growth can occur concurrently with psychopathology such as anxiety and depression (Hawley & Joseph, 2008). This adds further evidence to the potential for PTG to be a long-term cognitive experience.

In respect to stroke, an earlier small U.K. study ($N = 60$) investigated the relationship between PTG and other factors such as psychological distress and cognitive processing (Gangstad, Norman, & Barton, 2009). Duration of time post stroke was investigated as a potential mediator between these variables. Findings suggest that participants experienced PTG, with cognitive restructuring being positively associated with PTG and depression being negatively associated with PTG (Gangstad, Norman, & Barton, 2009). Furthermore, psychological distress was deemed to initiate the response of benefit finding as a way of coping with the experience, which subsequently led to the development of PTG (Gangstad, Norman, & Barton, 2009). Consistent with the PTG model, duration of time post stroke was found to influence the development of PTG and was related to improved psychological health long term (Gangstad, Norman, & Barton , 2009). Similarly, a further qualitative investigation ($N = 16$) found that 63% of ischaemic stroke patients were able to find positive consequences related to their experience. Themes that emerged included improved social relationships, enhanced awareness of personal health, greater connection to spiritual and religious life, individual growth as a person and an increased engagement with altruism (Gillen, 2005).

These findings cannot be generalised due to their qualitative nature; however, they suggest along with previous studies that people who experience stroke may, like other medical diagnoses, also experience PTG. Furthermore, as aSAH is a subset of haemorrhagic stroke, this may also be true for people who have experienced this diagnosis. However, to date the literature is scarce in this regard, as PTG, and what specifically predicts its growth and the factors that influence its growth, has never been investigated in people who have experienced an aSAH.

1.8.5. Predictors of Post-traumatic Growth

As previously discussed, traumatic events involve a reassessment of life meaning and purpose. It is known that trauma has the propensity to elicit distressing psychological responses and that these responses are unpleasant and negative, often persisting for the duration of a person's life (Brandell & Ringel, 2012). Various predictors (i.e., personality factors, demographics, social support and cognitive factors) have been posited as having an influence on the development of PTG (Dekel, Mandl, & Solomon, 2011; MoshirPanahi, Moradi, Ghaderi, McEwen, & Jobson, 2020). One such predictor is emotional regulation. Emotional regulation is defined as the ability to identify, understand, accept, manage and express emotions (Gratz & Roemer, 2004). Emotional regulation is regarded as an essential coping skill for optimal functioning, which is an important means of exerting affective self-control, particularly after trauma (Rickard & Vella-Brodrick, 2014). Previous research has found that traumatic experiences have a negative impact on emotional regulation (Courtious, 2004; Herman, 1992; Scoglio, et al., 2015). Furthermore, a growing body of research posits a strong relationship between PTSD and emotion dysregulation (Badour & Feldner, 2013;

Burns, Jackson, & Harding, 2010). Emotional dysregulation has also been implicated in other psychological conditions including anxiety disorders, eating disorders and depression (Barlow, Allen, & Choate, 2004; Scoglio, et al., 2015; Larsen & Berenbaum, 2015). Therefore, it appears that healthy emotional regulation is a crucial factor in managing emotional dysregulation in the context of psychological sequelae. Previous studies have found that emotional regulation may also play an important role in coping in addition to the development of PTG after trauma (Yu, et al., 2014; Wild & Paivio, 2004). Healthy emotional regulation strategies include self-compassion problem-solving, acceptance, cognitive reappraisal and psychological flexibility (Aldao, Nolen-Hoeksema, & Schweitzer, 2010). Self-compassion has emerged as an important form of emotional regulation and its role in the context of aSAH recovery requires further exploration to determine its potential to improve psychological outcomes in this population under investigation.

1.9. Self-compassion

Recently there has been an increasing interest in the relationship between compassion and mental health outcomes (Barnard & Curry, 2011). Studies have posited that compassion is an important factor associated with improved well-being and reduced emotional distress (MacBeth & Gumley, 2012). Compassion directed toward the self is referred to as self-compassion. Self-compassion originates from the Buddhist philosophy of compassion (Barnard & Curry, 2011). Self-compassion is recognised as the ability to be kind to oneself, and the ability to recognise individual experiences in the context of the wider population by holding painful and traumatic thoughts in balanced awareness, in contrast to avoiding or over-identifying with them (Neff, 2003a; Neff, Hsieh, & Dejitterat, 2005). Self-compassion comprises 6 subscales being: “self-kindness (i.e.,the ability to show kindness and understanding to the self), self-judgement (i.e., the capacity to be harsh and self-critical towards the self), common humanity (i.e., being able to put one’s experience into the context of a larger human experience), Isolation (i.e., seeing ones experiences as being separated and isolated from that experienced by others), Mindfulness (i.e., capacity to hold painful and emotional feelings and thoughts in a state of balanced awareness) and Over-identification (i.e.., inability to see one’s emotions and thoughts in balanced awareness but rather over identifying and being stuck with them)” (Neff, 2003, p. 224-225). Self-compassion focuses on a healthy attitude and relationship with oneself, which Neff defines as being touched by and open to one’s own suffering, not avoiding or disconnecting from it, but generating the desire to alleviate one’s suffering and to heal oneself with kindness (Neff, 2003a; 2003b). As such, self-compassion also involves taking a non-judgemental stance towards oneself in respect to perceived failures or pain experienced and being able to place one’s experience within the broader context of humanity; that is, recognising that others also go through similar experiences (Muris & Petrocchi, 2016). Self-compassion draws upon the evolutionary perspective, which posits that compassion is an “advantageous trait evolved as a survival mechanism (i.e., being kind-hearted is good for your survival with appraisal of costs, benefits and motivation at the centre)” (Macbeth & Gumley, 2012, p. 546). The difference in this context is that self-compassion is concerned with showing that self-kindness and empathy to the self rather than others. Consequently, self-compassion posits the importance of embodying a compassionate stance toward the self, to “embrace negative emotions in order to generate positive ones” (Germer & Neff, 2013, p. 858).

Over the past decade, self-compassion has been increasingly researched, particularly in the field of clinical psychology (Muris & Petrocchi, 2016). A recent study found that self-compassion predicted fewer emotional regulation difficulties and lower levels of PTSS in people who had experienced childhood abuse (Barlow, Turow, & Gerhart, 2017). Self-compassion also appears to improve peoples’ abilities to identify and accept emotions, resulting in a reduction of emotional numbing and a diminishing of chronic hyperarousal (Ogden, Minton, & Pain, 2006). Furthermore, self-compassion has been associated with a variety of positive psychological outcomes such as resilience and general well-being (Terry & Leary, 2011; Neff, Hsieh, & Dejitterat, 2005) and reduced depression (Diedrich, Grant, Hofmann, & Hiller, 2014). A recent U.K. cross-sectional study of adults living with epilepsy (*N* = 270) found that SC reduced levels of depression and anxiety and increased levels of resilience (Baker, Caswell, & Eccles, 2019). Self-compassion has also emerged as a vital concept related to recovery after trauma and subsequent PTSD (Scoglio, et al., 2015). It is possible that by promoting resilience, self-compassion may be an adaptive strategy that reduces the development of post-traumatic-related psychopathology (Trompetter, De Kleine, & Bohlmeijer, 2016). Furthermore, self-compassion may assist in recognising the importance attributed to the meaning connected to lived experiences of having a mental health condition (Pauley & McPherson, 2010). It has been posited that the ability to derive meaning after a traumatic experience is important for the development of positive psychological gains, and that as self-compassion is a psychological strength, it may also play a key role in building and maintaining positive mental health (Pauley & McPherson, 2010). Consequently, self-compassion is an important factor in the ability to regulate emotions; however, this remains untested (Aldao, Nolen-Hoeksema, & Schweitzer, 2010).

Research has found that higher levels of self-compassion function as a protective buffer, resulting in lower levels of depressive symptoms (Kuyken, et al., 2010; MacBeth & Gumley, 2012; Gilbert, 2010). A previous U.K. qualitative study (*N* = 10), which used interpretative phenomenological analysis (IPA) of people living with anxiety and depression, found that self-compassion comprised two central themes: self-kindness and action. Conversely, self-judgement versus self-kindness and a sense of isolation versus common humanity have been found to predict depressive symptomatology and physical well-being, while self-judgement versus self-kindness and over-identification versus mindfulness were found to predict the ability to manage life stressors (Hall, Row, Wuensch, & Godley, 2013). Furthermore, self-compassion is a strong predictor of psychosocial attitudes, particularly in respect to psychological growth in menopausal women (Brown, Bryant, Brown, Bei, & Judd, 2016). This may also be a crucial factor in respect to aSAH recovery, given that the highest incidence of aSAH is in menopausal women. It is also possible that those people who exhibit higher self-compassion may also be more proactive in respect to their overall recovery, yet this remains untested.

Recently, studies have sought to investigate whether there may also be a relationship between self-compassion and well-being. A German meta-analysis (*N* = 79 studies; *n* = 16,416) found that a relationship exists between self-compassion and well-being. Interestingly, the relationship between SWB and psychological well-being was stronger than the relationship between self-compassion and positive or negative affect, highlighting the important role that self-compassion plays in respect to well-being (Zessin, Dickhauser, & Garbade, 2015). This connection to well-being may also be attributed to increased health-promoting behaviours, as higher self-compassion has been found to be associated with people who exhibit proactive behaviours in respect to their health needs (Dunne, Sheffield, & Chilcot, 2016). This may indicate that people who exhibit higher self-compassion are more likely to take better care of their health by doing things such as exercising regularly, eating healthy foods and obtaining enough sleep (Dunne, Sheffield, & Chilcot, 2016).

A further meta-analysis (N = 709) investigated the role self-compassion plays in patients from differing medical populations (Fibromyalgia1 n = 319, Fibromyalgia2 n = 152, Chronic Fatigue Syndrome n = 61, Cancer1 n = 55 and Cancer2 n = 122) in respect to adherence to treatment, with results showing greater adherence to medical treatment, due to self-compassion's influence on stress reduction (r = .22, 95% CI: 0.15, 0.29) (Fibromyalgia1; Fibromyalgia2 ; Chronic Fatigue Syndrome; Cancer1; Cancer2) (Sirois & Hirsch, 2019). Supporting this view, studies have found that self-compassion is associated with improved psychological and physical well-being (Hall, Row, Wuensch, & Godley, 2013). As a result, self-compassion is viewed as an adaptive health-related cognition and positive health-related affect which is an important mechanism in protecting mental health after traumatic health-related experiences (Terry, Leary, Mehta, & Henderson, 2013). This suggests self-compassion may also play a protective role after health-related trauma. As aSAH may be viewed as a health-related trauma as well, self-compassion may be a key factor in psychological outcomes for this population, yet this remains untested. In respect to PTSD, self-compassion has an important role to play, as evidenced by an earlier exploratory study of trauma survivors (Thompson & Waltz, 2008). The study found that self-compassion was negatively related to experiential avoidance in people diagnosed with PTSD, suggesting that trauma survivors may benefit from self-compassion being incorporated into their treatment (Thompson & Waltz, 2008). Consequently, self-compassion seems amenable to change and worth further investigation due to its potential therapeutic benefits for trauma populations.

Some have posited that the individual domains of self-compassion play an integral role in recovery after trauma (Barnard & Curry, 2011). For example, self-kindness can soften self-criticism and negative self-evaluation; acceptance of one’s common humanity (i.e., ability to view their experience in the context of others who have gone through a similar event) can lessen the perceived need for behavioural withdrawal and social isolation; and mindful awareness of feelings can decrease the tendency to mentally avoid or suppress natural emotional reactions to negative events (Barnard & Curry, 2011). Consequently, self-compassion may represent a potent new resource, capable of preventing or reducing depressive symptoms and other negative psychological sequelae in the aftermath of negative life events (Barnard & Curry, 2011). Furthermore, from a physiological perspective, such an effect, if found, would result from the ability of self-compassion to reduce the activity of the threat system, as self-compassion induces self-soothing in response to negative outcomes, resulting in the activation reduction of the threat system and subsequent depressive symptoms (Johnson & O'Brien, 2013). In the same way, people who report higher levels of common humanity may also report being able to view their personal experience, in the case of an aSAH, their traumatic health threat and risk of imminent mortality, from a broader lens as well.

Further studies have investigated the relationship between self-compassion and a range of other health conditions such as chronic pain (Wren, et al., 2012) and cancer (Pinto-Gouveia, Duarte, Matos, & Fraguas, 2014). Self-compassion was found to play a protective role against the development of psychopathology and reduced QOL in people experiencing cancer (e.g., breast, lung, stomach, prostate) and chronic illnesses (e.g., asthma, cardiac conditions, arthritis and allergies) (Pinto-Gouveia, Duarte, Matos, & Fraguas, 2014). Findings suggest that those people who exhibited higher self-critical judgement experienced higher levels of depressive symptomology (Pinto-Gouveia, Duarte, Matos, & Fraguas, 2014). It appears that people who report higher self-compassion also experience less negative affect (e.g., anxiety, depression, self-blame) in respect to their health than those lower in self-compassion (Terry, Leary, Mehta, & Henderson, 2013). In addition, higher self-compassion controlled for the overall impact of illness severity, anxiety connected to health condition and meaning derived from health condition, with people reporting a higher motivation to exhibit self-kindness when enduring a serious illness (Terry, Leary, Mehta, & Henderson, 2013).

Self-compassion has been found to play other interrelated roles between health-related variables, with one recent Australian study of breast cancer survivors (N = 82) finding that SC (M = 3.46, SD = .57) mediated the relationship between anxiety, avoidance and stress (B = 0.86, SE = .46, 95% CI[10]: LL = 0.033, UL =

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[10] CI- Confidence interval; LL – Lower level; UL- Upper level

1.81) and the negative impact of the condition (*B* = 0.16, *SE* = 0.06, 95% CI: LL = 0.05, UL = 0.29) (Arambasic, Sherman, & Elder, 2019). A further study investigated the indirect effect of coping styles between self-compassion and stress in people living with two chronic illnesses, inflammatory bowel syndrome (*n* = 155) and arthritis (*n* = 164) (Sirois, Molnar, & Hirsch, 2015). The study found that self-compassion was associated with a reduction in stress level via the indirect effects of positive reframing and active coping in both populations.

The only previously conducted compassion-related study that has utilised a stroke population investigated the role of compassion-focused therapy as an intervention during the recovery process in ABI patients (Ownsworth, & Fleming 2011). Like self-compassion, the theory underpinning compassion-focused therapy is based on a model of affect regulation that evolved from social evolutionary and neurophysiology approaches. A key premise of compassion-focused therapy is that emotional regulation difficulties (e.g., self-criticism and worry) activate and are maintained by the threat system and can be reduced by stimulating the soothing-contentment system to produce positive emotions (e.g., self-compassion and calmness). Preliminary data supported the efficacy of compassion-focused therapy for improving mental health and self-esteem in these patients (Ownsworth & Fleming, 2011; Kirby, Tellegen, & Steindl, 2017). It is possible that aSAH patients may also experience a similar level of emotional regulation concerns.

Self-compassion has also been found to be positively related to social connectedness (Barnard & Curry, 2011), partially mediating the relationship between SWB and social support (Jeon, Lee, & Kwon, 2016). Social connectedness in the form of social support is regarded as a vital element for successful recovery after illness (Joseph, 2012). Furthermore, social support has been found to play a vital role in the development of PTG (Prati & Pietrantoni, 2009). Despite these previously reported benefits, self-compassion has not been investigated in people who have experienced an aSAH, nor been extensively investigated as a possible predictor for the development of PTG. Clearly, the potential role of self-compassion during the recovery period after an aSAH needs further investigation. Along with self-compassion, other factors, including the ability to obtain support, may be important in the context of recovery after an aSAH, but this remains unclear.

1.10. Social Support

Social support is defined as the physical, emotional and practical support provided by an individual's significant others after a traumatic event (Nolen-Hoeksema & Davis, 1999). Social support posits that having others in your life who provide care and help during difficult life events influences positive physical, psychological and social health outcomes (Taylor, 2011). Wills and Shinar (2000) highlight different dimensions of social support as emotional support (listening, caring, acceptance), instrumental care (practical help), informational care (providing knowledge to help solve problems), companionship (socialising, belonging) and validation (feedback, social comparison). Subsequently, social support is regarded as a beneficial coping mechanism after emotional distress, which allows for the finding of meaning after traumatic events (Tedeschi & Calhoun, 1996). Furthermore, social support has been found to be positively related to the ability to successfully cope and adjust after trauma (Nolen-Hoeksema & Davis, 1999). In fact, social support has been regarded as a critical factor in helping people to recover after trauma (Rendon, 2015). This is attributed to the fact that when individuals are able to share their ‘story’ within a supportive social context, it provides an opportunity to integrate the trauma into their new life narrative, obtain affirmation and support from loved ones and cognitively process the event (Tedeschi & Calhoun, 2004b).

Of the limited literature that exists investigating social support and its relationship with PTG, findings appear to suggest that social support is an important factor in the development of PTG (Scrignaro, Barni, & Magrin, 2011). A previous study of vicarious trauma in nurses (*N* = 135) found that social support was positively related to PTG, most notably when they felt that they were able to talk about their traumatic experience (Mairen, 2016). This has been attributed to the fact that social support aids in the ability to cognitively process the aftermath of trauma via the mechanism of self-disclosure, in turn promoting the deliberate rumination and rebuilding of shattered assumptions required to develop PTG (Calhoun & Tedeschi, 2013; Tedeschi & Calhoun, 2004b; Lindstrom, Cann, Calhoun, & Tedeschi, 2013).

The ability to self-disclose with others who have experienced a similar trauma may also provide hope. A study of cancer patients found that cognitive processing was impeded in those who did not have the opportunity to verbally process their illness with family and friends (Cordova, Cunningham, Carlson, & Andrykowski, 2001). A further study utilised regression analyses to investigate whether social support predicted PTG in female cancer patients (*N* = 206) (mean age 61.9 years) in the three months post initial diagnosis (Schroevers Helgeson, Sanderman, & Ranchor, 2010). The study found that those people who received social support reported also experiencing PTG, suggesting the importance of social support (i.e., in the form of meaning, reassurance and problem-solving) in predicting positive psychological gains after cancer diagnoses (Schroevers, Helgeson, Sanderman, & Ranchor, 2010). Similarly, people who were able to share their traumatic experience with others reported higher levels of PTG as compared to those that were unable to do so (Taku, Tedeschi, Cann, & Calhoun, 2009).This finding suggests the ability to self-disclose one's personal experience after cancer may provide a valuable opportunity to obtain valuable emotional support and relieve any pre-existing fears one may be living with in respect to a cancer diagnosis. Furthermore, an Australian review and meta-analysis (*N* = 116) of studies published between 1990 and 2012 investigated PTSS and PTG in oncology patients (Shand, Cowlishaw, Brooker, Burney, & Ricciardelli, 2015). Results found that PTSS was associated with depression (*r* = 0.56), anxiety (*r* = 0.65), social support (*r* = –0.33) and QOL (*r* = –0.44) and PTG was associated with social support (*r* = 0.30) and depression (*r* = –0.06). These findings suggest that the development of PTG is associated with social support and appears to be an important factor in predicting PTG while living with cancer diagnoses and treatment. This may also be the case for people who have experienced an aSAH, however this is yet to be determined. Additionally, PTG has been found to be associated with increased social support, spirituality and the utilisation of adaptive coping strategies in women experiencing breast cancer (Danhauer, et al., 2013) and HIV (Kamen, et al., 2016). Therefore, social support seems to play an important role in respect to the development of PTG. Similarly, a previously conducted U.S. longitudinal study (*N* = 173) found that social support predicted PTG in women experiencing breast cancer (McDonough, Sabiston, & Wrosch, 2014). Social support, which was specifically targeted to the breast cancer experience, was found to be a greater predictor of PTG, as compared to general social support, which did not specifically involve disclosure of the cancer experience (McDonough, Sabiston, & Wrosch, 2014). This may also be an important factor during recovery after an aSAH, with social support playing a similar predictive role in the development of PTG, but this remains unclear.

Currently, social support has not been specifically investigated in aSAH patients; rather, it has been studied in respect to ischaemic stroke outcomes. Social support has been found to be an important factor in physical (e.g., functional) and psychological (e.g., cognitive resilience) recovery after stroke (Cookson & Casey, 2013; Glymour, Weuve, Fay, Glass, & Berkman, 2008). In addition, duration of recovery may also be reduced due to the influence of social support (Cookson & Casey, 2013). Social support has been found to achieve these outcomes due to its ability to reduce stressors affecting people during recovery, particularly on discharge from the inpatient setting (Cookson & Casey, 2013). In addition, people reported positive benefits from social support in the form of peer groups (i.e., stroke survivors) and from being encouraged to set goals and plan for the future (Pearce, et al., 2015).

Social support has also been found to play a protective role against the development of mood disorders such as depression during stroke recovery (Volz, Mobus, Letsch, & Werheid, 2016). A recent meta-ethnographic review investigated the impact of stroke on social support and social networks (k = 70, N = 4816) (Northcott, Moss, Harrison & Hilari, 2016). The review comprised both qualitative and quantitative studies. Findings suggested that social networks reduced an individual’s feelings of vulnerability and increased feelings of being valued, loved, accepted, understood and cared for. Furthermore, social support has been found to be positively related to HRQOL in a previously investigated systematic review of stroke survivors (*N* = 11); however, results needed to be viewed with caution due to the high number of cross-sectional studies, and potential for confounding variables such as employment status and educational attainment, which may impact well-being findings (Kruithof, Van Mierlo, Visser-Meily, Van Heugten, & Post , 2013). Domains of HRQOL found to be positively influenced by social support were increased social participation, independence and strengthened interpersonal relationships. Conversely, studies have found that poor social support resulted in the experience of psychopathology (e.g., depression), lower QOL and negative recovery outcomes (e.g., increased disability, increased vulnerability, reduced social participation) (Northcott, Moss, Harrison, & Hilari, 2016).

It is also apparent that types of social support may also be important in recovery outcomes. For example, social support in the form of peer support has been found to be beneficial in stroke survivors (Kessler, Egan, & Kubina, 2014), with a number of positive influences on recovery being experienced including feeling validated, motivated, encouraged and less isolated in respect to their stroke experience (Kessler, Egan, & Kubina, 2014).

This section discussed the association of negative psychological outcomes and predictors of PTG in respect to psychological recovery after stroke-related disorders such as aSAH. It is now essential to consider how these factors interrelate for PTG to play a psychologically protective role after an aSAH.

1.11.Post-traumatic Growth as a Protective Factor

1.11.1. Trauma and Positive Psychological Outcomes

To date most of the empirical investigation pertaining to PTG has considered the independent influence of the concept. PTG was initially conceptualised as a potential outcome after the experience of trauma. However, PTG may also act as a protective buffer with the potential to moderate the relationship between post-traumatic symptomology and negative psychological outcomes such as depression. Previous research has sought to discover whether there is a potential for a traumatic life experience to also induce a positive psychological outcome. Some posit that investigating the moderating effects, particularly in respect to health outcomes, provides evidence as to the coping mechanism that may be having a causal effect on positive outcomes (Aldwin, 1994). Most previous research has focused on the existence and predictors of PTG in different populations, rather than any other psychologically beneficial protective role it may play. However, more recently studies are emerging that reveal that PTG may provide an important psychological buffer in its relationship between traumatic stress and psychopathology.

1.11.2. Post-traumatic Growth as a Psychologically Protective Factor

An earlier study investigated the role of PTG as a buffering mechanism that may protect breast cancer patients from the impact of PTSS related to their condition (Morrill, et al., 2008). Researchers believed that PTG would also demonstrate a positive reinterpretation of participants’ breast cancer experiences, and this in turn would reflect in their overall well-being. As previously discussed, the ability to reappraise a traumatic event and reintegrate it into existing schemas as well as derive meaning are important factors that contribute to the development of PTG. Findings suggested that PTG did moderate the relationship between PTSS, depression and QOL. PTG was found to have a positive association with PTSS. This finding also supported the notion that it is possible for PTG and PTSS to occur concurrently (Cordova & Andrykowski, 2003; Tedeschi & Calhoun, 2004a). Another study found that PTG provides a protective mechanism against stigma and psychological impacts of smoking cessation in lung cancer survivors (Shen, et al., 2015), supporting earlier findings that PTG provides a protective buffer in respect to psychological adjustment (Aldwin, 1994). It appears that comparatively, for those people who were able to find positive benefits after trauma, psychological distress also reduced over time. Conversely, those people who were unable to find positive benefits tended to experience increased psychological distress over time (Aldwin, 1994). Comparatively, another study of Oslo bombing survivors (*N* = 197) concluded that PTG served more of an adaptive function, rather than serving as a protective factor against psychological distress (Blix, Hansen, Birkeland, Nissen, & Heir, 2013).

Perhaps PTG develops differently dependent upon the type of traumatic experienced. For example, there may be a difference in the development of PTG caused by a discrete traumatic event, as compared to an acute medical trauma with ongoing symptoms such as aSAH. Not enough is currently understood in relation to how PTG develops in the wake of a medical trauma such as an aSAH. Further investigation is required to better understand the role that PTG plays in buffering negative psychological outcomes after an aSAH.

It is important to understand whether people who have experienced an aSAH also, as a result, experience PTG. In addition, it is important to investigate the role that

PTG plays in protecting people from developing disorders such as depression and from experiencing reduced SWB after an aSAH. Further investigation of the relationships between these negative psychological outcomes and the potential for PTG to play a protective role against the development of negative psychological outcomes is vital in order to improve our understanding of the recovery experience after an aSAH. It can be posited that these protective factors form a framework that is aligned with the concept of PTG. PTG may play a protective factor with essential components that improve recovery outcomes; however, this has not been previously investigated in this population. Furthermore, this study of aSAH outcomes provides a valuable opportunity to add to this relatively new line of enquiry by exploring the role of PTG in a new population.

1.12. Gaps in the Literature

This study will address limitations of the previous literature by examining whether people who have experienced an aSAH also have a traumatic experience which results in the development of PTG. Based on previous findings and given the importance of the psychologically protective role that PTG has played for other patient populations, this study will also investigate the moderating role of PTG in people who have experienced an aSAH. The transformational model of PTG that will be utilised for this study incorporates mechanisms such as social support, which plays an important role in trauma recovery, and may subsequently also play a valuable role after aSAH. Similarly, few studies have investigated the potential for PTG to act as a psychological buffer to negative psychological outcomes such as depression, PTSS and reduced SWB. Subsequently, the findings of this study may further extend the view of PTG beyond current conceptual models and understanding, as the literature is growing in respect to PTG's existence as an important coping mechanism in recovery after critical illness. Therefore, it is important to understand what role PTG plays in the recovery process.

Furthermore, previous research has not exclusively investigated unique aspects such as self-compassion and post-traumatic growth that may well be playing a role in psychological recovery after an aSAH. As such, this will be the first study to comprehensively investigate these combined aspects in this population. Conversely, previous studies have only investigated specific aspects of recovery after an aSAH such as psychosocial adaptation (Powell, Kitchen, Heslin, & Greenwood, 2002), recovery (Greebe, Rinkel, Hop, Visser-Meilly, & Algra, 2010), HRQOL (Hedlund, Zetterling, Ronne-Engstrom, Ekselius, & Carlsson, 2010a), depression (Kreiter, et al., 2013) and PTSD (Noble, et al., 2008). Similarly, there has not been any previous research investigating self-compassion and social support in this population. SWB has been found to be a predictor of PTG in people who had experienced a range of life traumas (Wild & Paivio, 2004). Therefore, it may also be possible that SWB also has a relationship with PTG in people who have experienced an aSAH; however, this remains unclear. As discussed earlier, people who survive an aSAH can experience a myriad of different recovery outcomes, dependent upon factors such as location of the ruptured cerebral aneurysm and treatment received. Therefore, SWB may also be negatively influenced due to a person's aSAH experience. Furthermore, people may be able to derive positive psychological and well-being outcomes after an aSAH, yet this is currently not well understood and requires further investigation.

In addition, there have been limited qualitative studies investigating PTG and self-compassion, in this population. As a result, a final qualitative study will be included to explore the unique recovery experiences of people with a view to uncovering unique themes pertaining to psychological recovery. This study will assist to elaborate on existing understanding of the experiences of an aSAH and subsequent recovery. Consequently, findings from this research may have the potential to build on existing knowledge in respect to PTG and self-compassion and the currently limited research pertaining to aspects of psychological recovery after an aSAH. It is also envisaged that the findings from this study may contribute towards knowledge contributing to an illness-specific experience of PTG and self-compassion pertaining to aSAH.

1.13. Rationale and Conceptualisation of Present Study

The overall aim of this study is to address the lack of empirical research in respect to the role that PTG plays after an aSAH. The transformational model has been posited as the most comprehensive conceptualisation of PTG; however, there is limited empirical evidence in respect to aSAH recovery to support this view. This study will provide a partial test of this model. This model may provide a more comprehensive explanation of the role of PTG after cut-off medical conditions such as an aSAH. As previously discussed, PTG has been investigated in respect to various large scale traumatic disasters (i.e. 9/11) (Park, Riley, & Snyder, 2012) and bereavement (Michael & Cooper, 2013) as well as a range of medical conditions including burns (Askay & Maygar-Russell, 2009), HIV AIDS (Sawyer, Ayers, & Field, 2010) and cancer ((Ben-Zur, Cohen, & Gouzman, 2015). However, there has only been one previous study investigating PTG in ischaemic stroke patients (Gangstad, Norman, & Barton , 2009). In addition, a few small-scale qualitative studies have investigated PTG in ABI patients, of which one or two participants had experienced stroke-related disorders (McGrath & Linley, 2006). Subsequently, there does not appear to be any previous research that has explored PTG in people who have experienced an aSAH. This study will also investigate the potential for PTG to act as a moderating or protective factor, after a medical illness, which to date, has only ever been investigated in breast cancer patients (Morrill, et al., 2008). In addition, the relationship between PTSS, PTG and the outcome measures of depression and SWB will also be investigated. Consequently, this study will seek to determine:

- if PTG is experienced by people who have suffered an aSAH
- if Self-compassion and Social support predict PTG after an aSAH
- if PTG moderates the relationship between PTSS and psychosocial outcomes (depression, SWB).

Furthermore, a qualitative study will be conducted in order to explore individuals' recovery experiences.

1.14. Research Questions

1. Do people experience PTG after an aSAH?
2. Do emotional regulation factors such as Self-compassion and Social support predict the development of PTG after an aSAH?
3. What is the relationship between PTSS, depression and SWB?
4. Does PTG moderate the relationship between PTSS and depression? And PTSS and SWB after an aSAH?
5. Does Self-compassion moderate the relationship between PTSS and depression? And PTSS and SWB after an aSAH?
6. What is the experience of recovery like after an aSAH? How do people experience PTG and Self-compassion after an aSAH?

1.15. Research Hypotheses

It will be hypothesised that:

1. Consistent with the Transformational model, Self-compassion and Social support are positively related to Post-traumatic growth in people who have experienced an aSAH.
2. Post-traumatic stress is negatively related to Subjective well-being in people who have experienced an aSAH.
3. Post-traumatic stress is positively related to Depression in people who have experienced an aSAH.
4. Post-traumatic growth moderates the relationship between post-traumatic stress and Subjective well-being in people who have experienced an aSAH.
5. Post-traumatic growth moderates the relationship between Post-traumatic stress and Depression in people who have experienced an aSAH.
6. Self-compassion moderates the relationship between Post-traumatic stress and Depression in people who have experienced an aSAH.
7. Self-compassion moderates the relationship between Post-traumatic stress and Subjective well-being in people who have experienced an aSAH.

Chapter 2: Methodology

2.1. Introduction

Two studies were utilised in order to investigate the research questions in this thesis. These studies comprised both quantitative and qualitative research approaches. This chapter will discuss the theoretical underpinnings of these studies followed by the method employed in both studies.

2.2. Theoretical Perspective

A pragmatic position was utilised as the ontological and epistemological framework for this study. John Dewey, one of the first American philosophers to contribute to the pragmatic paradigm, stated that “all modes of experience are equally real” (Biesta, 2010, p. 107). This means that both the positing of hypotheses (i.e., studying quantifiable populations) and the experience of an individual (i.e., subjective approaches to research) are viewed as equally important. As such the ontological view of pragmatism posits that there can be both “singular and multiple realities” (Creswell & Clark, 2011, p. 42). As a result, an abductive stance (i.e., determining the best explanation) embodies a pragmatic approach (Johnson & Gray, 2010, p. 71). Pragmatism is considered to embody a flexibility which allows for movement between positivism and constructivist approaches. Consequently, pragmatism supports the combined viewpoints of positivism and constructivist epistemologies and is therefore consistent with the methodology proposed for this research which will allow for a comprehensive investigation. Pragmatism is viewed as pluralistic and more focused on what works for the issue being investigated rather than the importance of the methods utilised (Creswell & Clark, 2011).

The pragmatic research process is focused on intersubjectivity, which refers to a shared responsibility for knowledge, communication and shared meaning making, acting and thinking (Greene & Hall, 2010, p. 132; Shannon-Baker, 2016). Inferences taken from data in pragmatic research stipulate the need for transferability, which refers to the fact that findings should be transferable to other contexts (Morgan, 2007). Furthermore, the pragmatic lens also posits that research should provide a “valuable external consequence”. This is especially important in areas of research that investigate medical and psychological disorders. Consequently, health psychologists have recognised that pragmatism can provide an important lens through which to examine specific aspects that relate to health conditions (Bishop, 2015, p. 7).

Pragmatism posits that an individual is the “central ‘actor’ living and engaging with a bio-physical, socio-cultural and subjective world” (Hjørland, 1997, pp. 58-59). By engaging with the world in this manner, a priori knowledge is assumed and simultaneously constructed. This knowledge becomes part of the “acting system” subsequently functioning as an “internal action determinant” (Hjørland, 1997, pp. 58-59). Pragmatism acknowledges the continual interaction between knowledge and action, which provides an individual with the impetus to influence future action (Hjørland, 1997). This may be important in respect to the multiple determinants involved in recovery after an aSAH[11] and consequently the aspects

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[11] aSAH – Aneurysmal subarachnoid haemorrhage

being investigated in this research (i.e., social support, self-compassion, post-traumatic stress, depression, subjective well-being, individual recovery experience/s and post-traumatic growth). The recognition that multiple factors (i.e., both objective and subjective) influence a person's experience and recovery after an aSAH demonstrates that a pragmatic lens provides the most appropriate theoretical framework in which to conduct this study.

Additionally, from an axiological standpoint, researchers may be both biased and unbiased in their approach and employ a rhetoric that embodies styles of writing that incorporate both the informal and formal (Creswell & Clark, 2011). This means that pragmatism provides the epistemological foundation that allows for the empirical and narrative 'story' of the participant to be explored and scribed in a flexible way. Pragmatism achieves this aim due to its ability to offer a means of exploration of the reality of a person who has experienced an aSAH.

A comprehensive pragmatic standpoint (i.e., emphasising the importance of multiple realities and the impetus of internal determinants towards future action) fits well with the transformational (Tedeschi & Calhoun, 2004a) theoretical framework of PTG that will be adopted for this study. Transformational theory allows for an extensive investigation of multiple factors (i.e., biological, psychological and social) that may significantly influence participant experiences of recovery after an aSAH. Transformational theory is also recognised as one of the most comprehensive of the established theories underpinning PTG. Transformational theory of PTG posits that positive psychological growth is the result of biological, psychological and social changes in an individual as a result of a traumatic experience (Tedeschi & Calhoun, 2004a). Transformational theory also acknowledges the necessity of a ‘shattering’ of pre-existing cognitive assumptions that occurs after the experience of trauma.

Given that stroke-related disorders such as aSAH occur rapidly and often without warning, it is possible that intrinsic survival and adaptive mechanisms may also be involved, yet these have not currently been thoroughly investigated in order to better understand the concept of PTG. Perhaps, in the aftermath of traumatic medical conditions, the threat and self-soothing (i.e., self-compassion) systems which are pertinent to survival play a pivotal role in the development of positive psychological growth, yet this continues to remain unclear.

2.3. Research Design

The pragmatic stance involves both an active and iterative process with the inquirer seeking actionable knowledge and assertions of “direct practical value as they are applied to new experiences” (Morgan, 2007, p. 138). This means that research needs to link its context with the participants’ lived experiences of the phenomenon being investigated with an end result that provides a practical improvement to their lives (Morgan, 2007). As previously stated, the pragmatic research lens does not ascribe to any particular methodological stance; rather, it is guided by an “action-knowledge” framework which permits the utilisation of any method that best “suits the situation at hand” (Greene & Hall, 2010, p. 132). Designs may include the gathering of information from multiple forms and perspectives. As a result, the methodology employed is flexible, utilising whatever works best to address the problem being researched. This means that data may be collected and analysed in a variety of forms including personal interviews and surveys or questionnaires, with the researcher continually assessing the practical end value of the data utilising reflection throughout the analytic process (Tashakkori & Teddlie, 2003, p. 139; Tashakkori & Teddlie, 2010). In turn, this also allows the researcher to be aware of their own stance while working with knowledge from multiple sources in order to arrive at a workable outcome (Johnson & Onwuegbuzie, 2004).

A combination of quantitative and qualitative data was utilised in two separate studies (i.e., study one – quantitative and study two – qualitative) in order to obtain a comprehensive understanding of the problem under investigation. The two research strategies allow for the combination of the distinctive strengths of each approach, an important requirement for this study. This is because previous stroke research related to well-being has indicated that, despite the valuable and necessary findings of empirical studies, many have not been able to explain 'why' certain variables (i.e., impaired mobility or loss of independence) negatively impact well-being (Clarke, 2009, p.294). Similarly, qualitative studies are not able to be generalised due to their smaller sample sizes and do not provide valuable information around the quantities of stroke survivors who may have experienced difficulties with independence, mobility or mood, which quantitative research is able to provide (Clarke, 2009). By utilising both forms of data several issues will be addressed. Firstly, the strength and weaknesses of individual research approaches will be addressed. This means that concerns around the ability to generalise findings will be addressed by the quantitative study, which the qualitative study is not able to provide. On the other hand, the qualitative study will provide a more in-depth viewpoint of the participant's individual aSAH recovery journey, while also allowing for unique nuances (i.e., gender, demographics, diagnostic and treatment experiences and differences, feelings about recovery and impact on self and family members), and other variables that may not be revealed via psychometric measures utilised in quantitative inquiry alone. There do not appear to be any previous studies that have investigated the proposed research questions. The conceptual framework for this study utilised both positivist and constructivist perspectives. This study addressed PTG and predictors such as self-compassion and social support in people who have experienced an aSAH. The design involved collecting quantitative data first and then further exploring the questions under investigation with in-depth qualitative data. This approach is a good fit for this study as it allows for a thorough exploration of the predictors and unique aspects of the individual recovery experience in respect to a medical condition that, due to its high mortality rates, has had limited previous investigation.

In the first exploration, the quantitative study (i.e., study one), data will be collected from people who have experienced an aSAH via an online survey to partially test the transformational theory of PTG and whether self-compassion, social support and PTSS relate to depression and SWB, and if PTG plays a moderating role between these factors (see figures 3 and 4) and self-compassion and these factors (see figures 5 and 6).

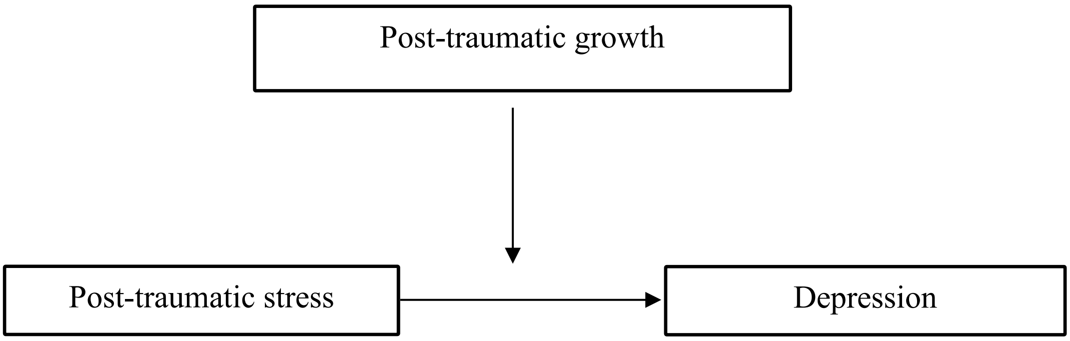

Figure 2: Model of post-traumatic growth as a moderator between post-traumatic stress and depression

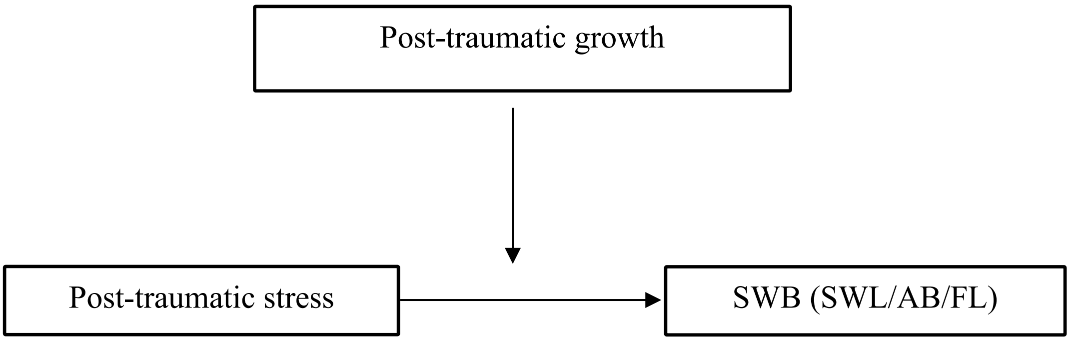

Figure 3: Model of post-traumatic growth as a moderator between post-traumatic stress and subjective well-being domains (i.e., satisfaction with life, affect balance, flourishing)

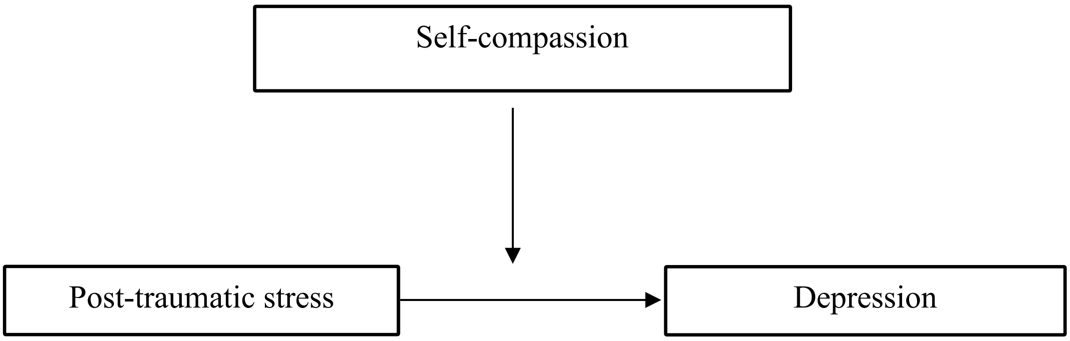

Figure 4: Model of self-compassion as a moderator between post-traumatic stress and depression

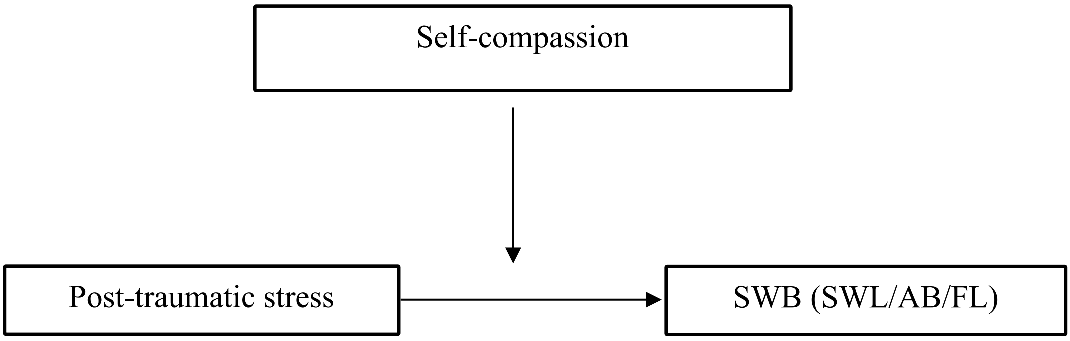

Figure 5: Model of self-compassion as moderator between post-traumatic stress and subjective well-being domains (i.e., satisfaction with life, affect balance, flourishing)

The second, qualitative study (i.e., study two) was conducted to help explore unique aSAH recovery experiences further. This study is important as the individual nuances that will be obtained from each individual participant are difficult to obtain via empirical investigation solely. In this exploratory follow-up, unique recovery experiences including whether self-compassion and PTG has been experienced were obtained via face-to-face or telephone interview.

2.4. Study One: Quantitative Study

2.4.1. Exploring Predictors and the Role of PTG after an aSAH

This study investigates predictors (i.e., self-compassion and social support) of PTG in people who have experienced an aSAH. It will also examine the moderating role of PTG. A moderating model is one that demonstrates how a variable may affect the strength of the relationship, or direction between independent and dependent variables (Baron & Kenny, 1986). In other words, the relationship between the two variables changes as a function of a moderator variable (Baron & Kenny, 1986). The purpose of utilising a moderating design is to ascertain if the effect of the independent variable on the dependent variable changes, contingent upon the value of the moderator variable (Markland, 2000). The moderating model allows for the complexity of behaviours, experiences and relationships to be comprehensively investigated (MacKinnon, 2011). In order to test this further within the context of this study, PTG will be utilised as the moderating variable.

2.5. Study Two: Qualitative Study

2.5.1. Case Studies

A descriptive exploratory qualitative research design was utilised for this study. Qualitative research does not rely on a specific theoretical framework, but rather seeks to examine and understand experiences, meanings and events in the context of the concurrent discourse that operates within the phenomenon under examination. This allows for an exploration of an individual's views in order to construct meaning around their own unique experiences of a situation or event (Creswell & Creswell, 2018).

Comparative exploratory descriptive case studies were utilised as the method due to its compatibility with the pragmatic paradigm and its ability to describe unique variances in individual participant presentations. Yin defines a case study as "an empirical inquiry that investigates a contemporary phenomenon (i.e., the case) in depth and within the real-world context, especially when the boundaries between phenomenon and context may not be clearly evident" (2014, p. 16). Case studies support the use of multiple perspectives or information which also allows for triangulation of data sources. Case studies have been widely used in health research, most notably in medicine, and allow the researcher to investigate the wider context of a health condition on the individual’s life (Radley & Chamberlain, 2012). Subsequently, case studies are useful and relevant to other disciplines because they provide the opportunity to explore how an individual or group of people is impacted by a disorder or disease (Radley & Chamberlain, 2012, p. 391). The case study method is appropriate for inquiries that address illness as they allow for in-depth exploration and sensitivity (Radley & Chamberlain, p. 393).

Some have raised concerns around whether case studies are rigorous enough to be considered as a form of inquiry, most notably in respect to the inability to generalise findings or follow an analytic process. Some have suggested that there needs to be greater emphasis applied to systematic procedures for data analysis and strengthening of the validity to counteract these claims. Yin (2014) posits that, similar to other methodologies, case studies can utilise a number of data sources, increasing their strength; and, in respect to generalisability of findings, case studies are no different to experimental research, which “does not presume generalisability from a single study, but rather requires replicable multiple studies all arriving at the same conclusion before generalisation can be assumed” (Yin, 2014, p. 20). Further, case studies have been seen to “readily complement the use of both quantitative data, particularly in the field of clinical psychology” (Yin, 2014, p. 22).

2.6. Method: Study One - Quantitative Study

2.6.1. Participants

Participants were adults aged 18 years and above with no upper age limit applied, who had experienced an aSAH at any duration post their aSAH. Participants were recruited from English-speaking countries such as Australia, New Zealand, U.S.A., Canada and the U.K. Any participants who attempted to enter the study from outside of these geographical locations were automatically excluded by the survey (i.e., software program). Green (1991) stipulates that a minimum sample size of $N > 104$ plus the number of predictor variables is sufficient to calculate sample size for regression analyses, therefore a minimum sample size of at least 114 participants were recruited for the study. This study comprised a sample of $N = 251$.

2.6.2. Materials

In psychology research, psychometric measures provide a standardised scale from which to obtain diagnostic information about a participant. It is important that there is existing literature supporting the use of applicable measures for cohorts being studied, as without this, the measure may prove to be invalid and yield biased or inconclusive results. The psychometric measures utilised in the current study are described in the following sections.

2.6.2.1. Demographics Questionnaire

The questionnaire included questions pertaining to aSAH (i.e., presentation at hospital, location, treatment, previous mental health diagnoses prior to aSAH and post aSAH, current medication taken, number of aneurysms experienced, family members who have experienced an aSAH, if this is the first aSAH experienced, if they were aware they had a brain aneurysm prior to rupture) (refer Appendix A).

2.6.2.2. Assessment of Aneurysmal Subarachnoid Haemorrhage

Level of overall functioning due to aSAH at time of rupture and on presentation to hospital was measured by the following (refer Appendix B):

- Modified questions based on the **Glasgow Coma Scale (GCS)**

  (Teasdale & Jennett, 1974)

  Score of 1 (Good), 2 (Moderate functioning), 3 (Severely disabled) and 4 (Vegetative state). This measure has been modified by removing the score of 5 as this infers death on arrival and was not appropriate or relevant to this study.

2.6.2.3. Self-compassion

Self-compassion was measured by the following (refer Appendix L):

- **Self-compassion scale (SCS)** (Neff, 2003a)

  26 items, 5-point Likert scale, with 1 (Almost never) to 5 (Almost always). The mean score of items is how scores are calculated. Range of mean scores 1 to 5. Higher scores infer a higher level of self-compassion experienced. An overall self-compassion score was calculated for each participant by reverse coding responses to the negatively worded items comprising the self-judgement, isolation and over-identification subscales, then calculating the means for each of the six subscales and averaging the means to create a total self-compassion score (i.e., Self-Kindness- "*I try to be loving towards myself when I'm feeling emotional pain*", Self-judgement – "*I'm disapproving and judgmental about my own flaws and inadequacies*", Common Humanity – "*When things are going badly for me, I see the difficulties as part of life that*

everyone goes through", Isolation – *"When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world",* Mindfulness – "*When something upsets me I try to keep my emotions in balance",* Over-identification- "*When I'm feeling down I tend to obsess and fixate on everything that's wrong")*. Cronbach's alpha = .92. Individuals who report higher levels of self-compassion would be more likely to report that they were as kind to themselves as they were to others. A total mean SC score of 3 and above was deemed as the cut-off for experiencing SC in this study, as recommended by Neff (2003a) as this represents the average score.

2.6.2.4. Social Support

Social support was measured by the following:

- **Medical Outcome Study: Social Support Survey (MOS-SS)**

  (Sherbourne & Stewart, 1991) (refer Appendix K)

  19 items, 5-point Likert scale, with 1 (None of the time) to 5 (All of the time). Higher scores pertain to a higher level of social support experienced. The MOS-SS (Sherbourne & Stewart, 1991) is a self-reporting scale, designed to measure the perceived availability of functional social supports. It was initially developed for use in a longitudinal research study of patients with chronic conditions and has been used in people with stroke. The main focus of the MOS-SS is the 19 items representing five dimensions of functional social support: (i) emotional support (4 items) (i.e., "*Someone you can count on to listen to you when you need to talk")*, (ii) informational support (4 items) (i.e., " *Someone to give you good advice about a crisis")*, (iii) tangible support (4 items) (i.e., *"Someone to help you if you were confined to bed")*, (iv) affectionate support (3 items) (i.e., "*Someone who shows you love and*

affection"), and (v) positive social interactions (4 items) (i.e., "*Someone to have a good time with")*. An additional two items provide contextual background (i.e., "*Someone to do things with to help you get your mind off things").* These structural support items (marital status and number of people in whom the person can confide) are not scored. Responses for the 19 functional items are made on a 5-point scale: 1 (None of the time), 2 (A little of the time), 3 (Some of the time), 4 (Most of the time), 5 (All of the time). Cronbach's alpha = .97.

2.6.2.5. Post-traumatic Growth

Post-traumatic growth was measured by the following (refer Appendix M):

- **Post-traumatic Growth Inventory (PTGI)** (Tedeschi & Calhoun, 1996) 21 items, 6-point Likert scale, with 0 (I did not experience this change as a result of my crisis) to 5 (I experienced this change as a result of my crisis). Scores range from 21 to 105. The self-reported measure which was modified to ask participants to provide responses in the context of their aSAH experience, comprises five sub-domains: new possibilities (i.e., " *I developed new interests")*, relating to others (i.e., "*I more clearly see that I can count on people in times of trouble")*, personal strength (i.e., "*I have a greater feeling of self-reliance")*, spiritual change (i.e., "*I have a better understanding of spiritual matters")* and appreciation of life ("*I changed my priorities about what is important in life")*. A total score was utilised instead of sub-scores for this study. Scores of 55 and above were regarded as achieving a higher level of post-traumatic growth. Cronbach's alpha = .90.

2.6.2.6. Post-traumatic Stress

Post-traumatic stress symptomology was measured by the following (refer Appendix J):

- **Impact of Event Scale – Revised (IES-R)**

  (Horowitz, Wilner, & Alvarez, 1979; Weiss & Marmar, 1996)

  23 items, 5-point Likert scale, with 0 (Not at all) to 4 (Extremely) for how distressing each item has been during the past week. This self-reported measure which was modified to ask participants to provide responses in the context of their aSAH experience assesses the level of post-traumatic stress symptomology experienced in the past seven days. This measure comprises three sub-scales: hyperarousal (i.e., "*I felt irritable and angry")*, avoidance (i.e., "*I avoided letting myself get upset when I thought about it or was reminded of it")* and intrusion (i.e., "*Any reminder brought back feelings about it")*. A score of 33 or above is regarded as a clinically significant score for PTSS. Cronbach's alpha = .90 (Weiss & Marmar, 1996; Creamer, Bell, & Failla, 2003).

2.6.2.7. Depression

Depressive symptomology was measured by the following (refer Appendix N):

- **Center for Epidemiological Studies Depression Scale – Revised (CESD-R)**

  (Radloff, 1977; Eaton, Smith, Ybarra, Muntaner, & Tien, 2004)

  20 items, 5-point Likert scale, with 0 (Not at all or less than 1 day) to 4 (Most or all of the time / Every day for the past two weeks). Items 4, 8, 12 and 18 are reverse scored (i.e., "*I was bothered by things that usually don't bother me")*. This self-reported measure asks respondents to rate how often over the past

week they have experienced symptoms associated with depression, such as restless sleep, poor appetite and feeling lonely. Scores range from 0 to 60, with high scores indicating greater depressive symptoms. The CESD-R provides a cut-off score (16 or greater) that aids in identifying individuals at risk for clinical depression, with good sensitivity and specificity and high internal consistency. Cronbach's alpha = .82 (Lewinsohn, Seeley, Roberts, & Allen, 1997).

2.6.2.8. Subjective Well-being

Three domains of subjective well-being were measured by the following:

- **Scale of Positive and Negative Experience (SPANE)**

  (Diener, et al., 2009) (refer Appendix O)

  12 items, from 1 (Very rarely or never) to 5 (Very often or always) for the following: positive, negative, good, bad, pleasant, unpleasant, happy, sad, afraid, joyful, angry, contented. Provides three sub-scores: positive, negative, and balance between positive and negative scores. Scores can reflect a negative (i.e., negative affect) or positive (i.e., positive affect) score between –24 and +24. The lower the score the lower the level of affect experienced and the higher the score the more (i.e., negative/positive) affect experienced. The measure can be used to derive an overall affect balance score, which was the score utilised for this study. For positive feelings (SPANE-P), add the scores, varying from 1 to 5, for the six items: positive, good, pleasant, happy, joyful and contented. The score can vary from 6 (lowest possible) to 30 (highest positive feelings score). For negative feelings (SPANE-N), add the scores, varying from 1 to 5, for the six items: negative, bad, unpleasant, sad, afraid and angry. The score can vary from 6 (lowest possible) to 30 (highest negative

feelings score). For affect balance (SPANE-B), which was only utilised in this study, the negative feelings score is subtracted from the positive feelings score, and the resultant difference score can vary from –24 (unhappiest possible) to 24 (highest affect balance possible). A respondent with a very high score of 24 reports that she or he rarely or never experiences any of the negative feelings, and very often or always has all of the positive feelings. SPANE-P (positive; 6 items) – Cronbach's alpha = .87, range 6–30. SPANE-N (negative; 6 items) – Cronbach's alpha = .81, range 6–30. SPANE-B (affect balance; 12 items) – Cronbach's alpha = .89, range –24–24 (Diener, et al., 2009).

- **Satisfaction with Life Scale (SWLS)**

  (Diener, Emmons, Larsen, & Griffin, 1985) (refer Appendix P)

  5 items, 7-point Likert style response scale, with 1 (Strongly disagree) to 7 (Strongly agree) for the following items: "*In most ways my life is ideal", "The conditions of my life are excellent*", "*I am satisfied with my life*", "*So far I have gotten the important things I want in life", " If I could live my life over, I would change almost nothing*". This self-reported measure assessed the level of overall life satisfaction experienced. Lower scores reflect a lower level of life satisfaction and higher scores a higher level of life satisfaction experienced. The possible range of scores is 5–35, with a score of 20 representing a neutral point on the scale. Scores between 5 and 9 indicate the respondent is extremely dissatisfied with life, whereas scores between 31 and 35 indicate the respondent is extremely satisfied. Cronbach's alpha = .89 (Pavot & Diener, 2008).

- **Flourishing Scale (FS)** (Diener, et al., 2009) (refer Appendix Q)

  8 items, 5-point Likert scale, with 1 (Strong disagreement) to 5 (Strong agreement). The range of scores is from 8 (lowest possible) to 56 (highest possible). This self-reported measure assesses the level of psychological flourishing a person is currently experiencing (i.e., self-perceived success in important areas such as relationships, self-esteem, purpose and optimism) (Diener, et al., 2009) (i.e., " *I lead a purposeful and meaningful life").* The scale generates a single score reflective of a person's psychological well-being. A high score represents a person with many psychological resources and strengths. Responses vary from 1 to 5, for all 8 items. Cronbach's alpha = .87 (Diener, et al., 2009).

2.6.2.9. Health-related Quality of Life

In order to assess level of impairment after an aSAH, so that the individual level of impairment can be accounted for in the prediction models, the following measure has also been included.

- **Quality of Life after Brain Injury (QOLBRI)**

  (Von Steinbuchel, et al., 2010b) (refer Appendix I)

  This self-reported measure provides an overall health related QOL factor, and this is captured by a total QOLBRI score (Von Steinbuchel, et al., 2010b). The measure comprises 37 items, with six sub-scales. Cognition (i.e., "*How satisfied are you with your ability to concentrate, for example, when reading or keeping track of a conversation?"),* self (i.e., "*How satisfied are you with your level of energy?"),* daily life and autonomy (i.e., " *How satisfied are you with the extent of your independence from others?"),* and social relationships (i.e., " *How satisfied are you with your ability to feel affection towards others, for example your partner, family, friends?")*are on a 5-point Likert scale, with 1 (Not at all satisfied) to 5 (Very satisfied). The next two sub-scales, emotions (i.e., " *How bothered are you by feeling lonely, even when you are with other people?")*and physical problems (i.e., "*How bothered are you by slowness and/or clumsiness of movement?")*, are also on a 5-point Likert scale (reverse scored) with 1 (Very bothered) to 5 (Not bothered at all). Scores range from 37 to 185. The QOLBRI total score has good internal consistency (Cronbach's alpha = .95) (Von Steinbuchel, et al., 2010b). A higher score in this measure is commensurate with a greater level of overall HRQOL[12].

2.6.3. Procedure

An online study was chosen due to ease of convenience for participants, as it is well known that after an aSAH people experience extreme fatigue (Kutlubaev, Barugh, & Mead, 2012). The online study allowed participants to save responses and sign back in, should they tire or require longer time to complete the measures and an expiry duration of 6 months was allowed for full completion of survey. Therefore, the utilisation of an online survey allowed participants to access and participate in the study at their own convenience, in their own home. In addition, this mode of delivery allowed participants to be recruited from different geographical locations within Australia and in other predominantly English-speaking countries worldwide such as the U.K., U.S.A., Canada and New Zealand. Those participants who resided outside of these selected countries were

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[12] HRQOL – Health related quality of life

automatically excluded from the study. Online studies have reported advantages including accessibility and increased distribution, vital for studies which are recruiting participants worldwide (Wright, 2005). As an alternative a paper-based questionnaire pack was also made available to participants should they prefer to utilise this in place of the online questionnaire. No participants made this request.

Participants were recruited via online advertisements within Australia and in English-speaking countries worldwide. A link to the online study was published online on Facebook and Twitter pages, and email newsletters and website news events or announcements by Australian and international stroke foundations, the Australasian Society for the Study of Brain Impairment and brain foundation websites located in Australia, the U.K. and the U.S.A. As social media platforms have been found to be an important source of information, communication and support for people who have been diagnosed with cerebral aneurysm's and aSAH (Alotaibi, et al., 2017), the online link for the study was also advertised via social media such as Facebook and Twitter to closed support groups of survivors of an aSAH and brain aneurysms. A dedicated Facebook and Twitter page was created in order to distribute the study's online link, as well as to provide ongoing study updates. Participants were provided with the contact details of the researcher in order to request a paper-based questionnaire should they prefer to participate in the study via this option. Participants were be provided with the contact details for Lifeline, Lifeline International and Befrienders worldwide in order to discuss any aspects of the study that may have caused them distress. Participants were advised that they had the right to withdraw from the study at any time.

The confidential online survey was produced utilising the Qualtrics (2009) program. As part of the demographic's questionnaire, participants were asked to provide their contact details and indicate their interest in being contacted to participate in the future qualitative interviews. All data obtained was stored on the secure Qualtrics survey system and the R drive, owned and managed by Victoria University, where it will remain for five years from the conclusion of the study.

2.6.4. Data Analysis

Descriptive statistics were performed along with correlations and standard multiple regression analyses, in order to determine the role of self-compassion and social support in predicting the development of PTG; the relationship between PTG, PTSS, depression and subjective well-being; and to test for moderation effects. In order to test for moderation effects, the interaction term for PTSS and PTG was entered into the prediction model (i.e., one model for both depression and subjective well-being for each of the three domains).

2.7. Method: Study Two - Qualitative Study

2.7.1. The Recovery Experience and Roles of PTG and Self-compassion

This qualitative study explored the recovery experiences of individual’s who had experienced an aSAH. Themes were identified utilising descriptive case studies. All case studies were “bounded” by the recovery experiences of Australian adults who had experienced an aSAH with the view to provide their unique and independent perspectives (Yin, 2014, p. 203; Merriam, 1992). A variety of participant experiences were explored across age ranges, gender, number of aneurysms experienced, and those continuing to live with unruptured brain aneurysms.

2.7.2. Participants

A small sample of $N = 6$ participants was recruited in order to provide sufficient data for this phase of the study. The minimum recommended sample size for multiple case studies is between three and five participants (Creswell, 2007) with Guest, Bunce and Johnson (2006, p. 78) positing that meta-themes and saturation may be achieved by utilising a minimum of 6 cases. An additional question at the conclusion of the online quantitative study requesting provision of contact details if interested in participating in the next phase was included in order to recruit participants. Four respondents indicated that they would be willing to participate in the second study, however only three participants eventually consented on follow up via phone. As a result, a further three participants were recruited via online advertising of the study via social media private patient groups. These additional participants were not participants in the first study. On initial phone discussion each participant was screened to ensure that the met the established study criteria being an Australian adult who has experienced an aSAH. This sample size was chosen in order to explore a variety of unique participant experiences of people recovering from an aSAH. Participant differences included gender, age, number of aneurysms, treatments received, geographical locations, multiple aSAH experiences and continued monitoring for additional unruptured brain aneurysms.

2.7.3. Materials

A semi-structured interview (Willig, 2013) schedule was constructed for the purposes of the qualitative study. Participants who had previously been involved in the initial quantitative study and had indicated their interest in taking part in the second study were interviewed along with others that were recruited from the community. As this population had not previously been extensively investigated it was anticipated that the qualitative investigation would elaborate on the initial survey results in order to provide a more comprehensive perspective of the recovery process and experiences of this population. The overall aim of interviews was to investigate participants' lived experience of recovery after an aSAH and how PTG and self-compassion may be experienced as part of that process.

2.7.4. Interview Schedule

Interview questions were devised in order to explore the experience of an aSAH and subsequent recovery. Questions including demographics for those participants who did not complete the online questionnaire such as age, relationship and employment status. Further questions explored aSAH from first symptoms, arrival at hospital, receiving diagnosis, treatment, impact on others and self through to current functioning. Where necessary, additional questions were asked about mood, positive reflections on experience and level of kindness towards self (see Appendix S).

2.7.5. Procedure

Interviews were scheduled via phone once participants had returned their signed consent forms, at which time interview locations were also designated. Semi-structured interviews were subsequently conducted either in public locations near the participants' homes or at the university campus or via telephone. A series of open-ended questions was asked over a duration of approximately one hour. Content domain was loosely directed by the results of the quantitative phase of the study and other domains focused on aspects of the recovery experience after an aSAH. All interviews were audiotaped and transcribed verbatim. To protect participant identity all participants were assigned a pseudonym prior to audio recording, and this was utilised in all written transcripts as an identifier.

2.7.6. Informed Consent and Ethical Considerations

Informed consent was obtained from all participants prior to their involvement with the study. A plain language statement and consent form (see Appendix B) were either emailed or posted to each participant who had indicated their desire to participate in the study. Those participants who partook in the qualitative study were required to sign and return the paper-based consent form prior to interview being scheduled. Participants were free to withdraw from the study at any time and were provided with support options should participation in the study cause any discomfort. All signed paper-based consent forms from interview participants were stored in the Victoria University confidential and secure R drive. Before beginning the interview each participant was provided with a verbal overview of the study and the purpose for which it was being conducted (i.e., that it was part of a PhD thesis). Consent forms were discussed, and verbal confirmation of participation was obtained in line with previously signed document. Each participant was provided with an opportunity to ask any further questions or clarify any aspect prior to commencement of the interview.

2.7.7. Data Collection and Analysis

Interviews were conducted between October 2018 and April 2019. Three interviews were conducted in person at neutral locations including the university campus, a meeting room in a public library and a community centre. A further three interviews were conducted via telephone due to the geographical location of participants. All interviews were audio recorded and transcribed by the student researcher. The researcher immersed themselves in the data, which involved repeating several steps throughout data analysis. Transcriptions were checked for accuracy.

As recommended, descriptive statistics from survey results were utilised in order to inform case studies where possible (i.e., for those participants who had completed online survey) and assist with triangulation of findings (Creswell, 2007). As previously stated, six participants were selected in total for this study. Three had provided extensive descriptive information due to their participation in the previous quantitative study, and the remaining three were required to provide demographic information as part of their interview. Data was focused on providing an 'in depth and up close' exploration of each case and any potential links between them. Each participant's interview was written up as a case prior to analysis commencing.

Data was analysed following the exemplar for intrinsic exploratory descriptive case studies specified by Stake (1995; 2006) and Merriam and Tisdell (2016). Interview data was analysed at the conclusion of each interview. Steps were as follows:

- Exploration via multiple reading and open coding of interview transcripts with an overarching view to bound the case (Yin, 2014; Merriam & Tisdell, 2016) and ensure that the focus on phenomena connected with the recovery experience.
- Interview data was analysed utilising NVIVO 10 (QSR International Pty Ltd, 2014) to check for any recurrent elements. An audit trail was maintained

within NVIVO 10 and member checking with other research staff conducted intermittently throughout the coding process.

- Categories, themes and sub-themes were identified, tabulated and labelled from recurring patterns identified from data (Yin, 1994: 2014, Creswell, 2003). Themes and sub-themes were further investigated for the potential to derive any links to further meaning of participant's experience.
- Within-case (for *n* = 3 who provided data from the quantitative study this was also discussed and compared) and cross-case synthesis was conducted at the conclusion of all single case studies to further explore any relevant links and themes in data.
- Triangulation of data from those participants (*n* = 3*)* who provided survey responses was also drawn on throughout the analysis stage to increase validity and reliability of that analytic process and results.

Merriam states that there is "no standard format for reporting case study research", therefore findings will be displayed in their voice in a vignette form for each participant, followed by within-case and cross-case analyses (Merriam & Tisdell, 2016, p. 267). Due to the qualitative nature of the study, external validity could not be posited due to the inability to generalise findings.

2.7.8. Researcher's Position

Reflexivity is an important aspect of studies conducted within a qualitative methodology. Reflexivity allows researchers to reflect upon their position and role within the context of the research process as well as their influence upon data analysis and eventual results (Willig, 2013). It is noted that I am an Australian-born woman aged 50 years who experienced an aSAH in the posterior communicating artery with subsequent vision loss and diplopia for a period of two months in 2013, with ongoing visual impairment issues. I am also a practising clinical psychologist working in both public hospital and private practice sectors. It was during my own recovery that I became aware of the lack of understanding particularly in respect to aspects of emotional and psychological recovery in addition to physical and cognitive impairments experienced in this population. Participants were not advised of my personal aSAH experience or that I was a practising clinical psychologist until the conclusion of interview and only if they had requested further information as to why I was investigating this subject. Finally, in order to address issues of personal reflexivity, I maintained a reflective diary throughout the study to record any pertinent issues and was aware that I was able to seek external supervision as and if required, should any personal difficulties arise for me at any stage throughout the research project.

2.7.9. Summary

This chapter began with an exploration of the methodology utilised for both studies (i.e., study one- quantitative and study two - qualitative study), followed by the overall pragmatic theoretical framework employed. This concluded with details of the method used for both studies. The next chapter will present the results and discussion of the empirical findings of the first study.

Chapter 3: Results and Discussion

Data in the study comprised online questionnaire responses collected via Qualtrics (2017), which met demographic inclusion criteria (i.e., participant must reside in Australia, U.K., New Zealand, Canada or U.S.A), medical condition (i.e., has experienced an aSAH[13]), medical status (i.e., duration of time since aSAH, location of aSAH within the brain, applicable treatment received, ongoing medical complications and symptomology) and provision of informed consent. The online study was conducted for 233 days between 1/3/2017 and 19/10/2017. On average participants took three hours to complete the online questionnaire, with the most common time of day to complete the study being between 6 am and 9 am (equivalent to AEST). All results pertaining to quantitative data were analysed using SPSS Version 25 (2017) statistical computer software. Responses to all questionnaire items were transferred electronically into an SPSS data file directly from Qualtrics (2017) and scale scores were computed for multiple-item measures and sub-scale scores where appropriate. Alpha was set at 0.5 for all inferential analysis.

This chapter will present the results for the quantitative aspect of this study, as follows: a review of hypotheses being investigated; an overview of demographic data; a brief description of data screening, reliability analysis and assumption testing; a discussion of descriptive analyses and bivariate correlations (Pearson's *r* and Spearman's Rho for continuous and ordinal variables, respectively); the

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[13] aSAH- Aneurysmal subarachnoid haemorrhage

preliminary analyses that were conducted to test the hypotheses; regression and moderation analyses; and finally, any supplementary analyses.

Study One: Quantitative Study

3.1. Review of Hypotheses

As previously stated, It will be hypothesised that:

8. Consistent with the Transformational model, Self-compassion and Social support are positively related to Post-traumatic growth in people who have experienced an aSAH.
9. Post-traumatic stress is negatively related to Subjective well-being in people who have experienced an aSAH.
10. Post-traumatic stress is positively related to Depression in people who have experienced an aSAH.
11. Post-traumatic growth moderates the relationship between post-traumatic stress and Subjective well-being in people who have experienced an aSAH.
12. Post-traumatic growth moderates the relationship between Post-traumatic stress and Depression in people who have experienced an aSAH.
13. Self-compassion moderates the relationship between Post-traumatic stress and Depression in people who have experienced an aSAH.
14. Self-compassion moderates the relationship between Post-traumatic stress and Subjective well-being in people who have experienced an aSAH.

3.2. Overview of Demographics

Participants comprised female *n* = 221 (88%), males - *n* = 30 (12%), with the most common age range being between 45 years and 54 years (*n* = 112 or 45%); 64% of participants reported that they were in a relationship (see Table 1). There was no upper age limit applied to participants in this study.

Ninety-eight percent of participants reported that the main language spoken at home was English. In respect to highest level of education attained, 30% had completed a diploma/certificate course. Forty-nine percent of participants reported that they were currently employed, with the most common participant income levels reported within a range that allowed participants to pay their bills and still have money left over to buy what they would like (see Table 2).

Table 1: Demographics of participants in the study ($N = 251$)

	n	%
Gender		
Male	30	12%
Female	221	88%
Age range		
18–24	3	1.2 (Female = 3)
25–34	16	6.4 (Female = 13 / Male = 3)
35–44	45	17.9 (Female = 40 / Male = 5)
45–54	112	44.6 (Female = 100 / Male = 12)
55–64	58	23.1 (Female = 49 / Male = 9)
65–74	17	6.8 (Female = 16 / Male = 1)
Ethnicity		
Caucasian	233	92.8%
Indigenous	2	0.8%
African American / Black	6	2.4%
Asian	3	1.2%
Latino/Hispanic	6	2.4%
Pacific Islander	1	0.4%
Relationship status		
Single	38	15.1%
Married	140	55.8%
De facto	21	8.4%
Divorced	36	14.3%
Separated	12	4.8%
Widowed	4	1.6%
Number of children		
Does not have dependent children	93	37.1%
Does not have children	59	23.5%
Has 1 to 2 children	84	33.4%
Has 3 or more children	15	6.0%

Table 2: Academic, employment and financial demographics of participants (*N* = 251)

	n	%
Educational level		
Did not complete high school	12	4.8%
Completed high school	50	19.9%
Completed certificate/diploma	76	30.3%
Completed undergraduate degree	70	27.9%
Completed postgraduate degree	43	17.1%
Employment status		
Unable to work – other reasons	10	4.0%
Unable to work due to aSAH	62	24.7%
Unemployed	13	5.2%
Student	3	1.2%
Home duties	9	3.6%
Retired	30	12.0%
Employed part-time in same occupation^	26	10.4%
Employed part-time in different occupation^^	15	6.0%
Employed full-time in same occupation^	67	26.7%
Employed full-time in different occupation^^	16	6.4%
Financial status		
Limited financial means *	69	27.4%
Stable financial means**	144	57.4%
Surplus financial means***	25	10.0%
Did not wish to answer	13	5.2%

Note: Education levels were self-reported, ^ = Employed in same occupation as was previous to aSAH; ^^ = Employed in a different occupation as was previous to aSAH; *Unable to pay bills and have little money spare; ** = Able to pay bills and have some money to spare to buy the occasional special item; *** = Able to comfortably pay bills and have excess funds to buy anything required.

The study, as previously described, involved participants from several global locations. Details of participants countries of residence and birth are provided in Table 3.

Table 3: Participants' countries of residence and birth (*N* = 251)

	n	%
Country of birth		
Australia	34	13.5%
New Zealand	4	1.6%
U.S.A.	109	43.4%
Canada	8	3.2%
U.K.	84	33.5%
Other	12	4.8%
Country of residence		
Australia	39	15.5%
New Zealand	4	1.6%
U.S.A.	115	45.8%
Canada	8	3.2%
U.K.	85	33.9%

Note: U.S.A. = United States of America, U.K. = United Kingdom.

As a result, participants received aSAH surgical treatment and care from a variety of locations globally (see Table 4).

Table 4: Participants' country of treatment for their aSAH (*N* = 251)

	n	%
Country of treatment		
Australia	37	14.7%
New Zealand	4	1.6%
U.S.A.	116	46.2%
Canada	10	4.0%
U.K.	84	33.5%

Note: U.S.A. = United States of America, U.K. = United Kingdom.

The most common pre-aSAH risk factor reported at the time of completing the survey was high stress (33%), followed by family history of aSAH (16%) and smoking (11%), with 47 participants reporting they had family members (2 family members *n* = 11; 3 family members *n* = 4; 4 or more family members *n* = 1) who had experienced an aSAH. Of note, 21% of participants reported not experiencing any known risk factors (see Table 5).

Table 5: Participants' pre-existing risk factors for aSAH (*N* = 251)

	n	%
Family history of aSAH^	40	15.9%
Smoking	28	11.2%
Hypertension	22	8.8%
Polycystic kidney disease	6	2.4%
Alcohol	10	4.0%
High stress	82	32.7%
Other risk factors	17	6.8%
Did not experience any risk factors for aSAH	52	20.7%

Note: ^ = Family member who has previously experienced an aSAH.

Two hundred and forty-nine (99.2%) participants reported that at the time of completing the survey this was their first experience of an aSAH. Of those, 97% reported that they were not aware that they had a brain aneurysm prior to it rupturing. No minimum time period post aSAH was applied to this this. As a result, the most common duration of time since aSAH at the time of completing the survey was one to two years (34%) followed by three to five years (28%), more than five years (27%) and 11% for less than six months. Ninety-two participants (37%) reported being severely disabled on arrival at hospital after their aSAH. The most common location within the brain where aSAH had occurred was the posterior communicating artery (*n* = 41,)16%) followed by the anterior communicating artery (*n* = 33, 13%); the least common location was the basilar (*n* = 17, 7%) artery. Most participants had experienced one aSAH (*n* = 239, 95%). The most common surgical treatment reported by 59% of participants was endovascular coiling followed by cerebral clipping (31.5%), with 8% of participants unsure of the treatment they received (see Table 6).

Table 6: Aneurysmal subarachnoid haemorrhage features and experiences of participants (*N* = 251)

	n	%
Level of consciousness on arrival at hospital		
Good – able to function^	43	17.1%
Moderately impaired^^	82	32.7%
Severely disabled^^^	92	36.7%
Vegetative state	34	13.5%
First occurrence of an aSAH	249	99.2%
Not aware of brain aneurysm prior to rupture	244	97.2%
Location of aSAH in the brain		
Anterior communicating artery	33	13.1%
Posterior communicating artery	41	16.3%
Middle cerebral artery	23	9.2%
Internal carotid artery	18	7.2%
Basilar artery	17	6.8%
Other areas	39	15.5%
Unsure / Don't know	80	31.9%
Number of aSAH experienced		
1 aSAH	239	95.2% (Female = 210/ Male = 29)
2 aSAH	11	4.4% (Female = 10/ Male = 1)
3 or more aSAH	1	0.4% (Female = 1)
Surgical treatment received for aSAH		
Endovascular coiling	147	58.6%
Clipping with craniotomy	79	31.5%
Stent	4	1.6%
Post aSAH treatment received	21	8.3%
Duration of time since aSAH		
Less than 6 months ago	27	10.8%
1 to 2 years ago	86	34.3%
3 to 5 years ago	71	28.3%
More than 5 years ago	67	26.7%

Note: ^ = Good – is still able to communicate and understand what was happening around them; ^^ = Moderate – experienced some impairment but still able to function independently, ^^^ = Severely disabled – experienced a high degree of disability, completely reliant on others to provide support. Post aSAH treatment received comprises additional interventions such as mesh, glue and follow up surgery if initial intervention failed.

In respect to post-surgical medical complications, 62% (*n* = 155) of participants reported that they had experienced difficulties. The most reported post-aSAH complications comprised pain (13%) and headaches/migraines (12%). Twenty-four percent of participants reported a variety of other post-aSAH complications including visual disturbances, unstable blood pressure, endocrine disturbances (i.e., pituitary and thyroid dysfunction), paralysis in legs, anosmia, deep vein thrombosis and elimination difficulties (i.e., bladder and/or bowel dysfunction). Seventy-four percent reported that they are currently taking prescribed medications (anti-hypertensive = 19% and analgesia / pain relief = 17%) since their aSAH. Thirty-seven percent of participants reported taking other prescribed medication including antidepressants, statins, Adderall, thyroid medication, anti-epileptics, mood stabilisers and medication to assist with sleep. Participants reported experiencing ongoing impairments post their aSAH with the most common being vision impairments (5%) followed by both hypertension (4%) and sleep disorders (4%). Twenty-three percent of participants reported experiencing other post-aSAH impairments including memory difficulties, cognitive difficulties, foreign accent syndrome and tinnitus. Psychological diagnoses post aSAH were reported by 53% of participants (see Table 7).

Table 7: Post-aneurysmal subarachnoid haemorrhage medical complications ($N = 251$)

	n	%
Post-surgical complications experienced after aSAH^		
Vasospasm	11	4.4%
Stroke	7	2.8%
Seizures	4	1.6%
Re-bleeding	1	0.4%
Wound infection	1	0.4%
Headaches/Migraines	29	11.6%
Pain	33	13.1%
Hydrocephalus	9	3.6%
Other complications	60	23.9%
Did not experience complications	96	38.2%
Impairments/conditions diagnosed with post aSAH^		
Headache	3	1.2%
Vision impairment	13	5.2%
Mobility impairment	9	3.6%
Epilepsy	7	2.8%
Hypertension	10	4.0%
Sleep disorders	10	4.0%
Stroke	1	0.4%
Other complications	58	23.1%
Did not experience complications	147	58.6%
Currently taking prescribed medications due to aSAH^		
Blood thinning	4	1.6%
Anti-hypertensive	47	18.7%
Analgesic / pain relief	42	16.7%
Other medication	94	37.5%
Not taking any medication	64	25.5%
Psychological diagnoses post aSAH^		
Depression	24	9.6%
Anxiety	66	26.3%
PTSD	42	16.7%
Not diagnosed with any mental health condition	119	47.4%

Note: ^ = Participants were able to select one or more complications/conditions/medications that they experienced post aSAH; PTSD = Post-traumatic stress disorder.

3.3. Preliminary Analyses: Data Screening, Reliability and Assumption Testing

3.3.1. Data Screening

Prior to analysis, the data was screened for input accuracy, normality, linearity, multicollinearity, missing values and outliers. Overall, missing data was manageable due to the force response required for each item on each questionnaire in the online Qualtrics platform. This procedure is preferable as it has less impact upon the data and is easily recognisable as not being a score within the dataset. Due to multivariate analyses being extremely sensitive to outliers the data was carefully screened (Tabachnick & Fidell, 2013). A total of 688 people attempted to access the online study. People that did not meet eligibility criteria as approved by ethics at Victoria University and based on initial recommendations of candidature confirmation panel members, such as country of residence and English proficiency (i.e., as previously mentioned in introduction) were automatically excluded from the online study (*n* = 346). A further 14 participants were excluded after further exploration revealed that they had not experienced an aSAH. Sixty-nine participants were discovered to have provided incomplete responses to multiple questionnaires (i.e., had stopped responding to some questionnaires and not returned to the Qualtrics platform to fully complete all aspects or select the submit option and were therefore also subsequently excluded as they were deemed to have withdrawn from the study. All participants were identified via their device login internet protocol (IP) meaning that it was not possible for one person to provide multiple responses, rather they would take up where they left off if logging in multiple times. A further eight participants who reported pre-existing PTSD diagnoses were excluded, resulting in a total sample size of $N = 251$.

3.3.2. Reliability and Validity

Internal consistency reliability of the measures utilised in the study were calculated utilising Cronbach's alpha. Cronbach's alpha was computed for all multi-item measures to determine their internal consistency reliability with results finding $r = .910$ for the PTGI, $r = .907$ for the CES-D-R, $r = .932$ for the IES-R, $r = .932$ for the SCS, $r = .938$ for the MOS-SS, $r = .\ 967$ for the SWLS, for the SPANE -Affect Balance Positive $r = .889$; Negative = .887, $r = .889$ for the FS, and $r = .951$ for the QOLBRI, indicating strong reliability of these measures in the current study. As this was a cross-sectional study, no data on test-retest reliability are available for this sample.

3.3.3. Assumption Testing

After formal testing and visually inspecting scatter plots, all continuous variables fell within the acceptable ranges for skewness and kurtosis. As regression analysis is sensitive to outliers, we carefully screened for this. All variance inflation factor statistics for all the predictor variables fell below the recommended value of 10, and tolerance statistics for these variables were above .10., indicating that assumptions of multicollinearity were met (Pallant, 2016). Furthermore, residual statistics comprising both Mahalanobis and Cook's distance fell within the accepted range (Field, 2009; Pallant, 2016). Levene's test for ANOVA analyses was not violated, therefore equal variances were assumed.

3.4. Exploring Descriptive Statistics and Relationships between Variables

3.4.1. Descriptive Analyses

Descriptive statistics including mean (*M*), standard deviation (*SD*) and 95% confidence intervals (CI) were calculated for demographic (i.e., age), primary predictors (i.e., post-traumatic stress symptoms, self-compassion, social support), health outcomes (i.e., depression, subjective well-being) and the potential moderating variables (i.e., post-traumatic growth and self-compassion). The means, standard deviations and ranges were computed for each of the measures and are presented in Table 8.

Table 8: Descriptive statistics of measures (*N* = 251)

Measure	*M*	Range	*SD*
PTGI	69.15	21.00–118.00	20.28
CESD-R	30.38	1.00–69.00	15.62
IES-R	28.89	0.00–76.00	17.32
SCS	2.60	1.00–5.00	.65
MOS-SS	3.23	1.00–5.00	.99
SWLS	17.74	5.00–35.00	7.14
SPANE	1.59	–18.00–24.00	9.01
FS	38.87	13.00–56.00	8.98
QOLBRI	114.92	48.00–182.00	28.20
GCS-MOD	2.47	1.00–4.00	0.93

Note: All scores derived from the Likert scoring method.
PTGI = Post-traumatic Growth Inventory; CESD-R = Center for Epidemiologic Studies Depression Scale; IES-R = Impact of Events Scale – Revised; SCS = Self-Compassion Scale; MOS-SS = Medical Outcome Scale – Social support; SWLS = Satisfaction with Life Scale; SPANE = Scale of Positive and Negative Experiences; FS = Flourishing Scale; QOLBRI = Quality of Life after Brain-related Injury; GCS = Glasgow Coma Scale – Modified.

Of interest to this study 206 participants (82.1%) reported levels of post-traumatic growth with scale PTGI scores at 55 or higher. Levels of depressive symptoms as measured by the CESD-R (*M* = 35.20, *SD* = 12.94) showed that 205 participants (81.7%) reported symptomology at or above the clinically significant cut-off score of 16 (Radloff, 1977). Additionally, 99 participants (39.4%) reported levels of post-traumatic stress symptomology at or above the clinically significant cut-off score of 33 (Weiss, 2007), Furthermore, 67 participants (26.7%) reported having a pre-existing psychological diagnosis of either anxiety (*n* = 16) or depression (*n* = 51) prior to experiencing their aSAH. It is noted that this study did not exclude these participants from analyses, rather controlled for their reported diagnoses as part of the regression and moderation analyses. Increased levels of self-compassion where identified as attaining a mean score of 3 and above and were found to be reported by 64 participants (25.5%).

As this study is the first to comprehensively investigate the role of post-traumatic growth in people who have experienced an aSAH, further analysis of comparative studies involving other life-threatening health conditions was conducted via two-tailed T-tests and is reported in Table 9.

Table 9: Comparative Post-traumatic growth outcomes between current and recent studies

Study	**Health condition**	**N**	***M***	***SD***	***t***	***p***
Thorburn, 2020	**aSAH**	**251**	**69.15**	**20.27**		
Morrill, et al., 2008	BCa	73	73.00	21.00	1.42	< .001*
Karagiorgou, et al., 2016	ABI	33	54.00	19.60	4.06	< .001*
Rogan, et al., 2013	ABI	70	53.76	22.88	5.47	< .001*
Kelly, et al., 2018	Stroke	43	51.53	26.25	5.03	< .001*
Sekely, et al., 2019	TBI	74	48.61	23.40	7.38	< .001*
Kuenemund, et al., 2016	Stroke	42	57.69	19.28	3.42	< .001*
Danhauer, et al., 2015	BCa	564	58.64	22.80	6.29	< .001*
Chen, et al., 2019	BCa	108	32.54	26.17	14.35	< .001

Note: aSAH = Aneurysmal subarachnoid haemorrhage; ABI = Acquired brain injury, BCa = Breast cancer; TBI = Traumatic brain injury.

Findings show that mean PTG scores in the current sample were significantly less than for patients experiencing breast cancer and other brain-related conditions (i.e., ABI[14], TBI, stroke).

Similarly, this study is the first to investigate self-compassion in people who have experienced an aSAH, therefore further analysis of comparative studies involving other life-threatening health conditions, via two-tailed T-tests was conducted, with results detailed in Table 10.

Table 10: Comparative self-compassion outcomes between current and recent studies

Study	Health condition	N	*M*	*SD*	*t*	*p*
Thorburn, 2020	**aSAH**	**251**	**2.60**	**.64**		
Siriois, et al., 2019a	Ca	55	3.39	.76	–.05	.87
Siriois, et al., 2019b	Ca	122	3.56	.73	.92	.85
Arambasic, et al., 2019	BCa	82	3.46	.57	1.17	.24

Note: aSAH = Aneurysmal subarachnoid haemorrhage; Ca = Cancer; BCa = Breast cancer.

Findings show that the mean self-compassion scores for the current sample were not significantly different than for patients experiencing cancer diagnoses.

3.4.2. Bivariate Correlations

Prior to hypothesis testing regarding the prediction models, Pearson’s bivariate correlations were performed to determine associations between the dependent variables and the potential predictor variables. Results are presented in Table 11.

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[14] ABI- Acquired brain injury; TBI – traumatic brain injury

Table 11: Correlations between measures (*N* = 251)

Measure	1	2	3	4	5	6	7	8	9	10
1. PTGI	–	–.01	–.12*	.07	.16**	.19**	.27**	.29**	.17**	.01
2. IES-R	–		–.68**	–.22**	–.48**	–.37**	–.57**	–.45**	–.61 **	.08
3. CESD-R	–	–	–	–.45**	–.68**	–.66**	–.83**	–.70**	–.74**	–.16
4. MOS-SS	–	–	–	–	.31**	.47**	.46**	.51**	.36**	–.06
5. SCS	–	–	–	–	–	.54**	.74**	.63**	.59**	–.07
6. SWLS	–	–	–	–	–	–	.71**	.69**	.64**	–.06
7. SPANE	–	–	–	–	–	–	–	.75**	.72**	–.11
8. FS	–	–	–	–	–	–	–	–	.76**	–.16*
9. QOLBRI	–	–	–	–	–	–	–	–	–	–.20**
10. GCS	–	–	–	–	–	–	–	–	–	–

Note: * $p < .05$ (two-tailed). ** $p < .01$ (two-tailed).
PTGI = Post-traumatic Growth Inventory; IES-R = Impact of Events Scale – Revised; CESD-R = Center for Epidemiologic Studies Depression Scale; MOS-SS = Medical Outcome Scale – Social support; SCS = Self-Compassion Scale; SWLS = Satisfaction with Life Scale; SPANE = Scale of Positive and Negative Experiences; FS = Flourishing Scale; QOLBRI = Quality of Life after Brain-related Injury; GCS = Glasgow Coma Scale – Modified.

Based on the results in Table 11, all measures were significantly correlated with each other, except for the GCS which was only correlated with the FS and QOLBRI; and PTG was not correlated with MOS-SS or the IES-R. It is important to note that both the QOLBRI and GCS were included as part of the study to provide further overall HRQOL[15] and level of consciousness data on arrival at hospital immediately after aSAH respectively, rather than as part of the primary measures utilised. PTGI was correlated with the CESD-R, SCS, QOLBRI, SWLS, SPANE and FS. The strongest associations with the CESD-R were the IES-R, SCS, MOS-SS, FS, QOLBRI, SWLS and SPANE. The smallest but statistically significant association with the CESD-R was with the PTGI. The strongest associations with MOS-SS were the CESD-R, SCS, QOLBRI, SWLS, SPANE and the FS. The strongest associations with SC were with the IES-R, CESD-R, QOLBRI, SWLS, SPANE, PTGI and FS.

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[15] HRQOL- Health related quality of life

In order to determine whether any of the demographic variables were associated with any of the outcome or primary predictor variables, further bivariate correlations (Pearson's r and Spearman's Rho for continuous and ordinal variables, respectively) were calculated. Categorical variables (i.e., employment status, relationship status, medical complications post aSAH) were converted to dichotomous variables (i.e., employed / not employed, in a relationship / not in a relationship, yes/no) prior to analysis. Bivariate correlations were calculated for demographic variables and are presented in Table 12.

Table 12: Bivariate correlations among study variables ($N = 251$)

	PTGI	CESD-R	IES-R	SCS	MOS-SS	SWLS	SPANE	FS	QOLBRI	GCS
Age	.09	–.16	–.19	.22**	–.13	.01	.18**	.13*	.09	.05
Financial status (Rho)†	.01	–.32**	–.27**	.25**	.28**	.39**	.28**	.28**	.05	.00
Employment status	.12	.16**	.07	.01	–.07	–.17**	–.03	–.11	–.34**	.15*
Relationship status	–.02	–.15*	–.03	.06	.32**	.27**	.10	.15*	.10	.07

Note: * $p < .05$. ** $p < .01$. † Spearman's Rho ($n = 251$). (0 = not employed, 1 = employed) PTGI = Post-traumatic Growth Inventory; CESD-R = Center for Epidemiologic Studies Depression Scale; IES-R = Impact of Events Scale – Revised; SCS = Self-Compassion Scale; MOS-SS = Medical Outcome Scale – Social support; SWLS = Satisfaction with Life Scale; SPANE = Scale of Positive and Negative Experiences; FS = Flourishing Scale; QOLBRI = Quality of Life after Brain-related Injury; GCS = Glasgow Coma Scale – Modified.

As depicted in Table 12, age, financial status, employment status and relationship status were associated with one or more of the outcome measures at the $p < .01$ level. Similarly, age, employment status and relationship status were associated with one or more of the outcome measures at the $p < .05$ level. Age was positively associated with SC, SWL and Flourishing; Financial status was negatively associated with depression and PTSS and positively related to SC, QOL, SWL, Affect balance, and flourishing. Employment status was positively associated with depression, and negatively associated with SWL and QOL. Relationship status was negatively associated with depression, and positively associated with QOl and SWL. Based on the results of Table 12, these observed differences in respect to household financial status were subsequently tested. To evaluate the significance of the association between relationship status and depressive symptoms and financial status and demographic variables, one-way between-group ANOVAs were conducted. Results guided decisions about whether these demographic variables needed to be controlled for in regression analyses. Results confirmed that household financial status was associated with symptoms of depression and SWB (flourishing, affect balance and satisfaction with life) experienced by some people who have experienced an aSAH. Therefore, this demographic variable was included in the following prediction models.

Primary Analyses

3.5. Assessing the Prediction Models

An examination of scatter plots was conducted to ascertain if the variables were suitable for regression analysis, and all seemed to have a linear relationship. Remaining assumptions of linearity, homoscedasticity, non-multicollinearity and independence of residuals were met (Doric, Nikolic-Doric, Jevremovic, & Malisic, 2009). Separate standard multiple regressions for each of depression and the well-being measures (SWB comprises three separate components: satisfaction with life, affect balance and flourishing), along with subsequent moderation analyses, were deemed to be the most appropriate analysis techniques to utilise in this study.

The first question under consideration was exploring whether consistent with the Transformational model, the relationship between SC and social support were positively related to PTG. Correlational analyses were conducted to explore the relationship between these predictors.

The second question under consideration was whether PTSS was negatively related to SWB after an aSAH. In the first standard multiple regression, PTSS, self-compassion and social support were used to assess their ability to predict SWB (Satisfaction with Life), after controlling for QOL-cognition, QOL-physical, household financial status, employment status and relationship status (see coefficients in Table 14 for further information).

In the second standard multiple regression, PTSS, self-compassion and social support were used to assess their ability to predict SWB (Affect Balance), after controlling for QOL-cognition (see coefficients in Table 15 for further information).

In the third standard multiple regression, PTSS, self-compassion and social support were used to assess their ability to predict SWB (Flourishing), after controlling for QOL-cognition, QOL-physical, relationship status and household financial status (see coefficients in Table 16 for further information).

The third question under consideration was whether PTSS was positively related to depression after an aSAH. In the fourth standard regression analysis, PTSS, self-compassion and social support were used to assess their ability to predict depression, after controlling for age, household financial status, QOL-cognition and QOL-physical (see coefficients in Table 13 for further information).

The fourth question under consideration was whether PTG moderates the relationship between PTSS and SWB after an aSAH. The first moderation analysis was conducted to assess whether PTG moderates the relationship between predictor and outcome variables.

The fifth question under consideration was whether PTG moderates the relationship between PTSS and depression after an aSAH. The second moderation analysis was conducted to assess whether PTG moderates the relationship between predictor and outcome variables.

The sixth question under consideration was whether SC moderates the relationship between PTSS and depression after an aSAH. The third moderation analysis was conducted to assess whether SC moderates the relationship between predictor and outcome variables.

The seventh question under consideration was whether SC moderates the relationship between PTSS and SWB after an aSAH. The fourth moderation analysis was conducted to assess whether SC moderates the relationship between predictor and outcome variables.

3.5.1. Exploring relationships with Post-traumatic Growth

Correlational analyses found a significant relationship between PTG and self-compassion, however social support was not related to PTG (as per previously reported in Table 11, see below):

Measure	1	2	3	4	5	6	7	8	9	10
1. PTGI	–	–.01	–.12*	.07	.16**	.19**	.27**	.29**	.17**	.01
2. IES-R	–		–.68**	–.22**	–.48**	–.37**	–.57**	–.45**	–.61 **	.08
3. CESD-R	–	–	–	–.45**	–.68**	–.66**	–.83**	–.70**	–.74**	–.16
4. MOS-SS	–	–	–	–	.31**	.47**	.46**	.51**	.36**	–.06
5. SCS	–	–	–	–	–	.54**	.74**	.63**	.59**	–.07
6. SWLS	–	–	–	–	–	–	.71**	.69**	.64**	–.06
7. SPANE	–	–	–	–	–	–	–	.75**	.72**	–.11
8. FS	–	–	–	–	–	–	–	–	.76**	–.16*
9. QOLBRI	–	–	–	–	–	–	–	–	–	–.20**
10. GCS	–	–	–	–	–	–	–	–	–	–

3.5.2. Predicting Depression

A standard multiple regression analysis was performed to determine the ability of the model to predict depression. Variables were entered in no particularly order. Age, household financial status, QOL-cognition, QOL-physical, social support, self-compassion and PTSS variables were entered into the prediction model as previously described. Results are presented in Table 13.

Table 13: Regression analysis for the prediction of depression (*N* = 251)

Variable	*B*	*SE B*	β	*t*	*p*
Self-compassion	–7.80	1.05	–.32	–7.40	.01**
Social support	–3.38	.60	–.21	–5.63	.01**
PTSS	.32	.04	.36	8.32	.01**
QOL-physical	–.15	.18	–.04	–.88	.38
QOL-cognition	–.46	.09	–.21	–4.89	.01**
Household financial	–.27	.44	–.02	–.61	.54
Age	–.28	.56	–.18	–.50	.61

Note: *p < .05. **p < .001. R^2 = .72 (.71 adjusted). PTSS = Post-traumatic stress symptoms.

Table 13 indicates the final model significantly accounts for 72% (71% adjusted) of the variance in depression. The model was significant, F (7, 243) = 86.36, p < .001. Most predictor variables (self-compassion, social support, PTSS and QOL-cognition) were significant. QOL-physical, household financial status and age were not significant. As presented in Table 13, results indicate that QOL-cognition, self-compassion, social support and PTSS remained associated with depression at the $p < .01$ level. PTSS accounted for 8%, self-compassion accounted for 6%, social support accounted for 4%, and QOL-cognition accounted for 3% of the variance in the model, respectively. QOL-cognition, social support and self-compassion were negatively associated with depression, while PTSS was positively associated with depression.

3.5.3. Predicting Subjective Well-being

A standard multiple regression analysis was performed to determine the ability of the model to predict levels of SWB. Variables were entered in no particular order. As previously discussed, SWB was measured utilising three domains: flourishing, affect balance and satisfaction with life. Therefore, three separate standard regression analyses were conducted for each of these domains, to provide for a comprehensive overall picture of SWB. The first standard regression analysis was conducted to predict SWB (Flourishing). Age, household financial status, relationship status, QOL-physical, QOL-cognition, PTSS, social support and self-compassion were entered the prediction model. Results are presented in Table 14.

Table 14: Regression analysis for the prediction of SWB (Flourishing) (*N* = 251)

Variable	***B***	***SE B***	**β**	***t***	***p***
Household financial status	–.12	.29	–.01	–.43	.67
Relationship status	.47	.79	.02	.60	.55
QOL-cognition	.40	.06	.32	6.51	.01**
QOL-physical	.29	.17	.12	2.44	.01*
PTSS	–.01	.03	–.02	–.51	.61
Self-compassion	4.60	.68	.33	6.73	.01**
Social support	2.82	.40	.31	7.02	.01**

Note: *$p < .05$. **$p < .001$. $R^2 = .63$ (.61 adjusted).

Table 14 indicates the final model significantly accounts for 62% (61% adjusted) of the variance in SWB (Flourishing). The model was significant, F (7243) = 57.13, $p < .001$. Not all predictor variables (PTSS, household financial status and relationship status) were significant. Self-compassion, social support, QOL-cognition and QOL-physical were all significant. Social support accounted for 8%, self-compassion accounted for 7%, QOL-cognition accounted for 7% and QOL-physical accounted for 1% of variance in the prediction model. Self-compassion, social support, QOL-physical and QOL-cognition were positively related to SWB (Flourishing).

A second standard multiple regression analysis was conducted to predict SWB (Affect Balance). Variables were entered in no particular order. PTSS, self-compassion, QOL-cognition and social support were entered the prediction model. Results are presented in Table 15.

Table 15: Regression analysis for the prediction of SWB (Affect Balance) (*N* = 251)

Variable	*B*	*SE B*	β	*t*	*p*
PTSS	–.10	.02	–.19	–4.15	.01**
Self-compassion	6.90	.65	.48	10.25	.01**
Social support	2.14	.37	.23	5.76	.01**
QOL-cognition	.18	.05	.14	3.08	.02*

Note: *$p < .05$. **$p < .001$. $R^2 = .67$ (.67 adjusted).

Table 15 indicates the prediction model significantly accounts for 67% (67% adjusted) of the variance in SWB (Affect Balance). The model was significant, F (4246) = 127.06, $p < .001$. Self-compassion, social support, QOL-cognition and PTSS were all significant predictors of SWB (Affect Balance). Self-compassion accounted for 16%, social support accounted for 5%, PTSS accounted for 3% and QOL-cognition accounted for 1% of variance in the prediction model. Self-compassion, social support and QOL-cognition were all found to be positively related to SWB (Affect Balance). PTSS was found to be negatively related to SWB (Affect Balance). Residual statistics showed Mahalanobis and Cook's distances within acceptable ranges.

For, the final standard multiple regression analysis which aimed to predict SWB (Satisfaction with Life), self-compassion, social support, PTSS, QOL-physical, QOL-cognition, household financial status, employment status and relationship status were entered the prediction model in no particular order. Results are presented in Table 16.

Table 16: Regression analysis for the prediction of SWB (Satisfaction with Life) (*N* = 251)

Variable	***B***	***SE B***	**β**	***t***	***p***
Self-compassion	3.37	.64	.31	5.29	.01**
Social support	1.68	.36	.23	4.62	.01**
PTSS	.00	.02	.01	.13	.89
Household financial status	.94	.27	.17	3.51	.01**
Employment status	1.07	.71	.07	1.50	.13
Relationship status	1.97	.72	.13	2.73	.01**
QOL-cognition	.17	.06	.17	2.93	.05*
QOL-physical	.18	.11	.09	1.67	.09

Note: *$p < .05$. ** $p < .001$. $R^2 = .51$ (.49 adjusted).

Table 16 indicates the final model significantly accounts for 51% (49% adjusted) of the variance in SWB (Satisfaction with Life). The model was found to be significant, F (8, 242) = 31.30, $p < .001$. However, not all predictor variables were found to be significant. PTSS, QOL-physical and employment status were found to be not significant. Self-compassion, social support and household financial status were found to be significant at the $p < .001$ level. QOL-cognition and relationship status were found to be significant at the $p < .05$ level. Self-compassion accounted for 6%, social support accounted for 4%, household financial status accounted for 2%, QOL-cognition accounted for 2%, and relationship status accounted for 2% of variance in the model. Self-compassion, social support, QOL-cognition, household financial status and relationship status were positively associated with SWB (Satisfaction with Life). There were no negative associations with SWB (Satisfaction with Life).

3.6. Testing Moderation

3.6.1. Moderation Analyses: Depression

To test the hypothesis that PTG moderates the relationship between PTSS and depression, and covariates self-compassion, social support and QOL-cognition, a moderated regression model (N = 251) using PROCESS macro model 1 (Hayes, 2013) based upon 5000 bootstrapped samples was conducted. Results showed that an interaction effect was not found between PTSS and PTG (b = .00, SE = .00, t = .73, p = .46). It can therefore be suggested that PTG is unlikely to moderate the relationship between PTSS and depression in people who have experienced an aSAH when accounting for covariates such as self-compassion, social support and QOL-cognition.

3.6.2. Moderation Analyses: Subjective Well-being

To test the hypothesis that PTG moderates the relationship between PTSS and SWB, three separate moderated regression models (N = 251) using PROCESS macro model 1 (Hayes, 2013) based upon 5000 bootstrapped samples were conducted.

3.6.2.1. PTSS and SWB (Flourishing)

Results showed that no interaction effect was found between PTSS and PTG (*b* = –.00, *se* = .00, *t* = .48, *p* = .63). It can therefore be suggested that PTG is unlikely to moderate the relationship between PTSS and SWB (Flourishing) in people who have experienced an aSAH when accounting for covariates such as self-compassion, social support, QOL-physical and QOL-cognition.

3.6.2.2. PTSS and SWB (Affect Balance)

Results showed that no interaction effect was found between PTSS and PTG (*b* = –.00, *se* = .00, *t* = –.34, *p* = .73). It can therefore be suggested that PTG is unlikely to moderate the relationship between PTSS and SWB (Affect Balance) in people who have experienced an aSAH when accounting for covariates such as QOL-cognition, self-compassion and social support.

3.6.2.3. PTSS and SWB (Satisfaction with Life)

Results showed that no interaction effect was found between PTSS and PTG (*b* = –.00, *se* = .00, *t* = –.1.65, *p* = .10). It can therefore be suggested that PTG is unlikely to moderate the relationship between PTSS and SWB (Satisfaction with Life) in people who have experienced an aSAH when accounting for covariates such as self-compassion, social support, QOL-cognition, relationship status and household financial status.

3.6.3. Moderation Analyses: Exploring Self-Compassion as a Moderator

3.6.3.1. PTSS and Depression

Results showed that no interaction effect was found between PTSS and self-compassion (*b* = –.02, *se* = .50, *t* = –.51, *p* = .61). It can therefore be suggested that self-compassion is unlikely to moderate the relationship between PTSS and depression in people who have experienced an aSAH.

3.6.3.2. Self-Compassion and SWB (Flourishing)

Results showed no significant interaction effect between PTSS and self-compassion (*b* = .01, *se* = .04, *t* = .38, *p* = .70). It can therefore be suggested that self-compassion is unlikely to moderate the relationship between PTSS and SWB (Flourishing) in people who have experienced an aSAH.

3.5.6.3. Self-Compassion and SWB (Affect Balance)

Results showed no interaction between PTSS and Self-compassion (*b* = –.05, *se* = .03, *t* = –1.52, *p* = .13). It can therefore be suggested that self-compassion is unlikely to moderate the relationship between PTSS and SWB (Affect Balance) in people who have experienced an aSAH.

3.6.3.4. Self-Compassion and SWB (Satisfaction with Life)

Results showed no interaction effect was found between PTSS and Self-compassion (*b* = .02, *se* = .03, *t* = .54, *p* = .59). It can therefore be suggested that self-compassion is unlikely to moderate the relationship between PTSS and SWB (Satisfaction with Life) in people who have experienced an aSAH.

3.7. Supplementary Analyses

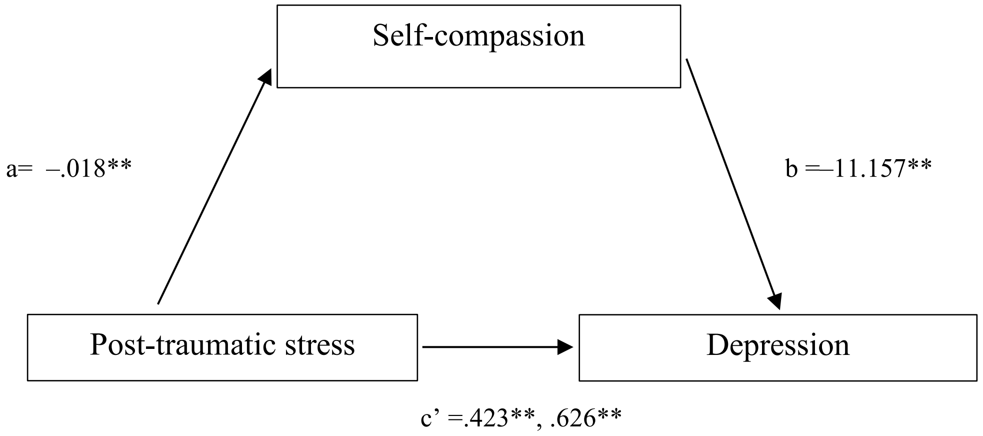
3.7.1. Exploring the Mediating Role of Self-compassion

Given findings that self-compassion is strongly correlated to other variables in this study, and moderation analyses not being significant, further exploratory analyses were conducted to explore if self-compassion may be acting as a mediator between predictor and outcome variables in the study. Mediation analyses were conducted in order to better understand the role of self-compassion between the predictor variable (PTSS) and the outcome variables (depression, SWB Flourishing, SWB Affect Balance and SWB Satisfaction with Life).

The first mediation regression model ($N = 251$) using PROCESS macro model 4 (Hayes, 2013) based upon 5000 bootstrapped samples explored the role of self-compassion as a mediating factor between PTSS and depression.

Results revealed that 64% of the variance in depression was explained by the mediation model ($R^2 = .637$) As seen in Figure 5 the relationship between PTSS and self-compassion (path a) and the relationship between self-compassion and depression (path b) were significant. PTSS had a significant direct effect on depression (path c) before and after (path c') including self-compassion towards in the model.

Results of bias-corrected bootstrapped analyses found that PTSS had a significant indirect effect on depression via self-compassion ($b = .203$, $Bse = .030$), with a 95% confidence interval ranging from .145 to .266. The absence of zero within the confidence interval indicates that self-compassion significantly mediated the relationship between PTSS and depression. Results indicate that self-compassion explains some of the relationship between PTSS and depression; that is, the relationship between PTSS and depression is still significant after including self-compassion in the model. Coefficients are presented in Figure 5.



Note: **p <.01

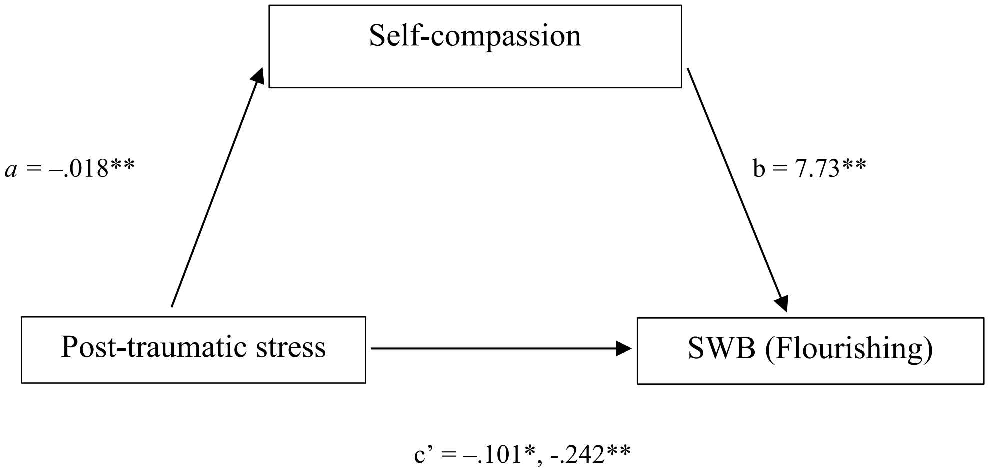
Figure 6: Relationships between post-traumatic stress, self-compassion and depression

The second mediation regression model (*N* = 251) using PROCESS macro model 4 (Hayes, 2013) based upon 5000 bootstrapped samples explored the role of self-compassion as a mediating factor between PTSS and SWB (Flourishing).

Results revealed that 44% of the variance in flourishing was explained by the mediation model (R^2 = .441) As seen in Figure 6 the relationship between PTSS and self-compassion (path a) and the relationship between self-compassion and flourishing (path b) were significant. PTSS had a significant direct effect on flourishing (path c) before and after (path c’) including self-compassion towards in the model.

Results of bias-corrected bootstrapped analyses found that PTSS had a significant indirect effect on flourishing via self-compassion (*b* =-.141, *Bse* = .020), with a

95% confidence interval ranging from -.183 to -.102. The absence of zero within the confidence interval indicates that self-compassion significantly mediated the relationship between PTSS and flourishing. Results indicate that self-compassion explains some of the relationship between PTSS and flourishing; that is, the relationship between PTSS and flourishing is still significant after including self-compassion in the model. Coefficients are presented in Figure 6.



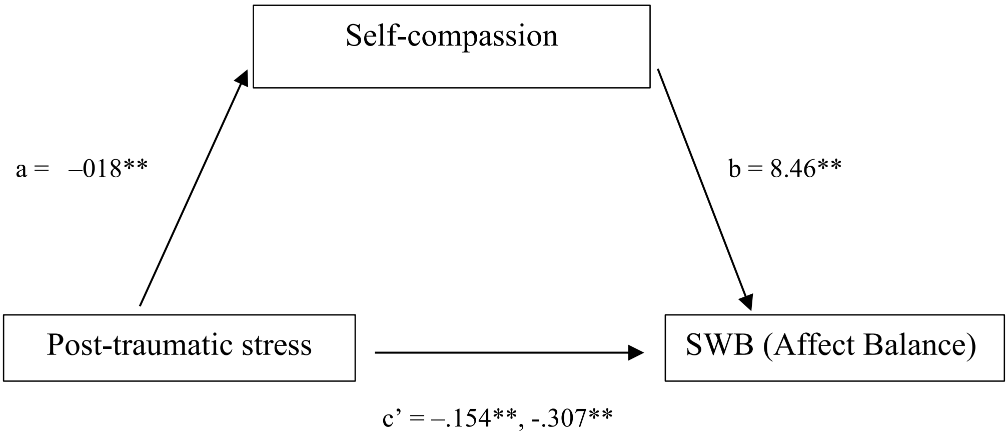
Note: * $p < .05$, ** $p < .001$

Figure 7: Relationships between post-traumatic stress, self-compassion and SWB (Flourishing).

The third mediation regression model ($N = 251$) using PROCESS macro model 4 (Hayes, 2013) based upon 5000 bootstrapped samples explored the role of self-compassion as a mediating factor between PTSS and SWB (Affect Balance).

Results revealed that 62% of the variance in affect balance was explained by the mediation model ($R^2 = .612$) As seen in Figure 7 the relationship between PTSS and self-compassion (path a) and the relationship between self-compassion and affect balance (path b) were significant. PTSS had a significant direct effect on affect balance (path c) before and after (path c') including self-compassion towards in the model.

Results of bias-corrected bootstrapped analyses found that PTSS had a significant indirect effect on affect balance via self-compassion (*b* = -.154, *Bse* = .021), with a 95% confidence interval ranging from -.197 to -.113. The absence of zero within the confidence interval indicates that self-compassion significantly mediated the relationship between PTSS and affect balance. Results indicate that self-compassion explains some of the relationship between PTSS and affect balance; that is, the relationship between PTSS and affect balance is still significant after including self-compassion in the model. Coefficients are presented in Figure 7.



Note: ***p* < .001

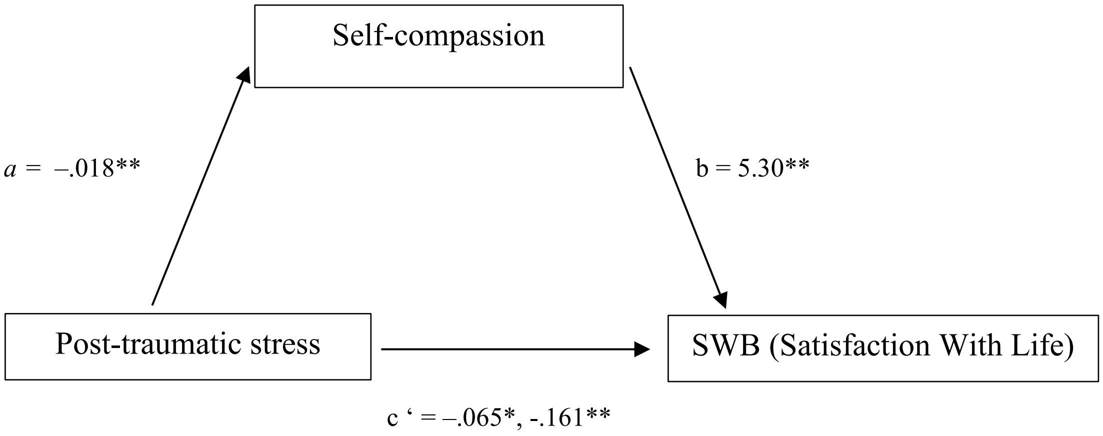
Figure 8: Relationships between post-traumatic stress, self-compassion and SWB (Affect Balance),

The final mediation regression model (*N* = 251) using PROCESS macro model 4 (Hayes, 2013) based upon 5000 bootstrapped samples explored the role of self-compassion as a mediating factor between PTSS and Satisfaction with Life.

Results indicated that the relationship between PTSS and SWB (Satisfaction with Life) is partially mediated by self-compassion in people who have experienced an aSAH.

Results revealed that 32% of the variance in satisfaction with life was explained by the mediation model ($R^2 = .323$) As seen in Figure 8 the relationship between PTSS and self-compassion (path a) and the relationship between self-compassion and satisfaction with life (path b) were significant. PTSS had a significant direct effect on satisfaction with life (path c) before and after (path c') including self-compassion towards in the model.

Results of bias-corrected bootstrapped analyses found that PTSS had a significant indirect effect on satisfaction with life via self-compassion (b = -.096, *Bse* = .016), with a 95% confidence interval ranging from -.130 to -.066. The absence of zero within the confidence interval indicates that self-compassion significantly mediated the relationship between PTSS and satisfaction with life. Results indicate that self-compassion explains some of the relationship between PTSS and satisfaction with life; that is, the relationship between PTSS and satisfaction with life is still significant after including self-compassion in the model. Coefficients are presented in Figure 8.



Note: $^{**}p < .001$, $^{*}p < .05$.

Figure 9: Relationships between post-traumatic stress, self-compassion and SWB (Satisfaction with Life)

3.8. Summary of Results- Study One

Data analysis was conducted to investigate PTG in people who have experienced an aSAH and its role as a protective factor against the development of depression in this population. It is noted that due to the cross-sectional nature of this study, results should be interpreted with caution, and a definitive conclusion regarding causal relationships cannot be made. The first hypothesis sought to understand if self-compassion and social support was positively related to PTG. Results of correlational analyses partially supported this hypothesis, with self-compassion being positively related to PTG; however, social support was not found to be related to PTG.

The second hypothesis posited that PTSS is negatively related to SWB. Correlational analyses supported this hypothesis. Any of the 3 measures of SWB: satisfaction with life, affect balance and flourishing. All sub-domains were found to be positively related to PTG.

The third hypothesis sought to investigate if PTSS was positively related to depression. Correlational analyses supported this hypothesis.

The fourth hypothesis sought to investigate if PTG moderates the relationship between PTSS and SWB. SWB was divided into three sub-domains: satisfaction with life, affect balance and flourishing . PTG was not found to be a moderator between PTSS and SWB domains with no significant interaction found.

The fifth hypothesis posited that PTG moderates the relationship between PTSS and depression. PTG was not found to be a moderator between PTSS and depression with no significant interaction found.

The sixth hypothesis posited that self-compassion moderates the relationship between PTSS and depression. Self-compassion was not found to be a moderator between PTSS and depression.

The seventh hypothesis posited that self-compassion moderates the relationship between PTSS and SWB domains. Self-compassion was not found to be a moderator between PTSS and SWB domains.

Further supplementary analyses were conducted utilising self-compassion as a potential mediator between PTSS and depression and PTSS and SWB across all three sub-domains. There were significant indirect effects found between PTSS and depression through self-compassion, and between PTSS and all SWB sub-domains through self-compassion. Self-compassion was found to partially mediate the relationship between PTSS and depression, and PTSS and all SWB domains.

Discussion- Study One

This global study was one of the first known explorations of PTG in the specific context of aSAH in order to shed a light on the recovery period and whether people experienced positive psychological growth after this life-threatening condition. This study investigated PTG and self-compassion in people who have experienced an aSAH and their roles as protective psychological factors in this population. Further predictors including PTSS, and social support, demographics and aSAH-related variables were also explored and investigated to ascertain if there were any influence on outcomes explored.

3.9. Post-traumatic Growth

PTG was experienced by participants in this study, with relatively high mean scores being reported in comparison to previous PTG studies in other populations such as breast cancer (Danhauer, et al., 2013; Chen et al., 2019), prostate cancer (Thornton & Perez, 2006), ABI (Rogan, Fortune, & Prentice, 2013; Karagiorgou & Cullen, 2016) and stroke (Kuenemund, Zwick, Rief, & Exner, 2016; Kelly, Morris, & Shetty, 2018). Morrill, et al. (2008) reported slightly higher mean PTG scores in their study of breast cancer patients; the reason for this remains unclear but may be due to the smaller sample size and older age of participants that were utilised as part of their study. It is also noted that participants were stabilised and had fully completed their treatment at the time of their inclusion as compared to this study where participants were at varying stages of recovery post aSAH.

The first hypothesis sought to understand if consistent with the Transformational model, self-compassion and social support were positively related to PTG in people who have experienced an aSAH. The current study found that correlational analyses partially supported this hypothesis. The results of this study showed that experiencing self-compassion is important in the development of PTG after an aSAH. Alternatively, results of this study found that social support did not play a predictive role in the development of PTG. These results are consistent with previous studies of social support which have found that it is not predictive of PTG singularly (Kelly, Morris, & Shetty, 2018), but with the inclusion of other variables such as meaning making becomes a stronger predictor than social support alone (Shang, et al., 2020; Zeligman, Varney, Grad, & Huffstead, 2018). Similarly, Tedeschi and Calhoun in their model of PTG state that social support has an indirect effect in the formulation of PTG and acts as a support from which rumination can take place in order to develop this psychological protective growth (Tedeschi & Calhoun, 1995; Tedeschi & Calhoun, 2004a). Rumination and meaning in life were not investigated as part of this study and may be why social support was not found to be predictive of PTG in this population; however, this remains unclear and requires further exploration. These results are consistent with the association between self-compassion and PTG in line with those of previous studies (Chan, et al., 2020).

3.10. Subjective Well-being

The second hypothesis posited that PTSS is negatively related to SWB for people who have experienced an aSAH. As previously stated, SWB was divided into three sub-domains: satisfaction with life, affect balance and flourishing. Correlational analyses supported this hypothesis. The results of the current study suggest that participants who reported experiencing PTSS may also experience reduced well-being, notably in life satisfaction, positive affect and psychological flourishing. These findings agree with those obtained by previous investigations of SWB and its opposing relationship with psychopathological outcomes such as depression, anxiety and other negative psychological sequelae (Houben, Van Den Noortgate, & Kuppens, 2015; Portocarrero, Gonzalez, & Ekema-Agbaw, 2020). Prediction models in respect to life satisfaction found that social support, followed by self-compassion, household financial status, relationship status and QOL-cognition contributed to this result. This reflects that connection with others such as family and friends during the recovery phase is important for overall life satisfaction. Similarly, the prediction model for affective well-being involved self-compassion being the strongest influence, followed by social support, PTSS and QOL-cognition. This means that being kind to oneself in the aSAH recovery period has a positive influence on overall affect. Finally, the prediction model in respect to psychological flourishing found that again self-compassion made the most contribution, followed by social support, QOL-cognition and QOL-physical, highlighting the importance of this emerging construct in maintaining overall psychological well-being. The study did not specifically investigate the potential variability in SWB that may fluctuate dependent on other aspects such as duration since aSAH, and the extent and location of aSAH, which may provide further understanding of this important well-being outcome.

The third hypothesis sought to investigate if PTSS was positively related to depression in people who have experienced an aSAH. As predicted, these results confirmed the association between PTSS and depression, which may increase the risk of experiencing both after an aSAH. These results are in line with those of previous studies of stroke patients linking both negative psychological outcomes post treatment (Grabowska-Fudala, et al., 2018) and in respect to depression, the risk of chronicity if not properly assessed and treated (Schepers, et al., 2009).

The fourth hypothesis sought to investigate if PTG moderates the relationship between PTSS and SWB in people who have experienced an aSAH. SWB was divided into three sub-domains: satisfaction with life, affect balance and flourishing. The current study found that PTG did not function as a psychologically protective buffer between PTSS and SWB domains. The results of this study indicate that PTG plays a different role after aSAH other than just being psychologically protective. It is possible that there is a unique experience of PTG for this population, dependant on the characteristics of the diagnosis, diffuse impact of haemorrhage and treatment experienced. Of note, this is the first study to investigate PTG as a protective factor between PTSS and life satisfaction, affect balance, and psychological flourishing.

The final hypothesis posited that PTG moderates the relationship between PTSS and depression in people who have experienced an aSAH. Similarly, the results of the study indicate that PTG did not play a psychologically protective role between PTSS and depression. These findings did not match those observed in earlier studies of breast cancer (Morrill, et al., 2008) which found that PTG played a buffering role between PTSS and depression in that population. There are several possible explanations for this result. Firstly, a larger sample size was utilised in the current study compared to the previous study; secondly, the psychometric tools utilised to measure PTSS differed, with the current study utilising the IES-R instead of the PCL-5 (the PTSD checklist used in the DSM-5), which may have provided a more comprehensive focus on the symptoms of avoidance, hypervigilance and intrusive thoughts that comprise PTSS; thirdly, a slightly younger age range of participants was utilised in the current study; and finally, the current study involved varying levels of time since the initial aSAH, compared to the previous study which utilised a sample of stage I and II breast cancer survivors at a duration of four years post-surgery and stable on treatment. It seems possible that these results may differ due to the fact that aSAH survivors continue to experience some form of symptomology that remains unresolved. It appears that regardless of physical, cognitive, or psychological, aspects, unlike the experience of breast cancer survivors' recovery is an ongoing process often with no defined end. As such, PTG appears to be playing a different adaptive role for these people.

3.11. Self-compassion

A novel finding from this study was that people who experience an aSAH also reported levels of self-compassion. Participants reported self-compassion during the recovery period after their aSAH, which was consistent with studies of people who had experienced cancer (van der Donk, et al., 2020), chronic illness (Arambasic, Sherman, & Elder, 2019; Sirois, Molnar, & Hirsch, 2015; Sirois & Hirsch, 2019) and chronic pain (Edwards, et al., 2019).

No significant difference in self-compassion was found as compared to previous studies, which may account for the fact that neurological disorders have not been previously investigated, but rather chronic illnesses and ongoing cancer presentations have been more extensively explored. Higher self-compassion has been linked to positive cognitive restructuring and reduced avoidance, whereas people reporting lower self-compassion generally utilise coping strategies such as problem-solving or distraction (Allen & Leary, 2010, p. 107). This may provide a partial explanation as to why self-compassion was lower in this study as, depending on functionality post aSAH, participants may be engaging in more practical or physical methods of coping rather than utilising cognitive strategies which may be difficult due to additional aspects such as mental and physical fatigue, and memory difficulties. Furthermore, participants may be unable to engage in experiential avoidance of their cognitive and physical impairments after their aSAH due to the magnitude of disability they have acquired and continue to live with on a daily basis.

As a result, additional hypotheses sought to investigate this relationship further. It was hypothesised that self-compassion may moderate the relationship between PTSS and depression in people who have experienced an aSAH. Self-compassion was found to be negatively associated with depression; this finding is in line with previous studies of patients experiencing breast cancer (Brown, Hughes, Campbell, & Cherry, 2020). The results of the current study did not find that self-compassion plays a psychologically protective role in the relationship between PTSS and depression or the relationship between PTSS and subjective well-being across all three domains. These results are also in line with those of previous studies that did not find self-compassion to moderate the relationship between negative life events and depression (Ford, Klibert, Tarantino, & Lamis, 2017). However, these findings did not match those observed in earlier studies that found self-compassion to be an important moderator between stress and negative psychological outcomes in other medical presentations (Abdollahi, Taheri, & Allen, 2020), populations (Shebuski, Bowie, & Ashby, 2020) and domains of SWB (Phillips, Hine, & Marks, 2018; Hwang, Kim, Yang, & Yang, 2016).

Despite self-compassion not being found to play a psychologically protective role after an aSAH, it was determined that further exploration was warranted.

Supplementary analyses were required to better understand the role self-compassion was playing in this population. As a result, self-compassion was explored as a potential mediator between PTSS and depression and PTSS and SWB across all three sub-domains. This study revealed that self-compassion did play an important mediating role in respect to its relationship between PTSS and depression through self-compassion and between PTSS and SWB sub-domains through self-compassion. These results are consistent with previous studies that have found self-compassion to be an important mediator with the potential to reduce depressive symptomology, in clinical settings (Raque-Bogdan, Ericson, Jackson, Martin, & Bryan, 2011) and are also consistent with studies in other medical conditions which have found self-compassion to be an important factor in reducing negative psychological outcomes (Przezdziecki, et al., 2013), improving well-being (Zessin, Dickhauser, & Garbade, 2015), enhancing QOL, reducing stress (Dev, Fernando, & Consedine, 2020) and exploring its relevance as a clinical intervention which is inclusive regardless of cultural or ethnic background (Kemppainen, et al., 2013). These findings add to the emerging literature in relation to self-compassion and its potential to reduce the level of depressive symptomology experienced in people after aSAH in addition to improving overall subjective well-being, both vital areas of importance in the recovery phase.

3.12. Further Findings

Previous research suggests that the location of an aSAH within the brain may play a role in negative psychological outcomes such as depression, most notably the posterior circulation of the brain (von Vogelsang, Svensson, Wengstrom, & Forsberg, 2013).

Previous studies have found that people with aSAH's located in the anterior circulation and middle cerebral artery have been found to experience mild to moderate deficits in areas of cognitive and executive functioning. Anterior communicating artery aneurysms (ACOA) have also been found to have significantly lower performance in the area of problem-solving (needing to restart a behaviour, unable to sustain good performance on a task). ACOA survivors also have difficulties with memory and memory retrieval, and initiation of problem-solving behaviour, indicating difficulties with medial orbitofrontal dysfunction – both groups reported lower HRQOL (Haug, et al., 2009).

In the current study, the highest reported post-aSAH complications were pain and headaches/migraines. These results are consistent with previous research which has also found that headaches were the most common post-aSAH condition experienced, and this is attributed to the "ongoing meningeal irritation, raised intracranial pressure and in some cases wound pain" (Dulhanty, Hulme, Vail, Patel, & Tyson, 2019, p. 6; Van Gijn, Kerr, & Rinkel, 2007). This may be an important issue that is also contributing to other aspects in recovery such as fatigue, physical functioning, and subsequently low mood, and HRQOL reductions as previous studies have found (Dulhanty, Hulme, Vail, Patel, & Tyson, 2019).

Return to work results were consistent with previous research findings which have stipulated that few people are able to function sufficiently to engage in work (Haug, et al., 2009). This study found that only 27% of respondents had returned to working full-time in the same occupation they had worked in prior to their aSAH. Of those that returned to work, only 10% returned to the same occupation part-time. Sadly, 25% were unable to return to work at all. Unfortunately, this study found that only 6% returned to work in new full-time occupation and 6% in a new occupation part-time. Financially, many respondents reported being of stable means, and 27% reported having limited financial means. This is a concerning finding, particularly given ongoing therapy costs and in turn overall QOL may be impacted by this significant reduction in income after an aSAH.

3.13. Theoretical Implications

The empirical findings in this study provide a new understanding of the unique journey experienced by people during recovery after an aSAH. These findings confirm that for these people recovery is not a linear process (i.e., involving a number of variables and fluctuations in functioning), but rather an enduring one that involves continuous experiences of fatigue, pain and psychological impairment. The findings from this study contribute to the development of both PTG and self-compassion theory, which have scientific and applied significance in this population.

Theoretically, this study partially supported the transformational model of PTG (Tedeschi & Calhoun, 2004a) by supporting that a seismic event in the form of a ruptured brain aneurysm leads to significant challenges, resulting in emotional distress which for some can develop into enduring distress. This distress over time with the assistance of social support, a new life narrative and a self-compassionate lens can result in the development of PTG. Previous studies have highlighted the need for disease-specific models of PTG and this study adds to the literature towards this pursuit. Given these results, it may be incumbent on researchers to expand and build upon this research and for clinicians to devise interventions that include PTG and self-compassion as part of treatment provision to improve outcomes for this population. Of note, out of the two constructs, self-compassion was the most important factor for this population in respect to predicting negative psychological sequelae, a novel finding that builds upon current literature and would benefit from further exploration, particularly from an interventional perspective.

3.14. Clinical Implications

Medical events such as aSAH that have traumatic and other negative psychological sequelae result in extensive psychosocial needs, therefore there is an important role that can be played clinically to support this population. The findings from this study may have the potential to increase practitioner knowledge in order to provide psychological therapy commensurate with client needs post aSAH. Self-compassion was found to be the most important predictor and mediator in this study as compared to PTG. As an important factor in this population during recovery, self-compassion should be considered in prospective interventions that seek to reduce or ameliorate negative psychological sequelae, such as depression and PTSS (Winders, Murphy, Looney, & O'Reilly, 2020), and improve well-being (Fong & Loi, 2016). Self-compassion may also be more beneficial as a target of intervention rather than targeting self-esteem due to its ability to induce a deeper relationship with the self as it does not involve self-evaluation but rather a stable form of emotional resilience (Neff, 2011). It has also more recently been found to be a "pertinent preliminary treatment target for individuals who avoid experiences of emotions" (Inwood & Ferrari, 2018, p. 215), a pertinent factor for those that have engaged in experiential avoidance or present with traumatic symptomology. In addition, working with the cognitive reserve post aSAH in order to address impairments and deficits across HRQOL domains is important in order to address individual symptomology more comprehensively (Rosenich, Hordacre, Paquet, Koblar, & Hillier, 2020). It is apparent that without a more comprehensive view of recovery that acknowledges the potential benefits of incorporating self-compassion and PTG, survivors of aSAH and other stroke related disorders may be missing out on influential psychological factors during this phase which may powerfully impact their overall functioning.

3.15. Summary

This chapter presented the findings of the first study. The following chapter will discuss the findings of the second study that explored the experiences of recovery after an aSAH utilising an exploratory descriptive case studies approach.

Chapter 4: Results and Discussion

Study Two: Qualitative Study

This chapter consists of 9 sections and will present the results of the six case studies encompassing each participant's story, followed by within case and cross-case synthesis comprising themes and sub-themes, and discussion section and a brief summary and reflections.

4.1. Participant Characteristics

As previously stated, three participants were recruited directly from the online survey study and a further three participants were recruited by convenience sampling from the community. Table 17 provides a summary of all participant characteristics.

Participant views in respect to their recovery experience after an aSAH[16] are diverse. Themes and sub-themes extrapolated as a result of this investigation were influenced by the initial questions:

- What is the experience of recovery like after an aSAH?
- How do people experience post-traumatic growth and self-compassion after an aSAH?

The author is not aware of any previous study that has investigated these questions. Results will be illustrated by the inclusion of participant quotations.

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[16] aSAH- Aneurysmal subarachnoid haemorrhage

After analysing the data using an exploratory descriptive case studies approach, four main categories were established (physical, psychological, social, and treatment) with four main cross-case themes being identified: psychological impacts, physical impacts, impact on family, friends and work roles, interaction with medical professionals and the implications of surgical treatment. Exploration of PTG and self-compassion after an aSAH was also explored with six themes being identified: feeling grateful, new directions in life, priority on living life, spiritual and existential growth and change, self-criticism and frustration, and putting the aSAH experience in context.

Table 17: Summary of participant characteristics (*N* = 6)

Characteristics	David	Amanda	Cameron	Elizabeth	Gaye	Maree
Age (years)	45–54	45–54	55–64	67	52	50
Gender	Male	Female	Female	Female	Female	Female
Education	Completed diploma / certificate	Completed diploma / certificate	Incomplete undergraduate degree	Completed undergraduate degree	Completed undergraduate degree	Completed undergraduate degree
Financial status	Enough $$ to pay bills with little spare	Enough $$ to pay bills with little spare	Enough $$ to pay bills with extra left over	Enough $$ to pay bills with extra left over	Struggling $$ to pay bills with none left over	Enough $$ to pay bills with extra left over
Relationship status	Married	Married	Divorced	Married	Single	Married
Country of birth	Australia	Australia	Singapore	Australia	Australia	Australia
Australian state of residence	Victoria	Victoria	Victoria	NSW	NSW	Queensland
Parental status	4 children	2 children	2 adult children	2 children	2 children	2 children
Pre-aSAH employment status	Full-time	Part-time	Full-time	Full-time	Full-time	Full-time
Post-aSAH employment status	Part-time	Part-time	Full-time	Not working	Not working	Part-time
Level of functioning on arrival at hospital	Moderate impairment	Severe disability	Vegetative state	Severe	Vegetative state	Vegetative state
Years since aSAH	7	First 27; second 11	3	6	5	3
Location of aSAH	Parietal	First, front left lateral; second, fronto temporal right side	Anterior communicating artery	Internal carotid artery	Right temporal	Anterior communicating artery
Number of aSAH experienced	1	2	1	1 (Grade 5)	2	1 (Grade 5)
Number of unruptured aSAH	None	1	1	Multiple (3 or more)	None	None
aSAH surgical treatment	Craniotomy with clipping	Craniotomy with clipping for both; induced coma for second aSAH	Craniotomy with clipping	Induced coma, burr holes, 7 endovascular coils	Induced coma, burr holes, craniotomy with clipping and shunt	Induced coma, drain, endovascular coiling

Note: aSAH = Aneurysmal subarachnoid haemorrhage.

For those participants who had completed the online survey, results of questionnaires exploring depression, self-compassion, PTG, social support and SWB are detailed in Table 18.

Table 18: Participant from both studies- questionnaire results

Results	David	Amanda	Cameron
PTSS	Normal range	Normal range	Experienced PTSS (on clinical cut-off)
SC	Experienced self-compassion: highest sub-score SJ; lowest CH	Experienced self-compassion: highest sub-score CH; lowest OID	Experienced self-compassion: highest sub-score SJ; lowest OID
SS	High level of social support: highest sub-score EM; lowest PSI	High level of social support: highest sub-score EM; lowest AFF & PSI	Low level of social support: highest sub-score EM; lowest AFF &PSI
PTG	Experienced post-traumatic growth: highest sub-score PS; lowest RTO & NP	Experienced post-traumatic growth: highest sub-score RTO; lowest SC	Experienced low levels of PTG: highest sub-score RTO; lowest sub-score SC
DEP	Normal range	High level of depressive sx above clinical cut-off	High level of depressive sx above clinical cut-off
SWB			
SWL	Satisfied	Very satisfied	Slightly satisfied
FL	High level	High level	Moderate level
AFF BAL	Positive	Positive	Small positive
HRQOL	Highest sub-score SELF; lowest COG	Highest sub-score AUT/INDEP; lowest EM & COG	Highest sub-score AUT/INDEP; lowest SELF & EM

Note: PTSS = Post-traumatic stress symptoms; SC = Self-compassion (sub-scores: SJ Self-judgement, CH Common humanity, OID Overidentification); SS = Social support (sub-scores: PSI Positive social interaction, AFF Affectionate support, PSI Positive social interaction); PTG = Post-traumatic growth (sub-scores: SC Spiritual change, PS Personal strength, RTO Relating to others, NP New possibilities); DEP = Depression; SWB = Subjective well-being; SWL = Satisfaction with life; ; SWL- range from31 - 35 Extremely satisfied (scores of 26 – 30) Satisfied (scores of 21 - 25 Slightly satisfied (score of 20) Neutral (scores of 15 – 19), Slightly dissatisfied (scores of 10 – 14) Dissatisfied (scores of 5 - 9) Extremely dissatisfied. ; FL = Flourishing; AFF BAL = Affect balance; HRQOL = Health-related quality of life (sub-scores: SELF, COG Cognitive problems, EM Emotional problems, AUT Autonomy, INDEP Independence). Sx = symptoms.

4.2. Case Study One: David

4.2.1. Background Information

David is a middle aged Australian-born married man who currently resides in his own home with his wife and four children aged 24 years, 19 years, 18 years and 12 years, respectively. David and his family had lived and worked in the Europe and the U.S.A. prior to settling in their current location. David had previously worked full-time in an educational training role which involved him travelling around Australia and spending much time away from his family. He currently works part-time in a retail role which he states he does not enjoy: "(it) is probably the worst job I've ever done". David identified that his Christian belief was an especially important part of his life and involves weekly attendance at his local Pentecostal church which he sees as a necessity for him and has been an important part of his life since childhood. He reported that he enjoyed a close and loving relationship with his wife and children.

4.2.2. aSAH Experience

David's aSAH occurred on a weekday morning in 2010. He had followed his usual routine of going for a run on his way to work, something that had increased recently as he was in training for an upcoming fun run. This usually involved him parking his car at work then going for his run. David had felt angry at himself that morning due to yelling at his children and leaving the house in a "huff" as he drove off to work.

David was a few kilometres into his run when he experienced a feeling like his "head had exploded". He did not know what had happened and was quite confused by the symptoms he was experiencing – "I had been pushing myself and was trying to work out how this (was) happening" – as he recalled being in Queensland for work and pulling a muscle in his shoulder, initially blaming this for what was happening. Within minutes his symptoms progressed to a loss of peripheral vision and temporary paralysis down the left side of his body culminating in a severe headache: "the left side of my body froze up and I couldn't move my arm – it was just hanging". He felt shocked at that time and recalls thinking to himself, "I got upset and I thought I was not going to see … I've got four children. I tried to keep walking towards work, as I tried, I got progressively worse, and I couldn't move my left leg". He noted that he had "never experienced headaches much", and recalled:

> I quickly realised this was quite serious and the pain … it was just like your brain had blown up and I'd never experienced anything like that in my life. Like the intense pain.

It was at this time that David turned to his Christian beliefs for support:

> I leant against a tree, and I thought I'm having a stroke so I put my right hand on top of my head and prayed to God – saying something has happened to my brain, can you please make it stop.

David noticed while praying that his vision changed from blurry to clear and his other physiological symptoms reduced. He did not know why he said those words in that moment, but the pain stopped. Once his symptoms stabilised, he decided to walk to work, approximately one kilometre from where he was at that time.

On arrival at work one of his work colleagues noticed he looked unwell and suggested they search Google to determine what might have happened to him. They both decided he may have experienced hypoglycaemia. His colleague said, "I don't know mate. I think you just need a sugary drink; I think you've overdone it" and he tried to resolve this by drinking soft drink and taking a shower. However, once in the shower David's headache returned. It was at this point that he decided to drive himself to the nearest hospital emergency department for further assessment. The hospital was located four kilometres from his workplace and despite his work colleague offering to drive him, he stated that it was nothing and he would be fine to drive himself. It was not until he was driving to the hospital that he realised he was becoming more unwell. He had no recollection of the drive to the hospital or how he found the emergency department after becoming disoriented in the hospital car park. Despite this, he managed to walk into the emergency department where he remembers he was the only person there on arrival. After advising the triage nurse about his headache and other symptoms he remembers "only sitting down for 30 seconds" before he was promptly admitted, and urgent CT scans were ordered. He recalled a neurosurgical doctor attending him after his scans were completed and advising him that he had experienced a ruptured aneurysm. David, did not fully realise what he had been diagnosed with until a week later, when he acknowledged that he had experienced something serious:

> I didn't know what an aneurysm was … I'd heard of an aneurysm, a heart one … I really didn't know what it was and the severity of it when the nurse told me … or the doctor told me … coz I remember saying … well I've got this [fun run] in a couple of weeks … do you reckon I'll be right for that? She [nurse] goes, you will not be doing that for a long time, and I thought … oh … seriously … then the neurosurgeon came down and spoke to me and I do not really remember what he said … from what I could gather it was quite serious.

After experiencing an initial medical complication – "they couldn't operate (until the next day) because they had to get my blood pressure down" – David underwent emergency neurosurgery to repair his ruptured aneurysm, involving an open craniotomy and clipping. David didn't remember a great deal about his initial hospital stay, only "bits and pieces". His neurosurgeon telling him that his aneurysm was in the parietal region of the brain and that he was surprised that he had survived it:

> … he [neurosurgeon] said that it was so big, and the artery wall had stretched so much that … [i.e., if a larger tear had of occurred], you would have been dead before you hit the footpath … this is where I thought oh shit!

Despite this, his primary concern at that time was the impact of his aSAH on his wife and children:

> I think the issue is, I didn't really suffer much, and it didn't really worry me, I think I felt sorry for my wife … she got the call she was picking the kids up and was told "You better get yourself to the [hospital], your husband is here, he has a brain aneurysm" and she was beside herself. She dropped the kids off to the neighbour but did not want to tell the kids what had happened coz she had visions of me lying in bed. So, she is trying to tell the neighbour what has happened without letting them know and then she drove to the [hospital]. So that is who I, who my main, I felt sorry for her, because I was alright. But for her not to know, I remember her [wife] turning up and she was just standing there, and she asked, "How are you going?"

4.2.3. Recovery Experience

(See Appendix U for further details and more extensive elaboration of recovery experience, comprising quotations and facts around events)

4.2.4. Within-case Synthesis

David was enthusiastic to tell his story to the interviewer and was observed to be forgetful at times when recounting aspects of his experience. Despite this he managed to articulate the events leading up to his aSAH and throughout his recovery to date. David expressed frustration at not being able to engage in previously enjoyed activities and the impact his initial diagnosis had on his wife and family. He acknowledged that despite this the aSAH had brought him closer to his family through spending more time at home, particularly during recovery, when he would have previously been travelling around Australia for work.

David's initial reaction to his aSAH in situ was one of shock in which he attempted to hurriedly ascertain the causal influence on his symptoms at that time. His first instinct to attempt to ignore what was happening and keep walking towards work, and upon arriving at work refusing the help of a colleague to transport him to hospital, reflected previous findings in respect to a reluctance to seek help in some people who are experiencing a stroke-related health event, which has been attributed to a lack of education around this health condition (Zock, et al., 2016; Zock, Kerkhoff, Kelyweg, & van de Beek, 2016).

Upon realising that he may be having a stroke and not being able to continue to walk towards work, David's immediate response was to engage in a prayer to God for which he attributes an instant reversal of the majority of his symptoms that were impacting on his mobility and vision. Centring prayers have been acknowledged as a contemplative practice, particularly for people who have a strong Christian or religious faith as an important factor in maintaining mental/physical health, especially in times of stress (Ferguson, Willemsen, & Castaneto, 2010). An alternative explanation may be that by focusing diligently on a prayer in a moment of shock and fear when David most probably was experiencing the stress response and biologically an activated hypothalamic pituitary adrenal axis, this action provided a valuable calming distraction, allowing his body to also calm temporarily the initial impact of the aSAH, although this is purely postulation on reflection (Buss, 2008).

Although David did not empirically report experiencing trauma symptoms as a result of his aSAH, it was evident that he engaged in a process of rebuilding his view of the world in respect to several areas of his life. He advised that he recalled that the only aneurysm he had heard of before was an aortic one in a well-publicised businessman who died suddenly when it ruptured. In respect to his own life, he identified that he was left disappointed by those friends and church members who failed to attend or support him or his wife and children and acknowledged his pastor as being very attentive and supportive from his initial hospital admission through to current times.

David's survey results in respect to PTG identified that he had experienced a positive psychological gain from his aSAH experience, notably in respect to new possibilities, relating to others, spiritual changes and a greater appreciation of life. These results were partially congruent with his interview responses, which reflected a greater appreciation for the life he had been given, allowing him to have a second chance and living a good life moving forward, in addition to new possibilities related to his career direction and spiritual changes that involved altruism, and an increased connection with God and a decision to combine his faith in his work role but also ensure he was living according to God's plan and living his Christian values more fully than perhaps he had done previously.

David reported a high level of self-compassion on his survey responses, with positive domain sub-scores including self-kindness, and negative domain sub-scores including self-judgement, isolation and over-identification scoring the highest. Although self-compassion can involve an acknowledgement of the imperfect failing of an individual with an acknowledgement that difficulties experienced in life are inevitable, it is interesting that rather than being ‘gentle’ with himself, often he tended to engage in more self-judgemental descriptions of himself, particularly when referring to his inability to follow God’s plan and act like and live his life like a good Christian. He acknowledged that common humanity in the form of other people going through an aSAH during interview, but this was not reflected in his survey responses. It was also of note that isolation within the context of self-compassion refers to a frustration at not having things exactly as desired accompanied by an irrational and pervasive sense that the individual is the only person who has suffered or made mistakes. This empirical response was in stark contrast to David’s interview where he acknowledged statistically the impact on others around the country and the impact his aSAH has had on his wife. However, he did not elaborate on the daily impact of his aSAH recovery or what others might go through and this may have influenced this sub-domain. Similarly, David’s high response rate in the over-identification sub-domain may be reflective of his negative thoughts and feelings about himself, notably his guilt, which have caused him to be more caught up in this mindset at times when reflecting on his experience.

David reported a moderately high level of social support, scoring highest in sub-domains such as tangible support, affectionate and social interaction support, and lower in domains such as emotional and additional support. David identified that the tangible and emotional support that he received from his wife and children was pivotal in his recovery. He identified that his wife provided all transport, particularly for shopping and medical appointments. He did not report any changes in his intimate relationship with his wife, however, did acknowledge frustration being expressed by his family in relation to his short-term memory difficulties.

David reported a high level of satisfaction with his life, in addition to psychological flourishing and a moderate positive psychological affect balance. David identified that he was generally happy in his life and enjoyed the extra time that he now gets to spend with his wife and children, which his previous work role involving lots of travel had prevented him from doing. He did identify that his work role was not currently fulfilling but acknowledged that he could only manage this type of role. He reported a generally positive outlook with no ongoing psychopathology since his aSAH.

Empirically, David reported experiencing strengths in HRQOL in respect to the following sub-domains: independence, social relationships and self, and slightly lower in emotional and physical QOL. Throughout interview, David identified feeling independent in general around self-care, navigating his way around his community (i.e., noting that he was able to find the interview location independently that day), and maintaining his relationships with his church congregation, friends and family. Of note, during interview he reported feeling happy and optimistic, in contrast to his survey results which recorded lower levels for emotional and physical domains. This may be attributed to the guilt that he described in respect to the extra burden his aSAH had placed on his wife and the lack of being able to engage in the world in the way he used to (i.e., can’t listen to music, attend fun parks with the family).

4.2.5. Researcher Observation

It was apparent that David was wanting to discuss his frustration and guilt predominantly throughout the interview and he would often lose track of what he was talking about at times, requiring redirection by the researcher. David presented as a man who had operated somewhat independently from his family prior to his aSAH due to his work role keeping him away from home for large periods of the year. His acclimatisation to spending more time at home with his family appeared to occur smoothly and out of necessity due to his dependence on his family for support on discharge from rehabilitation. However, he did appear frustrated by his memory difficulties and current work role in addition to his inability to engage in previously enjoyed activities, notably such as running and listening to music. Furthermore, he acknowledged on reflection a superficiality to his religious devotion which as a result of his aSAH he was determined to rectify by becoming more invested in his faith both professionally through study and international outreach work and personally by aligning his values more specifically. This appeared to be the sole goals he was focusing on moving forward.

On reflection after this interview, and as an aSAH survivor myself, it was difficult to hear his recount of the initial rupture, which took me back to my own experience of planning my day in one direction [for David going for a run then work] with it rapidly changing to one of shock and a rush to assess the situation in situ to determine what might be happening, often due to the varying array of symptomology occurring simultaneously. Self-reflection and external supervision were sought as required; however, these aspects did not negatively impact the interview. Of note, David did not enquire as to the researcher's connection with the topic being investigated at any time throughout or post interview.

4.3. Case Study Two: Amanda

4.3.1. Background Information

Amanda is a middle aged Australian-born married woman who currently resides with her second husband. She has two children who attend boarding school. Amanda lives with her husband in a semi-rural town in Australia. Amanda has been someone who regularly travels overseas for work and leisure.

4.3.2. aSAH Experience

Amanda has experienced two aSAH's, the first being in 1993 when she was in 24 years old and the second in 2009 when she was 40 years of age and a single mother caring for her young children. Amanda advised that there was no family history of aSAH as far she was aware. She identified that she was experiencing high stress prior to both aSAH's. Amanda experienced fatigue and lethargy in the lead up to her first aSAH but attributed this to being young and still "partying hard". She described her first aSAH as occurring after getting into a verbal argument with someone. At the time she was in a remote rural location and on leaving the property where the argument occurred her sister found her in her car feeling unwell on the side of a dirt road:

> When I started having a brain haemorrhage I was miles away from home, in the middle of nowhere … my sister arrived literally as I was having the haemorrhage, and I didn't collapse, I actually got in the car, and was driving along really slowly to the point that she [sister]

> came up to the window when I pulled over and I remember this really clearly. She said, “You’re not good, are you?”, and she took me to the local hospital half an hour drive away.

On arrival at the small bush nursing hospital Amanda started experiencing a high level of pain. She recalled her father arriving at the hospital and how emotional he was: “I had never seen him cry before”. Amanda remembered that she struggled with sensory issues such as noise while being assessed at the hospital. “I just felt she [nurse] was slamming the door, and the noise, it was just unbelievable.” Amanda’s first understanding of what might have happened to her was when she overheard her dad whispering to a nurse in the background about the possibility that she may have had a brain haemorrhage. Her symptoms had progressed to a point where a decision was made to transfer her by road ambulance to a larger rural hospital. “I was so ill; I was vomiting bile and then unconscious on and off.” Amanda remembers her father travelling in the ambulance at that time:

> I could see my father crying over me. I knew exactly what was going on and my dad who is quite religious, I was able to recount this to him about two weeks after, and he was really emotional, not coz all of his religion was coming forth, but because he thought I was really dead, and he couldn’t believe that I was able to, with such clarity, say what I had experienced.

On arrival at the larger rural hospital, she was unconscious for a long time and woke to find she was having a lumbar puncture before she was then transferred via another road ambulance to a large metropolitan public hospital for further treatment. She was not aware of what had happened to her until the later part of her journey due to being groggy prior to arriving at the metropolitan hospital. She recalled coping well: “I wasn’t even scared, funnily enough; I was probably more worried about my dad coz he just wasn’t coping”. Going into her surgery Amanda remembers being conscious and feeling calm: “there was nothing I could do, and I was in the best of hands”. When she woke, she was in a high dependency ward of six patients experiencing a lot of pain, and when a cousin came to visit and told her “they had to take the lid off” she became emotional. Amanda was treated with a clip via craniotomy in the temporal region. She also had a burr hole drilled into her brain, which has left a dent. Amanda remembered feeling very vulnerable and not coping emotionally with the confronting presentations of other patients in the ward with her:

> There was an old woman opposite me in the ward chattering her teeth continually. I’d never seen anything like that, I’d never been to hospital before, and I felt vulnerable.

For Amanda, a realisation set in during those moments. “I think reality had set in and I had realised that I had come close to dying”.

Amanda’s second aSAH occurred when she was 40 years old and home in the morning talking to her partner in Sydney before taking her two young daughters to primary school. She does not recollect anything around this rupture apart from what she has been told by others. Her partner had told her that he could hear her breathing and he was screaming down the phone at her. When he was unable to rouse her, he called her ex-husband who lived 30 minutes’ drive away. At the same time, her eight-year-old daughter had found her “wedged between the bed and bedside table sounding like I was snoring”. Her daughter had then gone downstairs to tell her seven-year-old sister that “they wouldn’t be going to school today because mum is dead”. At that point, her daughters wrote a note, leaving it on the kitchen table stating that they had gone to get help. They had attempted to call an ambulance, but the phone line was still open due to the earlier phone call. They then propped open the front door with a chair and ran towards their school. It was at that point that a young woman on a bike stopped and helped them as they were screaming hysterically as they ran towards school. The woman took her daughters to the lollipop lady at their school for them to be cared for while she took another person with her to go and check on Amanda. After a short delay due to an address mix up an ambulance arrived after the young woman had contacted them. Amanda’s ex-husband arrived shortly after the ambulance and provided them with her background health history.

Amanda recalls experiencing blurred vision and paralysis down her left side. She was transported to a large metropolitan public hospital via road ambulance, a trip she does not recall. This was a different hospital to where she was treated for her first aSAH and this caused her distress:

> I remember being really upset, I wanted them to take me to the other hospital. I told them you’ve got to get me to my [previous] surgeon because that is where they have saved me before. I wanted to live. I was terrified. I had two little girls and were they [the hospital] going to do the job.

On being taken into the operating theatre she remembers feeling emotional and telling them she had two little girls and she wanted to live. She was placed in a coma for three days post-surgery and on waking was told she had been treated by a second clipping via craniotomy on the mirror side of her head to her first aSAH. She was also advised that she has a third smaller unruptured brain aneurysm.

4.3.3. Recovery Experience

(Refer to Appendix V for further details, quotations and factual recount of recovery experience in order to provide further background history).

4.3.4 Within-case Synthesis

Despite experiencing two aSAH’s and living with a third unruptured aSAH, Amanda presented as someone determined not to let the experiences hold her back personally and professionally. She acknowledged feeling very loved by her husband and children and a desire to increase awareness of the condition in the future when the right time presented itself. Amanda expressed frustration and to some degree anger that medical knowledge and her medical practitioners were unable to monitor her more effectively between aSAH’s to prevent her recurrence many years later.

Amanda completed psychometric measures as part of the online study, with her PTSS symptomology being reported as beneath the clinical cut-off score.

In respect to PTG, Amanda reported experiencing PTG with the highest sub-domains being relating to others and new possibilities and the lowest sub-domain being spiritual change. Amanda had acknowledged that her relationships particularly with her father, sister, husband and daughters had grown stronger, while those with friends who had not been supportive had been let go since her multiple aSAH’s. She acknowledged that her experiences had led her to move to a semi-rural location without hesitation as she knew it would provide a more relaxed lifestyle for her and her family, something that she may not have previously contemplated. Amanda’s reported new possibilities may explain her change in intimate relationship (i.e., marrying second husband), moving home and commencing self-employment part-time in an area that she is passionate about. She acknowledged that despite experiencing what she termed as an out of body experience her view on spirituality had not changed, but she did appreciate that during her first aSAH her father had found his strength in his religious beliefs and prayer.

Amanda reported experiencing a high level of social support across all domains, with a slight reduction in the area of emotional support from others. This result may relate in the first instance to the fact that due to several family dynamics at the time of her first aSAH her needs were perhaps not as prominent as they could have been. In respect to her second aSAH she expressed that again she was unable to indulge her own recovery needs due to the caring responsibilities for her children at that time.

Amanda reported that she had experienced self-compassion with the highest sub-domains being common humanity, self-kindness and mindfulness, and the lowest sub-domain being isolation. This may explain Amanda’s comments about seeing other aSAH patients when she had been in hospital or at follow-up appointments and realising that despite what she had been through, her outward appearance did not reflect the level of neurological impact that these other patients appeared to be living with. This may have served to help Amanda to put her own aSAH experience into context in respect to common humanity (i.e., others have felt the same way as you and are going through the same things as you). Amanda reported being kind to herself in the context of the difficulties she had experienced and was able to rationalise why she may have felt a particular way at that time. Similarly, Amanda rating high in mindfulness reflects her ability to take a balanced big picture approach to her aSAH and the emotions she has around these parts of her life. She was able to acknowledge both the high and low points of each aSAH, which may explain why she scored so high on this sub-domain. Given that isolation is the opposing self-compassion sub-domain to common humanity, which was the highest scoring sub-domain for Amanda, it is understandable that she was able to recognise that what she had gone through was a human experience, meaning something that involves pain, vulnerability, imperfection and most importantly mortality.

Amanda reported a very high level of life satisfaction, which is not surprising given she is now very positive and happy in her relationships, finances and work. Amanda scored a similarly very high level of positive affect balance and psychological flourishing. These were perhaps more surprising given she scored above the clinical cut-off for depression, therefore representing a conflict in some ways. This may be attributed to the positive aspects of her life rather than representative of a positive affective mood per se, in line with Diener’s (1984) conceptualisation of SWB. Similarly, psychological flourishing incorporates all of the aspects that Amanda is feeling content within her life (i.e., relationships, income, direction in life, work, friendships) which may be reflected in this high score.

Amanda reported a depression level significantly above the clinical cut-off. It was noted that Amanda was teary intermittently throughout the interview and when discussing aspects of her aSAH experience connected with her children. She did also recall periods of mental ill health when she was struggling to manage caring for her own needs and her children after her second aSAH, necessitating input from a psychiatrist and psychopharmacological support at that time. It was recommended that Amanda follow up with her GP to discuss this aspect of her well-being further at the conclusion of the interview.

Like social support, Amanda reported that her lowest QOL sub-domain was emotional, and the highest was her social relationships and independence. This measure is reliable and valid in patients who have experienced brain-related trauma and may along with depressive score be a more accurate clinical picture of what might have been going on for Amanda at the time of interview, despite her positive subjective reports of well-being. Emotional HRQOL relates to aspects of depression, anger, anxiety, loneliness and boredom. From our interview it was apparent that anger and depression may be the two aspects that were impacting on Amanda’s narrative around her aSAH.

4.3.5. Researcher Observation

Amanda presented as a mature and capable woman who expressed that this was the first opportunity that she had been given to talk about her aSAH experiences, for which she was grateful. She reported that she had been shocked at how emotional she became during our interview, crying intermittently, particularly when discussing the impact of her daughters finding her and thinking she was dead after her second aSAH. Amanda also presented as someone who was cognisant of the ‘face’ she showed to the world being especially important. It was not until the interview commenced that she inadvertently, due to the questions being asked, let her guard down and become visibly emotional, crying and expressing that it was the first time she had allowed herself to ‘go there’ when reflecting on the emotional and psychological toll her two aSAH's had caused her. At times I felt that Amanda may have been trying to convince me that she wasn't sad, and that her life was perfect in her view therefore she had no reason to be sad, but once she was able to let her guard down fully, almost 'ripping off the band aid', she was able to be more emotionally honest with herself. It may be that Amanda has been living a life on automatic pilot as most parents do with the business that looking after children brings, and simply has not had the opportunity to stop and sit with someone who wanted to enquire about how she was feeling about her aSAH experiences.

On reflection, whilst transcribing this interview, I resonated with Amanda's concerns around her young children should she not survive her aSAH as a similar experience to her own aSAH experience where her children witnessed her very unwell in hospital. This does trigger innate evolutionary survival mechanisms with a conflict emerging around reserving your own energy for surviving and healing versus the innate desire as a mother to be there to care, provide and keep your young children alive and safe. Of all the interviews this was the most emotional, and I resonated strongly and connected with this participant not only as a woman who had experienced something but also as mothers with a strong desire to stay alive through this life-threatening experience to be there for their children.

4.4. Case Study Three: Cameron

4.4.1. Background Information

Cameron is a 63-year-old divorced Australian woman who currently resides on her own and is self-employed in an inner-city metropolitan area. Cameron has two adult children who reside overseas. Cameron's work is conducted from a home office and involves occasional overseas travel. Cameron regards herself as physically fit and prior to her aSAH she exercised weekly.

4.4.2. aSAH Experience

Cameron was 60 years old when she experienced her aSAH in 2016. On the day of her aSAH Cameron was open water swimming, something that she enjoyed on a weekly basis and was proficient at. She remembers feeling unwell prior to going for a swim and letting a friend know as they were walking towards the water:

> I walked onto the pier then jumped in and was swimming, I was only about 100 metres out [from shore]. It felt like a can of coke in my head had gone shht, there was no pain.

A woman swimming behind her happened to be a nurse and she let her know that she was not feeling well when she caught up to her. She remembers getting out of the water and collapsing on the landing, then getting up and making her way to the change room where she took a shower. She recalls, "I remember saying I'm not feeling that great, I think I should get an ambulance". The nurse who was there told her she would take her to hospital instead of calling an ambulance.

Cameron remembers arriving at a large metropolitan private hospital and being wheeled through emergency department where "a surgeon [was] peering over me and saying you've had a subarachnoid haemorrhage, a burst aneurysm, we are taking you into surgery". Cameron immediately understood what had happened to her because her mother had experienced an aSAH at the same age and she had been required to become her carer during her recovery:

> My mother had had one at exactly the same age, and I just thought, oh, just like mum, and because she survived it, I mean she was never the same, but she survived it.

That was the last that Cameron remembered for at least a week as she was placed in an induced coma. She was told that due to the extent of her aSAH she had to be transported by ambulance to a larger public hospital as the private hospital did not have the appropriate equipment to treat her. She remembers waking up in ICU where she had “ordered food with a glass of wine, which I don’t remember at all, I don’t remember much at all”.

Cameron was diagnosed with one aSAH and one small unruptured brain aneurysm. Her aSAH was treated with clipping via a craniotomy. Her aneurysms were both located on the anterior communicating artery.

> I’m not that patient at the best of times, the tubes, apparently I was thrashing around a lot and trying to rip the tubes out and yelled at a doctor, I don’t remember that or much else.

Cameron was discharged straight from hospital to home to rehabilitate.

4.4.3. Recovery Experience

(Refer to Appendix W for further details, quotations and background of events of recovery experience in order to provide further context).

4.4.4. Within-case Synthesis

Cameron reported that she experienced mild PTG, just above the cut-off range for this measure. During interview Cameron struggled to identify aspects of her aSAH that she could reflect on in a positive way other than friendships becoming stronger (i.e., relating to others) particularly with friends who may have experienced a significant health condition themselves, along with new possibilities for awareness and growth.

Cameron's results were on the clinical cut-off for PTSS. Further exploration with Cameron revealed that she was unclear about the symptoms of stress, anxiety and depression and this could possibly be something she was experiencing, however she remained unsure.

Cameron identified that she would like more social support in the areas of tangible support, affectionate support and positive social interactions. She identified that she would like to return to previous weekly exercise groups that she had enjoyed prior to her aSAH but was yet to do so due to fear of recurrence. These groups may have played an important social connection in her life as she had made friends with several other participants, including the woman who had driven her to hospital. Cameron is currently single and lives alone, with her sons living in Europe, which may be isolating for her, particularly in those moments where she may be feeling anxious or vulnerable. She did identify having good friends but limited opportunities to connect with them. She identified a strengthening of friendships with people who had experienced medical conditions. This may be helping her to navigate the post-aSAH experience and slowly regain those connections she has missed.

Cameron reported a moderate level of self-compassion. When measured, however, the highest sub-domain was that of the negative aspect of self-compassion, being self-judgement. This domain focuses on the frustration and stress that is caused when a person is unable to get what they want, or a reality has denied them. For Cameron this is possibly related to her inability to reconnect with her previous passion of exercise and the fears she continues to hold around recurrence given she has an unruptured brain aneurysm. She has also expressed frustration with medical professionals around not monitoring her unruptured aneurysm and the need for her to find someone who could be cognisant of her passion for exercise while also acknowledging her genuine concerns around a recurrence.

Cameron reported being slightly satisfied with her life, a small positive affect and moderate level of psychological flourishing. This may be attributable to her inability to regain the life that she previously enjoyed despite most things seeming to return to normal; her biggest passion of exercise has also become her biggest fear connected with an aSAH recurrence. Similarly, her small positive affect may be reflective of her overall unhappiness with how her life currently is, particularly in the context of her low levels of social support. Similarly, her moderate psychological flourishing levels highlight that she is struggling to regain the life she once had and although she can see glimpses of it in her work, which hasn't been severely impacted by her aSAH, her private life and relationships have seen the greatest impact. It may be that Cameron's level of aspiration to regain her previous life exactly as it was possibly holding her back from moving forward in her post-aSAH life, but this remains unclear.

Cameron reported depressive levels well above clinical cut-off range. She had previously reported that she was prescribed psychopharmacological support in the form of a selective serotonin reuptake inhibitor (SSRI) for her low mood post aSAH but had decided to stop taking it some months ago without consultation with her medical practitioner. Cameron identified being unsure about what symptoms constituted anxiety, trauma or depression and felt that perhaps her feelings were not about sadness. On further exploration she identified that perhaps she was feeling depressed after all, as she identified how sad it had been for her to not be able to return to her exercise. Cameron was encouraged to discuss this further with her GP.

Cameron reported being significantly bothered by feelings of boredom, anger and depression (consistent with separate assessment for mood). She also reported being bothered with slowness, clumsiness of movement, injuries sustained post aSAH and problems with seeing and hearing, which were not mentioned extensively during interview. Further exploration with Cameron revealed that several physical impairment issues had since resolved, although she did still have concerns around whether she may be able to participate in exercise at the same level of intensity again.

4.4.5. Researcher Observations

Cameron presented as a professional, capable and independent mature aged woman. She arrived promptly for her interview despite the hot temperature that day. Cameron appeared shocked when her findings were discussed from the quantitative survey and felt that she may have improved in respect to her low mood since she completed the online questionnaires. Cameron appeared to be the most capable of handling her aSAH and more informed about the condition, as compared to other participants, as she had been a carer for her mother, who had gone through a similar event at the same age. Cameron’s anxiety appeared to be centred around whether she had done something to increase her risk, most notably engaging in purging connected with a life-long eating disorder or her engagement in regular exercise, and whether or not it was safe for her to return to this part of her life which is her passion physically and professionally.

4.5. Case Study Four: Elizabeth

4.5.1. Background Information

Elizabeth lives in a suburb of a large capital city with her husband. She has two adult children and her first grandchild aged 18 months. She previously worked in administration and was a carer for parent who was in aged care who had been unwell at that time, necessitating in her having to spend more one-on-one time providing support. She was in good health, enjoying regular gym workouts and bushwalking. She had not experienced any pre-existing factors that may have contributed to her aSAH. She described her financial status as comfortable despite the fact she has not returned to work since her aSAH. She had not experienced any issues with her mental health prior to her aSAH.

4.5.2. aSAH experience

Elizabeth's aSAH occurred unexpectedly while she was in the shower one morning in 2013. Elizabeth had been up early to get ready for work while her husband remained asleep in bed. She rose at 5:30 am and had taken a step into the shower when pain suddenly hit in her head:

> I remember thinking nothing could hurt that bad, they say pain from one to 10 but a rupture is a 50, there is nothing like I had ever felt in my life that hurt like that did.

She then passed out. When she woke up approximately half an hour later, her husband was still asleep, and she automatically thought that she had simply fainted and must have hit her head as she had collapsed. “I thought to myself, I’m going to be late for work, what am I doing?” She got up and went back into the shower at which point she realised that something was terribly wrong when she touched her face. “I’m unwell, I’m desperately, there’s something wrong … because I was trying to touch my head and I couldn’t get my hands up.” She woke her husband who told her he would call an ambulance, which she stopped him from doing, telling him it would be quicker for him to drive her to the hospital. Her husband dressed her, and they drove 15 km to the nearest hospital emergency department. On arrival Elizabeth was experiencing spasms up her neck and into her head and her husband was frantic:

> I couldn’t breathe and the moaning with it, by the time I got to the hospital I couldn’t function, I couldn’t get out of the car, I was still speaking, I remember my husband running into emergency and all of these people running out behind him.

Elizabeth was triaged after being wheeled into emergency and does not remember anything else until she woke three weeks later. On waking she was told that she had started to fit in emergency and an emergency button was activated by the nurse. She was subsequently put into an induced coma and placed in a CT scanner. Her husband was told that it was serious and that she needed to be transported to a larger metropolitan hospital for emergency surgery. She was transferred and operated on after a burr hole was completed to relieve the pressure on her brain prior to transportation. She was operated on later that night, with seven endovascular coils being inserted. She spent some time in the ward but has little memory of this. Elizabeth was transferred to an inpatient rehabilitation centre near her home.

Elizabeth recounted being physically fit and strong prior to her aSAH and struggling to understand what may have caused her rupture as a result:

> It’s a bit difficult, it’s a bit of a grey area for us, because I was extremely fit, I worked out at the gym and did a lot. Bushwalked, did all that sort of thing, I was extremely fit and very healthy … Extremely fit, and we were just thinking well the stress of all I was going through with mum, I suppose it could have put my blood pressure up.

4.5.3. Recovery Experience

(Refer to Appendix Y for further details, quotations and comprehensive background history of recovery experience to provide further elaboration).

4.5.4. Within-case Synthesis

Although Elizabeth did not complete any psychometric measures for this study, she presented as having low mood and was flat throughout interview. Despite this she detailed experiencing PTG in the form of new possibilities by engaging in new creative arts pursuits. She also detailed maintaining strong relationships with her family members. In respect to social support Elizabeth acknowledged feeling loved and supported by her family members, who have provided most of her physical and emotional support during her recovery. She reported that they often engaged in humour to make light of certain things that she may have done (i.e., inability to walk up a few stairs or remember to turn the page in her book).

She did not feel that her aSAH had strengthened her relationship with her husband and children as they were already a strong family unit in her eyes. She was unable to detail any positive that she could take from her aSAH, and this may be reflective of the fact that she continues her journey with brain aneurysms, with not all being treated yet.

She presented as determined to make positive changes in her functionality both physically and cognitively, and although her physical strength had increased it was her cognitive aspects that she continued to see limited change with. She acknowledged that she continues to struggle with acceptance of what has occurred and a deep sadness at the loss of joy in her life, particularly around her grandchild.

4.5.5. Researcher Observations

Elizabeth's interview was conducted via telephone due to her geographical location, so I was not able to physically observe her, but her voice resonated with sadness, numbness and of being emotionally stuck. She had acknowledged struggling to feel joy, even with her beautiful new 18-month-old grandchild which logically she knew she should be overjoyed about but had been unable to feel anything. This had caused her great frustration at not making any recent progress with her rehabilitation. Conversely, she also mentioned not wanting to give up despite knowing the damage was permanent and I was left inspired by her determination to keep working on her cognitive functioning regardless of what she had been advised by professionals. Overall, I was left with a mixed feeling of sadness as she described someone who has gone from living life to the fullest to describing their aSAH and ongoing unruptured brain aneurysms as robbing her of her joy and essentially robbing her and life as she knew it, although she is still glad that she had survived.

4.6. Case Study Five: Gaye

4.6.1. Background Information

Gaye is a 52-year-old Australian-born divorced woman who currently resides in the suburbs of a large metropolitan city. She has two adult children for whom she no longer provides dependent care. She is currently not working but prior to her aSAH worked full-time supporting people whose loved ones had died. She reported that she was experiencing financial difficulties and struggles to pay her bills, with little funds left over. This was the first time she had experienced an aSAH and she had no knowledge of the aneurysm's existence prior to its rupture.

4.6.2. aSAH experience

Gaye's aSAH occurred in 2015. She experienced two ruptured brain aneurysms within an hour of each other. On the day of her aSAH she had just arrived home from work and walking in the door is the last thing she can remember. Gaye advised that there was usually never anyone home after her for a good hour when she got home from work. However, that day she described it as "like a miracle", as her son came straight home earlier than usual. She was told that he had initially thought she had experienced a fall in the kitchen, but when he realised it was more serious, he ran up the road to get help from a female neighbour who was driving in her driveway. They had not been acquainted with this neighbour due to only recently moving into the neighbourhood, but this woman – unbeknownst to them

– was a trauma nurse. She came over to Gaye's house to assess her and took control of the situation:

> The next thing there was two ambulances, police cars and a helicopter on the way. They got me to hospital quite quickly, I didn't have my second rupture until they got me in the ambulance.

Gaye was transported to the nearest public hospital approximately 40 minutes' drive away. On arrival Gaye was taken to the operating theatre immediately after emergency brain scans were conducted. She was told that neurosurgeons struggled to contain the bleeding and pressure in her brain:

> My head was filling up and my family who were telling me were saying they [neurosurgeons] were showing them the scans and my brain was sort of being pushed to one side coz of all the blood. They really didn't expect me to survive.

Her family were asked to say goodbye to her five times as her doctors did not believe she would survive:

> So, each time I went in for an operation and then when I was in a coma they told my kids that they weren't expecting me to survive, and if she [Gaye] does she will more than likely have to be in a nursing home.

Gaye had burr holes drilled to relieve pressure and was treated via a shunt and clipping via craniotomy. She was advised by her doctors that she was not expected to survive and subsequently underwent five brain surgeries in total. She was placed in a coma for week and continues to experience vocal cord issues due to the breathing tube causing damage.

Gaye was discharged to a rehabilitation unit adjacent to the hospital where she spent many months learning how to walk, talk and function independently again, gradually being allowed to go home for weekends until she was eventually discharged home full-time.

4.6.3. Recovery Experience

(Refer to Appendix Z for further details, quotations, background history of recovery experience in order to provide comprehensive recount and clarification).

4.6.4. Within-case Synthesis

Gaye’s interview revealed the significant impact that her aSAH has had on her children, particularly her son, who ended up in jail again, for which she blamed herself. She was unable to find any positive aspect that may have come from her aSAH apart from her work colleagues and friends coming together to arrange a fundraiser for her. She acknowledged that a number of these people had not kept in regular contact since that time, and this had left her feeling flat. She identified that she had some close friends but struggled to socialise with them. particularly in noisy pubs due to sensitivity she now experiences with loud noise.

Gaye appeared to experience PTG in the sub-domains of greater appreciation for life and spiritual changes. This reflected her statements about being aware she had been given a second chance at life and was not wanting to waste it, and her deepening spiritual beliefs which helped her through her recovery and also to connect with her father in spirit. In respect to SC, Gaye detailed examples of self-judgement about times when she struggled to identify when she had been compassionate or kind to herself, particularly as she had recently undergone a relationship breakup, and this was the main focus of her thoughts. She continued to express feeling disrespected by her partner's daughter and this was the impetus to end the relationship but did miss her partner a great deal. She also continued to be critical of herself in respect to the impact of her aSAH on her son and express frustration towards her daughter who had taken control and was constantly reminding her to do the right thing for her health, which she dislikes.

4.6.5. Researcher Observations

Gaye presented as flat, sad and somewhat emotionally stuck due to her recent relationship breakup. Throughout the interview she had to be redirected from wanting to talk about her relationship breakup and struggling to adjust around this change in her life. It felt like her relationship breakup was an additional barrier to her moving forward with her life and cemented her already negative feelings about herself.

As a mother it was easy to sense her emotional pain around the impact her aSAH potentially had on her son's actions and involvement with police. It was also emotional to hear what her children must have gone through having to say goodbye to her five times while she was in hospital; truly devastating for Gaye and her children.

4.7. Case Study Six: Maree

4.7.1. Background Information

Maree is a 50-year-old Australian-born married woman who currently resides with her husband in the suburbs of a major metropolitan city. She has two adult children who are independent but still reside at home. Financially, Maree advised that she has no current difficulties and has money left over to spend on other things once bills are paid. Maree is a registered nurse in a large metropolitan hospital. This was her first experience of an aSAH, and she was unaware of the aneurysm's existence prior to rupture.

4.7.2. aSAH experience

Maree's aSAH occurred in 2017 when she was at work. She was taking a patient to the emergency department for assessment and also to check on her daughter who had been brought in for assessment after an allergic reaction, when she collapsed and was caught by another nurse. She was told she had a seizure then went into cardiac arrest and had to be intubated before being transported by ambulance to a larger public hospital closer to the capital city. On arrival at the larger hospital CT scans of her brain were conducted and she was diagnosed with an aSAH, located in the anterior communicating artery. Her initial treatment while she was in an induced coma was a drain to relieve pressure on the brain before endovascular coils were inserted into the ruptured aneurysm; she is unsure how many coils were utilised. Approximately four days later she was brought out of her coma, immediately recognising that she was in an ICU:

> I was allowed to wake up four days later, so it happened on a Monday evening, so they started waking me on the Thursday evening, apparently, I was responding them, but I don't remember that. The first that I remember was the Friday morning when they [doctors]did their rounds and obviously they were just sort of questioning me and they asked, "Do you know where you are?" and I looked around and obviously being a nurse, I saw it was an ICU, so I said I'm in an intensive care unit. Then they asked, "Do you know where?" And I said no, then they asked if I knew what had happened to me and I said no. I was thinking car accident. I couldn't think of anything else, so I don't remember the actual rupture, I didn't remember the actual rupture, I didn't have any pain, no warning.

Maree was able to acknowledge the good fortune in events leading up to and immediately after her aSAH:

> I guess the only positive was that I really came out pretty unscathed. They called it a grade 5 SAH because I was comatose, and the bleed was bad. The saving grace was the location where it happened being at work, so they could quickly resuscitate me and get me treatment. For an arrest, it was very quickly treated. I still don't think they thought I would come out of the coma; they said I had a 10% chance of survival and they thought I would have moderate to severe brain injury.

Her doctors did expect her to have some degree of brain injury after her aSAH, which didn't eventuate, and she was discharged home from hospital to rehabilitate.

4.7.3. Recovery Experience

(Refer to Appendix AA for further details, background history, quotations of recovery experience, in order to provide further clarification).

4.7.4. Within-case Synthesis

Maree identified experiencing PTG in the form of greater appreciation for life and spiritual change. In respect to increased appreciation for life, she detailed a reprioritisation of her life goals as the main positive to come out of her aSAH experience, notably living life for today and bringing forward her retirement as it was not guaranteed. She acknowledged that she was enjoying taking overseas trips to destinations now rather than wait and was looking forward to travelling around Australia with her husband in the next year. In respect to spiritual change, she described an embracing of reincarnation as a process for which she had resonated with strongly since her aSAH.

Maree struggled to find an example of her being compassionate to herself, although she felt that changing her work roles to other locations with less cognitive and sensorial demand was in some way making her life easier and perhaps being kinder to herself in that context. She reported that as she works in the medical field she was probably tougher on herself and engaged in more negative evaluations of her functioning in order to push herself further, although she has generally recovered well and didn’t need extensive rehabilitation on discharge from hospital.

4.7.5. Researcher Observations

Maree presented as the most medically informed participant in respect to the ‘reality’ of potential outcomes from her aSAH, out of all the interviewees due to her work role in a hospital. She acknowledged the impact not only herself but her children, particularly one who was presenting in the hospital at the time of her aSAH and overheard her being intubated and resuscitated. She identified that as her aSAH occurred at her workplace, a hospital, where she was well known, her outcome was perhaps better than what might have occurred should she have experienced her aSAH at home or in public. She noted that she collapsed in the emergency department with all medical staff and equipment located in the vicinity, and this had subsequently increased her chances of survival. In some ways she was quite matter of fact about the situation and acknowledged that she sees unwell patients every day and understands her own mortality and that of all humans. Perhaps this placed her in a stronger emotional place than other participants or alternatively she may have already been extremely resilient, and this is what she engaged in rather than develop PTG or self-compassion.

4.8. Cross-case Synthesis and Discussion

This section answers the research questions through synthesis of information obtained from the 6 interviews conducted with Australian survivors of an aSAH. Survivors told their stories of ongoing difficulties and challenges along a continuum of recovery. The first question explored was ***What is the experience***

of recovery like after an aSAH? As described in the stories told by participants in this chapter, many have dealt with numerous difficulties. It was evident that for a few people the impact on their family members, particularly children, was an important factor from initial rupture, throughout treatment and recovery. For others, frustration and lack of progress (i.e., physical, cognitive or psychological) during recovery and a lack of understanding from family and medical professionals was highlighted. Continuing impacts on psychological functioning including sub-themes involving cognitive and memory issues and depression were raised by some participants, with many reporting they had not been assessed for negative psychological outcomes (i.e., depression, anxiety or potential acute trauma symptomology) as inpatients or since their discharge from hospital (see Appendix CC). Cross-case themes under four categories: psychological, physical, social and treatment, themes and sub-themes are depicted as follows (See Figure 9).

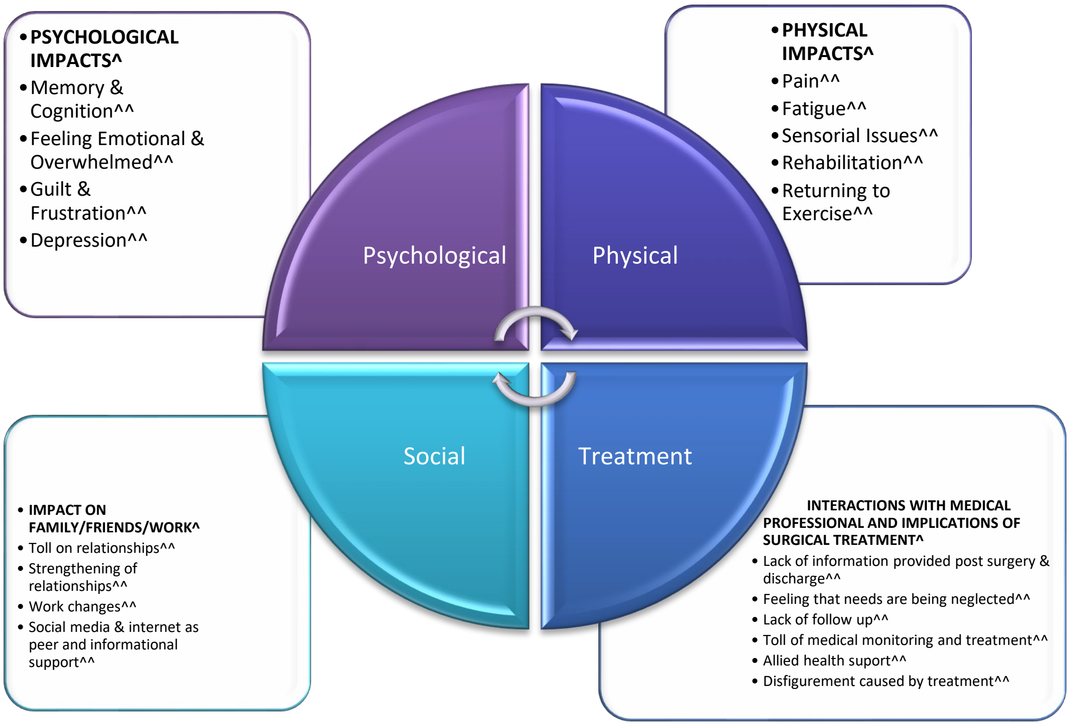

Figure 10: Categories, themes^ and sub-themes^^ experienced during recovery from an aSAH*

4.8.1. Overview

This study described the lives of Australian adults who have experienced an aSAH, examining individual characteristics and other factors involved in recovery including psychological concepts such as PTG and self-compassion. A comparative exploratory descriptive case study design allowed for an in-depth and participant-focused investigation. In each case, the individual participants demonstrated unique and comprehensive experiences filled with consistent sub-themes detailing frustration with medical professionals mixed with gratefulness for assisting to keep them alive; impacts on family and friends in the acute and long-term stages of recovery; impacts of surgical treatments and ongoing medical monitoring, particularly disfigurement for females who had experienced craniotomies; changes to work roles; PTG in the forms of feeling grateful, new directions in life, prioritising living life to the fullest, and experiencing spiritual and existential growth and change and; self-compassion in respect to self-judgement and putting their aSAH experience into context. In addition, participants detailed ongoing physical, and psychological symptomology, which is consistent with previous studies that found difficulties exist well beyond the initial aSAH experience (Boerboom, et al., 2017). Further sub-themes were apparent, such as the utilisation of social media or the internet as an information and peer support source, impact of pain and fatigue, returning to exercise, and allied health support.

4.8.2. Themes

4.8.2.1. Psychological Impacts

This theme reflected the experiences of participants in respect to the psychological and emotional functioning and well-being during the acute and recovery stages. This theme comprised sub-themes such as memory and cognition, feeling emotional and overwhelmed, guilt and frustration and depression.

Memory and Cognition

Cognitive impacts of aSAH were expressed by participants where they described struggling with attention, concentration and memory, much to the frustration of their family members and themselves. These difficulties had often led to changes in their home life around activities that they engaged in and also the type of work they were able to engage in. David expressed frustration around his ongoing short-term memory difficulties, however identified that it was a small price to pay in the overall scheme of things. David recalled that in his early recovery phase he struggled to remember the names for everyday objects:

> There was a time where I would look at that and I wouldn’t know what that was [pointing to a plastic water bottle on the table] and I wouldn’t know what it was … the names would go.

These findings are consistent with previous studies which have also documented long-term deficits, particularly in respect to working memory (i.e., especially the ability to hold and manipulate information) and executive processing (Sheldon, Macdonald, Cusimano, Spears, & Schweizer, 2013). This frustration was also evident when he had initially attempted to study a Diploma of Community services but:

> I really struggled. I can’t read stuff that is new and then have to write about it … I couldn’t remember where it was written or if that part was in this part.

Furthermore, he recalled attempting to drive a car during recovery and struggling cognitively:

> Even six months later when I could drive, I remember going to T intersections sitting there for ages coz I couldn’t remember if there were cars there, so it was very time-consuming.

Similarly, for those participants who experienced post-treatment complications such as hydrocephalus or a delayed cerebral ischemia this may have also had a significant negative impact on cognitive function. Elizabeth recounted how her husband had to assist with being a virtual ‘bookmark for her:

> Trying to remember things, I read all the time, all my husband had to do was move my bookmark in the book all the time because I wouldn't know what part of the book I had read.

This is consistent with findings which have revealed if a decreased level of consciousness at onset of aSAH is experienced, often memory and attentional difficulties ensue (Shen, Dong, Pan, Shi, & Song, 2018) with one participant revealing:

> I can't hold details so much, I think I am getting better…I feel improved with some of those things, but sometimes if my brain is going to skip that track, it doesn't matter how much I want to hold that detail it's not going to stick. It's frustrating (Elizabeth).

Feeling Emotional and Overwhelmed

Other participants recalled feeling overwhelmed and emotional at the experience they had endured. Amanda recalled:

> I remember being very emotional and they were telling me when they take the lid off, so mine were both craniotomies, so I have two clipped, mirror sides, same location opposite sides [of the brain] … so I have this big bore hole, that's the first one.

For others such as Elizabeth who struggled with cognitive, physical and psychological impairments there was an emotional void:

> It was an emptiness, that's when I started to think is there a future for me if this is what my life is going to be? Is there a future for me? I'm more remote or a bit isolated in my feelings. I just feel my emotions

> are muted. I don’t feel those huge surges of emotion that I used to have.

Guilt and Frustration

Participants also reported experiencing guilt and frustration, the antecedent to which varied. For one participant the guilt and frustration was initially around his partner having to juggle children and his needs while also being available for her needs in recovery. Alternately, some participants experienced guilt around being a survivor of aSAH when others that they have cohabitated with in hospital or rehabilitation did not survive the experience.

This guilt extended to existential reflections on why they had survived their aSAH. One participant stated that throughout recovery these feelings of guilt were amplified by the fact they were the only aSAH survivor on the acute ward:

> The surgeon said to me before I went in [for surgery] you’ve got a 10% chance of dying and you’ve got a 10% chance of a brain disability … I wasn’t happy to hear that because I thought there’s probably about 10 of us sitting in hospitals around Australia so one of us isn’t going to make it and one of us is coming out different … it’s the odds … I just thought that’s 10%, that’s bad.

This further complicated the conflict this participant was experiencing around his survival.

Depression

Only two participants reported being assessed for depression, sometime after their aSAH, which is consistent with previous studies of unmet psychological needs (Dulhanty, Hulme, Vail, Patel, & Tyson, 2019). Participants reported not being assessed for mood while in hospital or on discharge. For one participant, a psychologist diagnosed her depression and anxiety some months post discharge and was the first professional who had assessed her ongoing dysthymic mood:

> When I did see the psychologist and did their tests as well I had a high range for depression and anxiety (Gaye)

David identified that he was not assessed for his mood during his recovery after his aSAH despite experiencing times where:

> you'd sort of get a bit overwhelmed and needed to put music on and just sit down

This was amplified by the fact that David acknowledged he is someone who struggled to express his emotions or ask for help when needed.

Others had not been sure what their symptomology was (i.e., anxiety or depression) and for one participant, self-medicating with alcohol has been utilised as a coping strategy to manage low mood. These findings are in line with previous studies which found that depression and reduced QOL persist after an aSAH (Kreiter, et al., 2013).

4.8.2.2. Physical Impact

Participants did not report ongoing physical impairments that caused a limitation in their mobility, with a few reporting some proprioceptive and other movement difficulties in the early rehabilitative period that resolved with treatment.

Pain

In respect to pain, some participants reported experiencing ongoing headaches for which they were treated with prescribed analgesics, which is consistent with previous studies (Lai, Harrison, Plecash, & Field, 2018), confirming that around 23% of people experience ongoing difficulties in this area. As Elizabeth recalled:

> I was on pain meds for the first year. I was on Endone[17] and Panadeine forte[18] taking 4 Endone and 8 Panadeine forte a day and I was a mess with that. The pain in my joints, muscles, and neck and headaches was a nightmare.

David experienced a great deal of lower back pain during recovery due to the accumulated blood in his brain travelling down his cerebrospinal fluid and away from the site of his aSAH:

> … the blood came out of the artery then went out of the brain and down my spinal cord and congealed at the base of my spine and it irritated my sciatic nerve, oh man, that was the worst, the back pain was the worst.

Others described experiencing headaches post their aSAH:

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[17] **Endone** is the brand name of a pain relief medication that contains the active ingredient oxycodone hydrochloride. It belongs to a group of pain medicines called narcotic analgesics

[18] **Panadeine Forte** is indicated for the short-term management of severe pain for which other treatment options have failed, are contraindicated, not tolerated or are otherwise inappropriate to provide sufficient management of pain.

> When I was in hospital in HDU [high dependency unit] for a few days with headaches after I'd woken up and then they settled, when I left hospital (Maree)

Fatigue

Fatigue experienced post aSAH was one of the most widely reported symptom experienced by all participants interviewed. Several participants expressed their difficulties managing fatigue. This is consistent with previous research that has identified that the most commonly identified and reported post-aSAH impact is fatigue (Dulhanty, Hulme, Vail, Patel, & Tyson, 2019). Fatigue has been found to be a serious negative outcome which has the potential to also reduce long-term functionality (Buunk, et al., 2018, p. 1318; Sorbo, et al., 2019). Long-term fatigue may also be contributing towards the low mood reported by some participants.

For many participants fatigue was experienced at a level that they had never had to manage before and have wide ranging impacts in respect to all areas of their lives. One participant recalled that during the early stages of their recovery, they struggled with fatigue, resulting in them being unable to consume more than a quarter of a sandwich due to the level of physical exhaustion this exerted:

> I just couldn't eat; I didn't feel hungry and wasn't awake much … I remember taking three bites (i.e., of a sandwich) and chewing it and thinking, crap I'm tired. I slept for two hours That's ridiculous, but I didn't realise how sick I was and how bad I was until I ate that sandwich and had to sleep for two hours (David)

Maree experienced fatigue at varying levels over a short period subsequent to her aSAH, and notably an increase in fatigue once discharged home and attempting to increase daily activity which also impacted on her ability to communicate:

> All I really experienced was fatigue, for probably the first six months, really bad fatigue and when I get tired, still now when I get tired I might sound a little bit drunk, I start to slur my speech, can't find words occasionally. I didn't even realise the fatigue until I got home., I didn't realise how fatigued I was. Coz when I was in hospital, I wasn't doing anything; your meals are brought to you. But when you get home, I should have probably been doing things like walking people to the door of the ward or going to the canteen … When I got home, I would say [my fatigue was] 10/10. When I tried to make the bed, I would then have to have a rest. Then I would try to do things for an hour and then I would have to rest again .

Maree also described her fatigue as being difficult to articulate to others, with a requirement for her to pace her activity creating ongoing frustration for her family members, and leaving her feeling unsupported:

> Yeah, no that can get frustrating, like I'm so tired and they'd say let's go and do something and I'd say I'd rather stay home and have a nap. It's always frustrating when they don't understand but it's different now because my fatigue levels are much better. There are times when I can't keep my eyes open and my husband would come home and say what have you done all day and I would say, rested. And I shouldn't have to explain that. They look at you and they say you're recovered.

> [People would say] you look 100% and I [would] say well no I'm not 100% I still get fatigued, and I can't overdo it. I still need rest.

Sensorial Implications

Two participants reported difficulties with sensory difficulties comprising auditory, visual and smell. Cameron recalled noticing issues with her sense of smell while on a holiday overseas with friends. She had commented to them that after eating asparagus she had not noticed any change in the smell of her urine. She had thought that there may be a change in the asparagus grown in Europe where they were.

> I realised I couldn't smell anything. I've seen neurosurgeons and specialists and asked if it will come back, and they have said it's unlikely.

Similarly, for David, a committed runner, he found he was not able to manage listening to music and running at the same time due to it being too difficult for him:

> Now I just don't listen to music, I just have to listen to my breathing…I can't concentrate on music and keep the pace up for running, it is too many things…I also can't go on a trampoline, water slides or on rides.

Similarly, Maree struggled with visual and auditory sensory issues as well:

" I struggled with sunlight and noise".

Rehabilitation experiences

Three participants were discharged from hospital to inpatient rehabilitation wards, the longest duration of time being one year. On the whole most of these participants reported positive and supportive experiences, others struggled to justify their need to attend at all. One participant acknowledged that physically he needed support but on comparing himself to other patients felt they needed more support due to their limited mobility:

> I felt like a bit of a fraud, coz it was all these oldies, and I could walk, and these people were all on frames and wheelchairs

Some participants experienced a reduction in their ability to co-ordinate their physical movements:

> The family didn't understand how hard it was to do the simplest things. I think most people don't, they don't understand, like you lose all your instinctive movement. You've got to think about every tiny step to make yourself do it (Elizabeth)

Another recalled that he was able to recognise that he did need to relearn aspects of his functioning before he was able to be discharged home and was supported by physiotherapists to: "rewire my brain again. I sort of had to learn all that stuff again (David)

He also recalled that:

> They [physiotherapists] got me to do complex, well not complex, but you had to put your arm out and your leg out at the same time, well I

> couldn’t do that. I would put my arm up and then my brain would tell my leg to move, so I couldn’t do it.

On the whole participants reported their rehabilitation experiences were generally positive.

Returning to Exercise

Cameron struggled to return to exercise after her aSAH due to not knowing whether it may have a negative impact on her health. This led to a juggling of fears around the unknown cause of her aneurysm with her desire to maintain good health by returning to exercise that she previously loved to participate in. This was heightened by the fact that her aSAH had been experienced while exercising:

> I’m nervous, I was exercising when it happened, nervous to the point, that’s why I’ve probably changed to this second surgeon, he’s a swimmer, and cos I would say to the original one, can I get my heart rate up and blood pressure up, and he would say, yes that’s alright, wouldn’t that make me more susceptible. And I’ve been and had a stress test and had my blood pressure checked when you’re exercising but I’m still not … so I haven’t gone back to swimming as much. I would swim a lot more regularly, sometimes run, but I haven’t gone back to that.

In respect to recreational activities and returning to exercise, David acknowledged that there were some activities that he previously enjoyed that he could longer engage in due to his executive functioning and cognitive difficulties:

> I can’t run and listen to music [simultaneously], I just don’t listen to music, I just have to listen to my breathing get worse and worse. I can’t concentrate on music and keep the pace up for running, there are too many things. I also can’t go on trampolines, water slides or rides at fun parks.

4.8.2.3. Interactions with Medical Professionals and the Implications of Surgical Treatments

This theme revealed participants experienced a lack of information being provided to them by surgeons and treating doctors in both the acute and recovery phases, a feeling of their needs being neglected, a lack of follow up, the toll of medical monitoring and treatment, the importance of allied health support, and disfigurement experienced due to surgical treatment.

Lack of Information provided to survivors

It is a concern that most participants reported not being provided with diagnostic and treatment information during the inpatient or recovery phase after their aSAH. A number of participants reported that they were unsure of how many coils were inserted into their aneurysm or where their aneurysm was located in the brain, with this information failing to be provided post discharge as well, one participant recalled:

> I don’t know the exact number, they [medical staff] didn’t tell me. I kind of asked, but I don’t know how many coils. I asked them how big my aneurysm was, and they pretty well said because it ruptured we can’t really tell you. You would think they would have some idea.. so no, I don’t think I was given enough immediate information. I guess

> the more information I wasn’t given was more personal, so what happened to me, how big it [aneurysm] was, my own treatment, how to look after myself (Maree).

For Gaye, sources of dissatisfaction connected to her negative experiences with medical practitioners were varied. She described the lack of information provided around her diagnosis or prognosis as a main source of concern:

> Family, it was family, um, actually I didn’t get a lot of information out of the doctors. Yeah, I wasn’t getting much at all. Even after I came out of rehab, I’ve had nothing since. I feel really let down by the medical profession, it’s like I’ve just been swept under the rug and just you know forgotten about … No, I have had to push early last year I actually pushed to get an MRI, or something done because I was getting headaches. Yeah, I’ve just really had to push for anything.

Consistent with previous studies, patients have experienced ongoing difficulties obtaining and being provided with important diagnostic and treatment information in order to understand what they were experiencing (Von Vogelsang, Wengstrom, & Forsberg, 2004; Dulhanty, Hulme, Vail, Patel, & Tyson, 2019).

Elizabeth expressed frustration at the lack of information and direction provided to her from her doctors in respect to what she should expect during the recovery phase:

> The worst part of recovery was not having someone to say, okay this is what’s happened for you… to get past this we need you to do that,

> that, that and that. That's not available … yeah, there was a lack of information.

Information in the form of a booklet from the U.K. detailing what a subarachnoid haemorrhage was only provided to one participant; at discharge from hospital, she remembers:

> I was given a booklet, about a 30-page little booklet, I think it was from England. The biggest information was on fatigue and explaining fatigue, it was actually a very good book. The book included what your family can expect. I was also given a little diary from ICU that had little notes about what had happened to me during my time in there (Maree)

It is vital that information be provided in an accessible format. As found by a previous study, information that is of poor quality, in a difficult format to interpret, and more commonly provided to partners or family members without the patient present, compounds existing anxiety around not being provided with appropriate information about diagnosis and prognosis (Von Vogelsang, Wengstrom, & Forsberg, 2004; Choustikova, Turunen, Tuominen, & Coco, 2020). A lack of information also places carers tasked with the role of assisting aSAH patients in the recovery phase at significant burden, as they are attempting to provide vital social support whilst being potentially unsupported and under resourced. As previously found, information is also vital, particularly in respect to discharge planning, which can prevent recurrence or complications in the recovery phase (Kable, Pond, Baker, Turner, & Levi, 2017).

Feeling that needs are being neglected

A number of participants reported feeling let down by medical professionals both in the acute and post-discharge phases of recovery. Cameron expressed frustration at being discharged home with only her son to support her:

> What they did with me, they took me down a corridor of the hospital to assess if I needed to go to rehab, and they asked me to walk and because I could do a few steps they said, oh you're fine, you know even if they don't have enough rehab beds, they could send a nurse around to home, a bit like when you have a baby to check on you, because that was nice and you felt supported and it was comforting.

Furthermore, basic medical issues were found to be ignored by one participant, leading her to be re-admitted to another hospital due to her aSAH, despite the fact it was unrelated. She recalled that on discharge from hospital, despite raising concerns with nurses about urinary symptoms she was having, she ended up having to attend a different hospital emergency department, undergoing further unnecessary brain scans due to her recent aSAH where she was diagnosed with a urinary tract infection:

> You know as a woman, I spoke to the staff, and I said I need something, which they totally ignored, and they discharged me from hospital, and I ended up back in a hospital.

Cameron identified feeling ignored and further frustrated when in her opinion all she needed was Ural,[19] and given her recent aSAH she was subjected to further investigations to rule out a possible issue with her recent neurosurgery: "I was at home and my temperature had skyrocketed, so with the recent history of the brain aneurysms they had to do scans again.

Similarly, Elizabeth queried her neurosurgeon about her struggle to adjust to her ongoing impairments and was advised that their role was not to worry about her ongoing functionality but rather to keep her alive:

> I talked to my surgeon about it, and he said, look we're trained to save your life not to give you back your life. I understand, I get it, well they are doing their bit and doing the best they can but there is a big gap between saving your life and helping you come back to function as you feel you should and that was difficult to find information.

Lack of follow up post aSAH

A number of participants reported experiencing difficulties in medical follow up both with outpatient appointments, and medical treatments such as angiograms utilised for post aSAH monitoring. Gaye expressed feeling let down during the outpatient phase, particularly around the process of attending for outpatient follow-ups:

> I guess just how let down I feel with the medical profession. I had to go to see a doctor at the brain injury unit, but he was just wasting my

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[19] Ural ™ is a brand of urinary alkalising powder often used to assist when symptoms of urinary tract infection are experienced in order to provide relief.

> time. Like, I had to go every three months, um, they'd make the appointment, so they send you a letter, so I had to take time off work. It could be an 11 o'clock appointment or something in the middle of the day so you get there at 10.30 am or quarter to 11 and every time you'd be there for an hour waiting, and like he didn't really care. At that time, he would only show up half an hour after your supposed to be in there. The last couple of times I just ended up walking out. I never stayed, I walked out twice.

For those participants who had experienced more than one aSAH there were additional frustrations directed at medical professionals. Amanda expressed frustration at her treating physician's lack of follow-up after her second aSAH, which may have prevented her developing a further aneurysm. Furthermore, she also noted a change in demeanour in her physician, which she detailed as follows:

> This was after the first one, and he [neurosurgeon] was so tough, long gone was his bedside manner and he literally said to me, this was two years after the rupture, he said to me, they said there was a genetic cause, I think they should have recalled all of us, I was 26 years, they discovered there was a genetic disposition. He said to me the chances of this happening to you again are the same as anyone else walking down the street. And I remember walking down the street with my tail between my legs that I had gone in there being proactive trying to do everything to stay healthy, and I do remember being really cross about that, why didn't they recall us. Not that I would have sued anyone, but seriously they could have completely prevented my second one. But you know, intelligent medical profession discovering this, and they

> have a whole catalogue of people they have told it is never going to happen again and they did nothing. Um, so I remember being cross about that.

Toll of Medical Monitoring

The toll of medical monitoring was something that Amanda experienced, and appeared to be linked to previous surgical treatments and the implications for future symptomatic observations:

> My problem is because I have an old clip they can only do an angiography every two years. Then they moved to three years. Then they said it can go five years. But my last one I had a bad reaction, they couldn’t find a vein, so they did it without painkillers and it was fine until they started squirting a whole lot of dye through my brain. They had to stop it halfway through because my blood pressure went through the roof. I could tell something had gone wrong, because about 13 people came running into the room.

David also acknowledged the impact some follow-up medical tests had on him during recovery when he was required to attend for an angiogram, an event that left him feeling like his recovery had gone backwards:

> There was another time they put dye into an artery in my groin to my brain and did a scan of some sort and the next day I felt blab. It was like I’d gone back to recovery, so it was having those relapses which really knocked you around. Those two days were probably when I felt

> the most frustrated, but then having to then recover and seeing the improvement. You don't want to go backwards, that's the worst bit.

Others raised a desire to seek different medical opinions to manage their recovery and ongoing monitoring. Cameron sought a number of clinical opinions since her aSAH in respect to how often her unruptured brain aneurysm should be checked in order to determine whether exercise was safe to re-engage in and other issues:

> My scans are yearly, but I have kind of brought it forwards, that's the stress I have, because they are monitoring the unruptured one to see if it's growing. It's more about that, the follow-up for the other one that's been treated isn't as bad, they don't need to do that as much anymore.

Furthermore, she felt more reassured after consulting with a neurosurgeon who also enjoyed participating in the same sport that she did:

> I'm nervous, I was exercising when it happened, nervous to the point that's why I've probably changed to this second surgeon, he's a swimmer, and cos I would say to the original one, can I get my heart rate up and blood pressure up and he would say yes, that's alright. Wouldn't that make me more susceptible [to another aneurysm rupture]? (Cameron)

These fears continue for Cameron despite having positive results from a recent cardiac stress test.

Allied Health Support

A number of participants reported feeling well supported by allied health professionals such as physiotherapists, occupational therapists and psychologists during their recovery. For one participant, despite having had negative experiences with her medical doctors, she found her physiotherapist to be a valued source of support particularly around goal setting and encouragement:

> Like going to the physio like I did, they were brilliant with me, they've charted my progress and encouraged me every step. I have only started to get a bit of a level of physical fitness back, I'm definitely fitter and getting more confidence back in myself as far as my strength goes and being able to do things. I can vacuum through the house without having to sit down two or three times between, so to start improving and being able to get through the day without having to have a sleep, which was a huge achievement (Elizabeth).

Elizabeth's physiotherapists provided individualised support by pacing her sessions at a rate that was best for her, which she experienced as being safe and confidence-building:

> My physio was brilliant, they were so patient, they would do one small exercise then they'd take my blood pressure, they'd take it 10 times in an hour to see what was going on, then heart rate, watching to make sure I was okay. I felt protected with everything that I attempted with them. That was really cool and gave me confidence to try a bit harder and do a bit more.

Disfigurement caused by Surgical Treatment

The immediate and ongoing impact of the surgical treatment received after a ruptured brain aneurysm was an important factor experienced by most of the participants interviewed. For females particularly, the disfigurement caused by craniotomies involved large scars and metal staples leaving Frankenstein-like wounds, which often left them feeling unsightly, ugly and avoiding looking at themselves post surgically. Cameron recalled her feelings about her physical disfigurement post-surgery:

> I remember waking up with the shaved head and the big scar all that was a bit hard to deal with

For Cameron, the impact of the large metallic staples post-surgery left her feeling shocked at how she looked:

> Well, I mean, the staples, I had lots of staples, and I think this image of me lying in a bed with all these staples and a shaved head, it was horrible, um, you know I was in a bit of a shock.

Similarly, for Gaye, she had engaged in avoidance of looking at herself in the mirror due to the impact of her surgery:

> Well, I didn't look. My head was covered a lot of the time and I just, when I did go into the bathroom, I didn't look, coz I felt so ugly and awful, cause they had cracked open my head, it was bits shaven, and I couldn't even stand to look at myself.

Gaye experienced difficulties returning to previously enjoyed pursuits (i.e., being pampered at the hairdresser), along with several participants who highlighted the impact of disfigurement because of surgical intervention. She reported a strong desire to avoid looking at herself due to the impact of her surgery:

> I don't know, all I know now is I've got lumps and bumps all over my head and I have two holes. I go to the hairdressers and whenever there is something washing my hair, I have to say to them in case they wonder about all the lumps and bumps … No, well I didn't look. No, my head was covered a lot of the time and I just, when I did go into the bathroom I didn't' look, coz I felt so ugly and awful, cause they had cracked open my head, it was bits shaven, and I couldn't even stand to look at myself.

This is an area that has had little investigation, with only one previous study (Diccini , Yoshinaga, & Marcolan, 2009) which is consistent with the impact on self-esteem, body image and HRQOL. By contrast, for other women whose experienced appearance changes as a result of the treatment they received for their condition, for example baldness post chemotherapy in cancer patients (Serrurier, Melisko, Glencer, Esserman, & Rugo, 2012), there are alternatives to maintain self-esteem and improve overall quality of life such as wigs and headwear. Ever more important is the fact that aSAH impacts women far more than men at a time in their life, most often menopause, when their identity is undergoing further transition (Sergeant & Rizq, 2017). This is an important issue that requires further research.

4.8.2.4. Impact on Family, Friends and Work

Toll on Relationships

Family and friends played a pivotal role for all participants whether it be in providing social support and daily care, emotional support, rehabilitation support and transportation. Participants recalled their feelings about their children or spouses being told, in one case five times, that they were not likely to survive surgery due to the extent of their aSAH. Although Cameron was oblivious to what was happening to her during her initial treatment for her aSAH it was later on when she discovered what her sons had gone through while she was in a coma that she realised the impact this may have had on them:

> My sons had to deal with everything, they are both living in Europe, [became teary], but them being told, what had happened of course, they were googling stuff and then had to get on planes for 24-hour journeys, which was the hard part. I mean, I didn't know what they were going through because I was out of it, but in the aftermath, I guess I was processing a lot of that too.

Whilst Gaye recounted the emotional impact on her children, in the short and long term, after being told multiple times that she may not make it through in addition to their feelings of guilt and ongoing worries for her well-being:

> They gave me a pretty good chance of dying, so five times they [kids] had to come and say goodbye to me. So, each time I went in for an operation and then when I was in a coma, they told my kids that they weren't expecting me to survive … but if she does, she will more than likely have to be in a nursing home … my son blamed himself, he

> caused a lot of stress in my life a week before the aSAH. I had to bail him out of jail and so he sort of blamed himself and was asking the doctors can stress cause this … he was quite emotional about it.

These findings were consistent with a previous case study involving an aSAH patient and their partner five years post ictus, which found that both the family and survivor experience negative impacts to their QOL and increased stress (Brice & Brice, 2017). Similarly, for Maree a tremendous toll was experienced by her family members. She identified that distress for some family members continues to be a struggle. Maree's family members continue to have concerns around her well-being and maintaining a sense of being on guard for a further recurrence:

> I think they thought I was going to die. The doctors weren't giving them good news, they weren't saying she's going to pull through this. They told them she has a 10% chance of survival and lots of rehab and never being back to normal. They were quite scared and even in the beginning when I returned to work, this was once I was driving again so six months down the track, I was on a late shift and hadn't gotten home on time and they were panicking. They were out driving around looking for me thinking I might be in a ditch. So yeah, I think it had a bigger psychological effect on them than me. Having to go to ICU every day for the week and then high dependency and seeing me with tubes and drains and lines coming out of my neck and everywhere. So, it was harder on them than me.

Others expressed frustration around the long-term impact on their family members, including becoming controlling around behaviours (i.e., telling them don't do that or you might get another aSAH) or reverting to the worst-case scenario that they may have had another aSAH if they were late home from work. Gaye described feeling misunderstood and unheard by some family members for her ongoing impairments, leading her to feel unsupported and misunderstood:

> I hated it, I just kept doing what they wanted, just being, just agree to disagree. It has been tough; I find it hard with my daughter. She doesn't quite understand how I'm feeling. She feels lucky that I'm still here. That I should feel lucky, I shouldn't be feeling so bad. I should be happy and not down and out. I've got a second chance. But no one really knows how I feel.

Similarly, for Elizabeth who had recently become a grandmother for the first time, the feelings around that relationship were mixed:

> It's lovely and now I'm starting to feel more happiness, but initially it was really upsetting me, because I was looking at this tiny baby and I felt nothing. I know the way I used to be I should have been over the moon and walking 10 feet in the air and that was really hard.

Strengthening of Relationships

For other participants, existing relationships were strengthened as a result of the aSAH experience. David identified that his relationships are generally unchanged apart from spending more time at home with his wife and children:

> I'm more patient and probably value family and stuff more

David identified that his wife has been the main person responsible for his personal care, meal preparation and transport to appointments on his return home. David continued to feel a high level of guilt at what his wife was having to juggle at home on her own and for surviving his aSAH.

Similarly, Cameron felt well supported by friends during her recovery after her aSAH:

> People cared, I think that was it, you know at that time I was very much into Facebook, and it allowed me to keep in touch with people and take photos and post them of all the flowers so that was nice.

Gaye was well supported by family, friends and work colleagues in the aftermath of her aSAH, who came together to provide support financially and emotionally:

> The first week out [of hospital] was the night of the fundraiser and I was able to go. That was an amazing night, I was in awe of what they did, there was over 200 people turn up and they raised about $50,000. It was just amazing. That was my work colleagues that organised that. But people were there, it went everywhere, it was in the local papers. The amount of people who turned up. There were people from my childhood, from my old workplaces, the people who turned up.

Work Changes

Return to work after an aSAH was a predominant issue, with the type and hours of work changing for all but one of the participants interviewed. This is consistent with previous findings which acknowledged these aspects including the reduction of income that often occurs as a result of these changes (Dulhanty, Hulme, Vail, Patel, & Tyson, 2019). David reported that he had previously been independent and autonomous in his work role, often travelling extensively around Australia.

David advised that he had struggled to adjust back to working after his aSAH, and due to his short-term memory difficulties had to change his work to a retail position with minimal responsibility:

> Yeah, it's probably the worst job I've ever done. I couldn't find a job, and this is the one that come up, so you sort of just have to take it. I think I'd struggle if I had complex job.

Findings found that fatigue, physical and cognitive impairments contributed to participants either stopping work eventually, changing their occupation or role, or reducing their work hours. On her return to work, Maree continued to experience fatigue, and this resulted in her needing to reduce work requirements and shifts, as well as obtaining the support of her colleagues in order to manage:

> Sometimes when I was really fatigued … at work the colleagues always looked out for me, they will always come and go, are you okay. Also, with my shifts, as a nurse you might get seven shifts in a row but now I do get a bit of favouritism with the rosters, I don't get a bad run of shifts or getting fatigued they will give me the lighter load. I tell them you don't have to do that I'll take my share. But someone younger without past medical issues will take the shifts for me. So, no they do look out for me and will ask if I need a hand; it's good team nursing. So yes, I do feel that they look out for me.

This is also consistent with previous stroke studies that detail similar barriers in addition to coping and adaptation (Schwarz, Claros-Salinas, & Streibelt, 2018, p. 41). The inability to return to work for one participant meant that her financial situation had been significantly impacted, a common experience for survivors and in line with previous studies (Seule, Oswald, Muroi, Brandi, & Keller, 2020).

> Financially, I'm not good. I'm paying rent on my own and I'm finding that hard. I'm struggling in every aspect now (Gaye).

Furthermore, negative psychological sequelae has also been found to play a role in ability to return to work (Turi, et al., 2019).

Social Media and Internet as Peer and Informational Support

This study found that participants utilised and engaged in peer support and informational support by accessing the internet and social media such as Facebook, specifically aSAH private support groups.

> I've got a couple of support groups on Facebook that I'm part of for quite some years, it was great to find them, because they are people who truly understand what you're saying and why you're saying it. There's no judgment (Elizabeth).

This finding is similar to previous studies involving patients with diabetes and parents of children with genetic disorders, which found that informational and emotional support needs have been met by internet searching and connecting with others going through similar health challenges for peer support (Barton, Wingerson, Barzilay, & Tabor, 2019; Elnaggar, et al., 2020). Facebook groups, various apps and blogs have been shown to provide valuable emotional support when living with chronic health conditions (Elnaggar, et al., 2020, p. 8). Sporadic use as required was described, as Cameron reported:

> I do go in phases, and I guess that is probably the emotional side of it, when it becomes difficult that's when I'm on those sites and I've recently commented on other people's stuff.

Participants also reported using Facebook as their main source of information during the recovery period in addition to seeking out aneurysm-specific organisations via the internet. Facebook was utilised to express emotions, seek information about other people's impairment experiences, and share grief and loss and personal stories, which is also consistent with previous studies (Alotaibi, et al., 2017, p. 460). Furthermore, participant identified the use of social media to raise awareness:

> I just thought something has got to be done, so I set up a group on social media and organised an awareness walk, for aneurysm awareness (Cameron)

4.8.2.5. Experiences of PTG and Self-compassion

The second research question explored was ***How do people experience post-traumatic growth and self-compassion after an aSAH?***

In respect to experiences of PTG and self-compassion the following themes were identified: feeling grateful, new directions in life, priority on living life, spiritual and existential growth and change, self-criticism and frustration, and putting the aSAH experience in context (see Appendix DD). Cross-case themes are depicted as follows (See Figure 10).

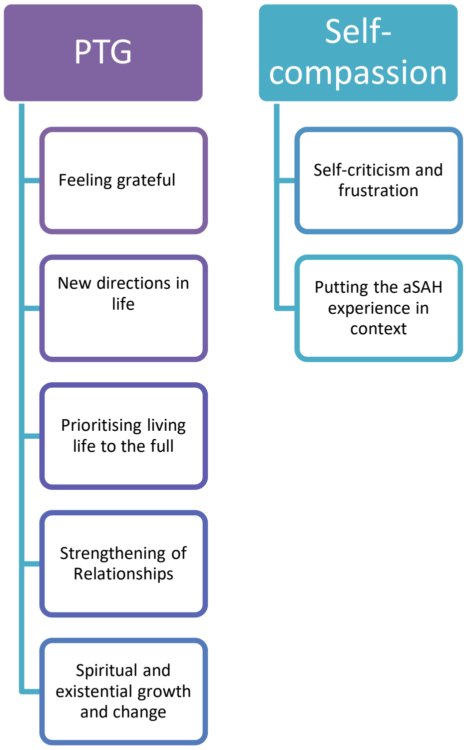

Figure 11 Post-traumatic growth and Self- compassion themes experienced after an aSAH

4.8.2.5.1. Post-traumatic Growth

PTG was experienced by participants across four sub-domains being feeling grateful, new directions in life, prioritising living life to the fullest, strengthening relationships and spiritual and existential growth and change (see Appendix BB).

Feeling Grateful

Feeling grateful and prioritising life to the fullest could be defined in terms of PTG literature as experiencing a greater appreciation for life. Greater appreciation for life is defined as:

> … increased appreciation for life in general and many smaller aspects of it along with a changed sense of what is important, described as a major shift in how a person approaches and experiences their daily life, typically involves a sense of being lucky and a radically changed

> sense of priorities and can include a change in priorities in what may have been before viewed as the little things and the recognition of the importance of things formerly taken for granted. (Tedeschi & Calhoun, 2004a, p. 6).

Participants described feeling lucky to have survived their aSAH and being given a second chance. For others it was experienced by a change of life priorities such as travelling more often and not putting off desired activities or experiences until later due to the understanding that life is precious and needs to be engaged with now. Amanda was able to recount a sense of overwhelming gratefulness for the doctor saving her life. Often this was only able to be appreciated and recognised at the first follow-up appointment:

> I remember walking into him [neurosurgeon] and having this overwhelming sense of emotion, wanting to burst into tears and throw my arms around him and thank him for saving my life.

Despite ongoing feelings of guilt and questioning why he was lucky enough to still be alive, David was able to identify aspects of positive psychological growth he had experienced since his aSAH. David identified that his survival had led him to experience a greater appreciation of life. Furthermore, David was able to view his aSAH experience as an important reminder that he had been given another opportunity to reset his life priorities:

> I think that I’ve survived it, that’s a positive. I always say to people when I’ve talked about that it’s been a positive experience. I hope that I don’t forget it and go back to how I was. I wasn’t a bad person, but it has brought me back to my values, what’s important.

In addition, David acknowledged surviving his aSAH as a timely wakeup call:

> I feel that I was given a second chance … so it’s changed me a bit … I always refer to the aneurysm as being a good kick up the bum. To say what’s important so the lessons would be that your priorities … .That I survived that’s a positive … there is a finite time that you’re here and it could finish at any time, and you need to do the right thing and what’s important.

New Directions in Life

Secondly, participants reported experiencing new directions in life. New directions in life , which could be viewed in accordance with the PTG literature’s sub-domain of new possibilities is defined as:

> One’s life or the possibility of taking a new and different path in life (e.g., personal loss was influenced by a person’s own struggle with grief to become a nurse where they could provide care and comfort to other persons suffering grief and loss). (Tedeschi & Calhoun, 2004a, p. 6)
>
> (Tedeschi & Calhoun, 2004a, p. 6).

Participants described making changes in their lives, such as studying theology with the view of obtaining future employment in order to support others as a by-product of their aSAH experience. David expressed his desire to embrace new possibilities in his life, particularly in respect to future career prospects. David recognised an opportunity to utilise and expand his Christian beliefs with the view to forge a new career path:

> I’ve gone and done some study, so I’ve done a Diploma of Theology and Ministry … I just finished that last year … I enjoyed that … I’m hoping that I get into chaplaincy or well-being, maybe in schools as a chaplain.

For others this involved undertaking vocational studies in creative arts as an initial rehabilitative exercise resulting in a potential future activity that they would not otherwise have engaged with.

Prioritising living life to the Fullest

Thirdly, participants identified that they had experienced change and future thinking detailing a reprioritising of life and financial goals as a result of surviving their aSAH:

> Probably the only thing with my mood is I don’t take things for granted so much anymore. The behavioural change, like before it was my husband and myself getting everything paid off and get ready for retirement and save our money, but now it’s like you know what, retirement isn’t guaranteed. Don’t put things [off] till later. So, yeah, that’s a change like before I would have put responsibility first, like you don’t think … I didn’t think I was going to arrest from an aneurysm. So, I’m a [medical professional] and I know people get sick and things happen all the time. But now you realise that you plan for your future, but that future is not actually guaranteed … Pretty much the changes have been more in not delaying things. So, I guess it’s about not delaying things, the reality check. If I hadn’t had the aSAH … we would still be working our butts off to build for the future. So, I

> guess it’s now more about living for the day. That was our thing, we will keep working hard for the next 10 years and retire early and travel Australia. But I am not guaranteed 10 years, no one is, and it will all be over before you get to do anything (Maree)

Strengthening of Relationships

Fourthly, participants identified positive changes in their relationships. This involved a strengthening of relationships and ways of relating to others. This deepening of their connections between participants and their families, intimate partners and friends revealed that this was one of the most important factors in their life as compared to external factors such as work or travel. For one participant the organisation of a fundraiser by family, work colleagues and friends had been a tangible example for her of the importance of those around her in the initial recovery phase:

> The first week out [of hospital] was the night of the fundraiser and I was able to go. That was an amazing night, I was in awe of what they did, there was over 200 people turn up and they raised about $50,000 dollars. It was just amazing. That was my work colleagues that organised that. But people were there, it went everywhere, it was in the local papers. The amount of people who turned up. There were people from my childhood, from my old workplaces, the people who turned up

In PTG literature relating to others is defined as:

> … closer, more intimate, and more meaningful relationships with other people, realisation that relationships are important while others may become less meaningful, you find out who your true friends are, and I cherish my husband and children a lot more and an increased sense of compassion particularly for others who share the same difficult fate is another way in which the greater connection occurs.

Spiritual and Existential Growth and Change

Finally, many participants reported experiencing spiritual and existential growth and change, which in the PTG literature may reflect the sub-domain of spiritual change which has been defined as:

> … spiritual or existential matters is another way in which some persons experience positive change in their struggles with stress and loss (e.g., you think about getting through something like that and its downright impossible to even conceive of how you ever could but that's the beauty of the thing, it's going to have to be said because I believe that God got me through). Five or six years ago I didn't have these beliefs and I don't know what I would do without him now. Individuals who are not religious or who are actively atheistic can also experience growth I this domain. There can be a greater engagement with fundamental existential questions and that engagement may be experienced as growth. (Tedeschi & Calhoun, 2004a, p. 6).

For those participants who described experiencing this change, they had strengthened their existing Christian beliefs with a view to extend Jesus's teachings of giving to others in the form of voluntary work with the homeless, while others described a new acceptance of spiritual beliefs either through Christianity or Buddhism. David was able to contextualise his experience with his Christian beliefs as a reminder that it was with God's intervention that he had survived:

> It's important for me to make sure that I've aligned my life with his plan and do good and be a positive aspect … I genuinely believe that there was a God who saved me when I felt what I felt and then the moment I finished saying that it all just came back. So, I am very appreciative of that. I don't know why out of four [sic] billion people on this Earth that's happened and I'm sure there was a lot of people that died of ruptured aneurysms that day, so why me, I don't know.

David expressed his desire to increase altruistic pursuits and give back to others as a result of his aSAH. He stated that he intended to travel overseas in coming months to provide pastoral services to less fortunate:

> I'm taking my daughter to the U.S.A. to work for a church helping the homeless. I would say to just show some care to people who are doing it tough. It's funny, you can just see people and their eyes, you see hurt …and it's just giving a damn.

Conversely, Maree's aSAH had led her to reflect on her own spiritual leanings as a result of her aSAH:

> I'm not religious or spiritual, but I like to believe in reincarnation, it's a whole cycle of actually to be arrested and almost gone and I have nothing. People will say they saw lights or there was something and I

> could see myself. And for me there was nothing, no dreams and it was like when you are born you have nothing, and this was the same.

Overall, PTG involves a number of factors including:

> … individual characteristics, support and disclosure, significant cognitive processing involving cognitive structures threatened or nullified by the traumatic events, and that play an important role. Also, PTG mutually interacts with life wisdom and the development of the life narrative and that is an ongoing process, not a static outcome. (Tedeschi & Calhoun, 2004a, p. 6)

The current study appears to embody this process of an ongoing life narrative, with some participants better able to articulate those aspects of their life that have experienced positive psychological growth more than others. This process is further complicated by the impact of cognitive impairment experienced after an aSAH. It is important to note that experiencing PTG after a cut-off illness supports the idea that recovery and thriving from illness can create a new awareness and heightened importance of the body, a novel element to the PTG process in physically traumatic situations. (Hefferon, Grealy, & Mutrie, 2009, p. 373). In the context of the current study this is an important factor as well, given the level of physical impairment reported by participants from initial surgical impacts though to fatigue, loss of strength and coordination. These physical impacts combined may influence the development of PTG by disrupting the normal process or development in some way; however, this was not investigated, specifically in this study.

4.8.2.5.2. Self-compassion

In respect to self-compassion, many participants reported experiencing self-criticism and frustration towards themselves in addition to eventually being able to put their aSAH experience into a broader context. This self-judgement and criticism reflects the literature in respect to self-compassion.

Self-Criticism and Frustration

Self-judgement opposes the positive self-domain of self-kindness, recognised as one of the hall marks of self-compassion literature (i.e., the ability to show self-kindness and compassion to the self). Self-judgement is defined as:

> … a feeling of inadequacy, comprised with a self-critical view directed at the self that involves a form of flagellation and anger at imperfects and difficulties experienced in life, there is a denial and frustration at any suffering experienced which increases stress and frustration rejecting acceptance, sympathy or kindness (Neff, 2003a, p. 87).

Self-judgemental people tend to deal with their struggles by "pushing negative emotions away in an aversive manner instead of replacing negative feelings with positive ones, positive emotions are generated by embracing the negative ones" (Germer & Neff, 2013, p. 858). Findings suggest that participants, particularly those with a cognitive impact as a result of their aSAH, experienced an emotional 'stuckness' which may account for their inability to experience self-kindness. Self-judgement findings incorporated participants being tougher on themselves and hating what they saw when they looked in the mirror, through to criticism around not being able to engage in previous pursuits they enjoyed. Others were judgemental around past behaviours and living their life in a hypocritical manner despite projecting otherwise.

One participant expressed self-critical views of himself, particularly connected with the way in which he had not been living according to God's plans:

> I probably could have done better at home at the time, and a bit of a hypocrite. So, you go to church and do whatever but you're not patient at home you can get a bit grumpy at home, you've got to not be a hypocrite.

Putting the aSAH Experience in Context

The other sub-theme reflecting putting their own aSAH experience into a broader context was reported by participants. This is defined in self-compassion literature as common humanity. Common humanity is defined as:

> Frustration at not having things exactly as we want is often accompanied by an irrational but pervasive sense of isolation – as if I were the only person suffering or making mistakes. All humans suffer, however, the very definition of being human means that one is mortal, vulnerable and imperfect. Therefore, self-compassion involves recognising that suffering and personal inadequacy is part of the shared human experience something that we all go through rather than being something that happens to me alone (Neff, 2003a, p. 87).

For one participant being exposed to others going through an aSAH, particularly in an inpatient setting, helped them to accept that they were not the only one going through a neurological condition; that there were others sometimes worse off than them. It was through this recognition that they were better able to embrace the experience and regain strength to move forward with their recovery. Interestingly, one participant went on to experience a further aSAH some years later for which she described her physical recovery being significantly better than her first as a result of an acceptance that she was not alone.

4.9. Summary and Reflections

The overall sense of experiencing an aSAH is a trajectory of recovery that may not have a conclusion point, particularly given the exhausting, confusing, frustrating experience that comprises recovery. For those participants continuing to live with further unruptured and in some case untreatable brain aneurysms, there may be a different experience in recovery as they are not yet finished this journey. The ongoing numbness and lack of joy in life, with an inability to embrace familial events that would usually bring joy, reflects a difficult experience that is yet to be completed. This finding is consistent with previous studies that found negative impacts to HRQOL and anxiety and depression in people living with unruptured brain aneurysms (Lemos, Roman-Calderon, Calle, Gomez-Hoyos, & Jimenez, 2020).

Recovery involves a change in relationships, with partners and children often becoming carers, and struggling to move forward while continuing to have fears of a recurrence. An aSAH may be described as a violation on the physical body and psyche involving fear, disfigurement, depression, trauma, pain, fatigue and reduced independence while also providing the launching pad for adversarial growth in the form of PTG and also both negative and positive domains of self-compassion.

In respect to onset of aSAH, this study found that when participants delayed seeking help at the onset of their aSAH, this was due to not understanding what was going on. One participant recognised that they may be having a stroke-related event; despite this they proceeded to ignore the symptoms they were experiencing and continued on with the events they would normally engage in that day until their symptoms became more painful and could no longer be ignored.

Furthermore, findings indicated that further information was initially obtained via searching the internet and speaking to others prior to pain become more overwhelming and to a point that it could no longer be ignored. It is interesting that, despite a recognition that the symptoms may be serious, one participant still drove themselves to a hospital, rejecting help from others to assist in this regard. Delayed help seeking is consistent with previous studies which ascribe delays in the acute stage to several factors. Firstly, whether a person has the understanding and knowledge to recognise and interpret and perceive their own acute stroke symptoms. Furthermore, personal attitudes about the seriousness of the stroke-related event have been found to occur for some people, even more so if symptoms may be fleeting or vary across the acute phase (i.e., headache, then arm tingling, then vision). Finally, an individual’s own issues about their health and potential for illness along with their opinions about emergency medical support have been found to contribute to their approach to acute medical issues such as stroke (Zock, Kerkhoff, Kleyweg, & van de Beek, 2016).

Delays in seeking help in the immediate moments after a stroke have been attributed to factors such as a lack of public education around symptomology, or a perception that symptoms being experienced are not serious (Teuschl & Brainin, 2010). Public health education in respect to strokes has included reminders of the FAST analogy (facial drooping, arm weakness, speech difficulties and time to call emergency services) (Tsakpounidor, Lotrari, Tselekidou, Baskini, & Proios, 2020), which has helped increase awareness. However, aSAH does not always present in this way. As previously stated, sometimes the only symptom may be a headache or fatigue. In the U.K. and U.S.A., the Same You (SameYou and SameYou Recovery, 2020) organisation has commenced raising public awareness of the impact of conditions such as aSAH in younger people. It is apparent that more aSAH public awareness and education is required to better inform the public of the differences in initial symptomology and the importance of seeking urgent medical assistance.

Also, for many participants this study provided a limited opportunity for them to have their voice heard. Consistent with findings of a previous study, it is evident that for some, recovery involves a struggle with "existential issues such as life, death, fate, future, meaning and meaninglessness after stroke" (Nilsson, Jansson, & Norberg, 1999, p. 259). This may be a pertinent observation for those participants who detailed feeling stuck and numb, which suggests they may be in denial, struggling to accept what has happened to them, and/or clinging to an idea of a full recovery and complete return to previous functioning. Findings suggest that there is no form of recovery that involves a full return to previous levels of physical and psychological functioning; as such, recovery may never be complete for people after an aSAH in the recognised sense of the word and this may be missing from information provided to survivors.

Of the three participants who completed both studies, results showing consistencies and inconsistencies between responses are detailed in Appendix EE. The majority of responses for all participants were consistent during interview as compared to the quantitative responses previously provided. Those that were partially consistent comprised differences in PTG sub-domains, trauma symptomology and mood. In respect to PTG, David reported the sub-domain of personal strength as the highest experienced in the quantitative study as compared to describing feeling grateful, new directions in life, and spiritual and existential changes during interview. Interestingly, David's lowest scoring PTG sub-domain empirically was relating to others. Similarly, Amanda identified the sub-domain of new directions in life during interview but did not during the online survey. Cameron similarly described new directions in life during interview but not empirically.

In respect to PTSS, Cameron's quantitative results placed her above the clinically significant cut-off, however she did not identify her aSAH experience as being traumatic for her, during interview. In respect to depression, both Amanda and Cameron reported levels of low mood above the clinical cut-off during the quantitative study but denied feeling depressed during interview. These inconsistencies may have been attributed to the fact, particularly in respect to PTSS and depression, that there was a significant time delay between studies, which may have allowed for a change in presentation and symptomology.

Finally, case studies as they were utilised in this study are just the participants own unique encounter with a complex case, therefore the author’s conceptualisation of cases included here cannot be generalised outside of the bounds of this study and requires further exploration to build upon the findings and subsequently literature.

The following chapter will present the conclusion of this thesis along with the strengths and limitations of this study and potential future directions.

Chapter 5: Conclusion

5.1. Overview

In the introduction it was noted that this was one of the first studies to investigate both PTG and self-compassion in people who had experienced an aSAH[20] , specifically exploring these concepts in addition to other aspects of recovery, as these had not been previously explored. The significance of these findings as previously discussed will be concluded here in two contexts. Firstly, the findings of the first study which explored the role of both PTG and self-compassion along with other predictors such as PTSS and social support on outcomes such as depression and subjective well-being. This study confirmed that people who have experienced an aSAH experience significant negative psychological outcomes such as depression, PTSS and reduced SWB. For some, this continues for many years post their initial aSAH. The role of PTG was explored, with findings suggesting that after an aSAH it is possible to look back on the event and develop positive psychological growth with an ability to take a more optimistic and constructive view of what one has survived and experienced. Furthermore, participants reported experiencing self-compassion, and that this has the potential to play an important role in reducing their depressive symptomology and improving their overall well-being.

Moderation analyses were conducted to explore whether PTG may be acting as a psychologically protective factor after an aSAH. Findings suggest that PTG does

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[20] aSAH- Aneurysmal subarachnoid haemorrhage

not act in this manner during the recovery period for this population. As previously stated this may be due to a number of factors, including diverse demographic and medical variables, along with the psychometric measures utilised to obtain self-report data, namely for PTSS. Similarly, SC did not play a moderating role, but was found to act as a mediator between predictors and outcomes. This finding is important and may provide a basis for further exploration in this population with the potential to negate or reduce negative psychological sequelae in this population, which is promising. Overall, results have provided a platform within the literature for future research to explore how PTG and self-compassion may be better utilised, particularly in an intervention and preventative manner to improve the lives of these populations who have survived a life-threatening medical condition.

Secondly, the findings of the subsequent study (i.e., study two) as previously discussed along with any final concluding observations or theoretical implications that both studies may contribute to the extant PTG, self-compassion and aSAH recovery literature will be noted in this section. This study has exposed a number of areas of unmet need for people who have experienced an aSAH such as a lack of information being provided to patients around diagnosis, treatment and on discharge from hospital about their aSAH, with information being provided to family members but rarely to the patient directly when they are capable of receiving that information amongst others.

These results contribute to existing literature by demonstrating that in respect to medical conditions such as an aSAH, which comprise a multitude of complexities and variances, the transformational model of PTG provides for a comprehensive examination and exploration of all the interrelated dimensions. This study was unique as one of the first studies to investigate PTG and self-compassion after an aSAH along with other aspects experienced during recovery. Some novel results were discovered that may provide important contributions to the extant aSAH, PTG and self-compassion literature and which may have implications for future prevention, treatment and support during the recovery phase. Given these findings, there is abundant room for further progress in determining how self-compassion and PTG interact and relate in differing health-related populations. Based on the findings of the quantitative and qualitative studies herein, the following important aspects relating to recovery after an aSAH are posited (see Figure 12).

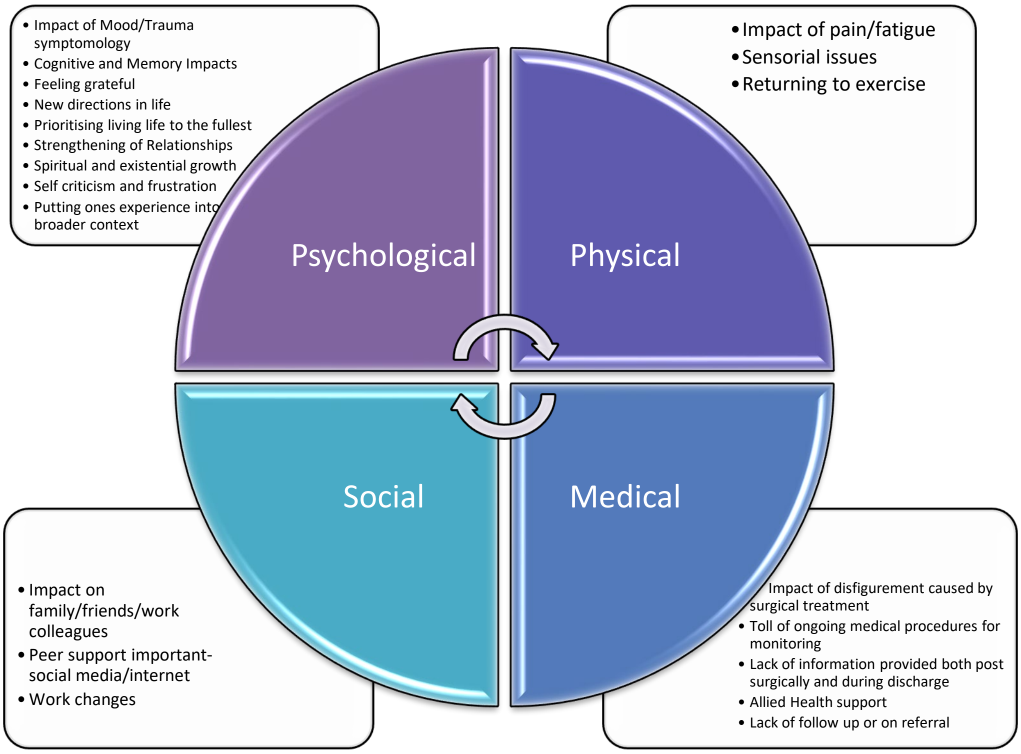

Figure 12: Factors experienced in recovery after an aneurysmal subarachnoid haemorrhage based on the results of both studies

It is noted that due to the cross-sectional nature of this study, results should be interpreted with caution, and causal relationships cannot be made. The findings in this study support the need to consider the significant ongoing impact aSAH has on an individual and the fact that recovery appears to not be a linear straight forward process, but rather an ongoing perpetuating, fluctuating and enduring one.

5.2. Strengths and Limitations of the Research

Strengths of this study included the large global sample size obtained in a population that experiences significant mortality rates. Furthermore, this study included comprehensive demographic questions in order to obtain a detailed overview of participant recovery information. Results obtained as part of the study, particularly incorporating emerging concepts such as self-compassion, further supported the idea of unique predictors being involved in respect to the development of PTG as found by Dekel, et al. (2011). The first study was limited in its scope due to its cross-sectional design and predominantly female sample. Similarly, the second study was also limited by its qualitative design, with results unable to be generalised. Overall, the study may also have been limited by its online delivery, convenience sampling, lack of a participant upper age limit, and recruitment via social media and organisational websites, which may have potentially excluded participants who are not computer or social media users. It is also possible, that despite modifying questionnaires such as the PTGI and IES-R to direct participants to answer each item in the context of their aSAH experience, as self-reported responses were reported online, it may be possible that some responses reflected other aspects of the participants experience. From a statistical perspective it is important to highlight that due to significance testing (i.e., use of alpha level of 0.05) involving no corrections for multiple comparisons there may be a potential for type 1 and 11 errors. Finally, conclusions throughout this study drew conclusions by utilising findings from other stroke related disorders in addition to those limited findings from previous aSAH studies, despite close comparisons it is acknowledged that differences exist between these populations and conclusions that have been drawn within this study are tempered by this fact.

5.3. Future Directions

This study builds upon the original work of Tedeschi and Calhoun (2004) in respect to PTG and Neff (2003a) in respect to self-compassion in that it considers the experiences of these concepts in a life-threatening medical condition (i.e., aSAH) for the first time. This study has shown that both PTG and self-compassion theory are useful to capture certain phenomena experienced by this population. In respect to methodology, the pragmatic lens allowed for a comprehensive exploration of numerous factors involved in recovery for aSAH patients which was important due to the diffuse impact throughout the brain an aSAH causes (Tolli, Hoybye, Bellander, Johansson, & Borg, 2018) as compared to the more localised impacts of an ischaemic stroke-related event. It is accepted that more "profound neuropsychological consequences" can result, compounded by the level of bleeding within the subarachnoid space, and complications such as vasospasm and hydrocephalus (Lezak, Howieson, Bigler, & Tranel, 2012, p. 234), which means a comprehensive approach is required in future research to fully understand all of these aspects.

As suggested earlier, there are many more aspects to look at which this research was not able to investigate; hence this study gives rise to more questions than solutions. Listed here in order of importance and achievability, are possible directions for future investigations stemming from this work. Firstly, future research in respect to both PTG and self-compassion would benefit from inclusion of more longitudinal (i.e., with repeated measures at different time periods to assess changes in relationships), randomised control interventional trials and further qualitative investigation. A longitudinal design would capture the PTG and self-compassion experience across multiple time frames during the recovery phase. This may have provided further opportunity for exploration in respect to the ongoing discussion around whether PTG induces cognitive or short-term change.

Secondly, future studies would benefit from exploring PTG from an age, ethnic and gender perspective to determine if there are other unique predictors involved. Further investigation into minority and vulnerable populations is important and necessary to better understand their experiences of recovery. This is important because it is possible that self-compassion, as previously explored, results in people appearing vulnerable and being exposed to negative judgement from others (Campion & Glover, 2017), which may further complicate their existing vulnerabilities.

Thirdly, as self-compassion has been found to be an important clinical intervention in respect to helping oneself improve interpersonal functioning (Germer & Neff, 2013), interventional studies targeting a reduction in depression utilising self-compassion may be beneficial in this population and other stroke-related populations, as a previous study has shown promise in other brain-injured patients (Campbell, Gallagher, McLeod, O'Neill, & McMillan, 2017).

Fourthly, randomised control trials could explore the use of self-compassion as a psychological intervention as compared to other evidenced based treatment in aSAH patients during recovery, particularly for those who report negative self-compassion symptomology, to ascertain if comparable results are possible for this population.

Fifthly, studies could also be strengthened with the inclusion of clinician reports, including accurate aSAH location and treatment information, in addition to obtaining perspectives on information provision to patients, which would benefit those future participants who are unable to remember or who have never been provided with this information.

This study was limited due to it only interviewing survivors of aSAH. Future research could benefit from and be strengthened by inclusion of other subtypes of SAH such as TBI and ABI, along with hearing from additional voices involved during the recovery of aSAH participants including clinicians, a broad range of cultural and ethnic representation, carers and family members. The inclusion of informant report from carers of people with aSAH may also be beneficial in order to clarify aspects of functioning and the overall level of impact on the family unit.

Lastly, the assessments based on the data in this thesis are suggestive only and serve merely as an indicator of a potential resource for future researchers moving forward with studies in this particular population or other stroke-related disorders.

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Appendices

Appendix P: SWLS (Subjective Well-being – Satisfaction with Life)

Appendix Q: FS (Subjective Well-being – Flourishing)

Appendix R: SPSS Output

Appendix S: Interview Schedule

Appendix T: Sample of Coding

Appendix U: Case Study – David

Appendix V: Case Study – Amanda

Appendix W: Case Study – Cameron

Appendix X: Case Study – Elizabeth

Appendix Y: Case Study – Gaye

Appendix Z: Case Study – Maree

Appendix AA: Table 19: PTG and Self-compassion Cross-case Synthesis

Appendix BB: Table 20: Comparative Case Study Synthesis – Main Themes

Appendix CC: Table 21: Comparative Case Study Synthesis – Sub-themes

Appendix DD: Table 22: Triangulation of Case Study / Quantitative Data

VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

Application for Ethical Review of Research Involving Human Participants

Application ID :	HRE17-007
Application Title :	Psychological Recovery after Aneurysmal Subarachnoid Haemorrhage: The Moderating Effects of Post-traumatic Growth.
Date of Submission :	16/01/2017
Primary Investigator :	PROF JENNY SHARPLES
Other Investigators :	DR KIM SHEARSON MS Joanne Thorburn

Introduction

Important Information

Form Version: V.13-07. Last Updated: 08/09/2014.

IMPORTANT INFORMATION FOR ALL APPLICANTS:

- Applicants are advised to follow the guidelines provided on the **Human Research Ethics website** prior to submitting this application.
- Ensure all questions are appropriately answered in plain language with correct spelling and grammar.
- All applications must be sighted and approved by all members of the research team and any relevant parties. Applications will not be reviewed without appropriate authorisation.
- To avoid unnecessary delays, please ensure application is submitted in full by the submission deadline for the relevant HREC.

You are reminded that your project may not commence without formal written approval from the appropriate Human Research Ethics Committee.

Contact:

Ethics Secretary
For help and further information regarding ethical conduct, refer to the Human Research Ethics website:
http://research.vu.edu.au/hrec.php or contact the Secretary for the Human Research Ethics Committee, Office for Research.
Phone: 9919 4781 or 9919 4461
Email: researchethics@vu.edu.au

Quest Service Desk
For technical help, refer to the Quest website: *http://research.vu.edu.au/quest.php* or contact a member of the Quest team.
Phone: 9919 4278
Email: quest.servicedesk@vu.edu.au

External Resources

- NHMRC: National Statement on Ethical Conduct in Human Research
- NHMRC: Human Research Ethics Handbook
- NHMRC: Australian Code for the Responsible Conduct of Research

Quest Guide

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Need Help? For help and instructions, we strongly recommend that you download the full Quest Online Ethics Guide (.pdf). Your questions may also be answered in the FAQ page on the Quest Website.

- **Answer All Questions**:

  Most questions are mandatory and must be completed before the application can be submitted. These questions are marked with a red asterisk (*)
- **Access Help and Tips**:

  The ? help icon, found next to questions and at the top of each page, will provide you with detailed advice on ethical content.
- **Remember to Save**:

  Use the 💾 floppy disk icon (and the ✓ green tick in some sections) regularly to avoid losing any answers. Each page will save automatically when you click *Next* ➡ or *Back* ⬅.
- **Print or Save a Copy of Your Application**:

  You can use the 📄 report icon at any stage to generate a printer friendly version of the form. Select HTML to print to screen. To save as a .pdf file to your computer select PDF then save a copy from the pop up screen. *(Don't forget to save a copy before you submit!)*
- **Submit Application**:

  When you have completed your application, click on the *Action* tab in the left-hand column and click *Submit Application*. The system will then convert the form to read-only and send it to the Ethics Secretary for review.

  You will receive an email confirmation at submission. Double check that your application has been submitted by viewing the application status in the *My Applications* page.

Responding to comments (if your application is returned)

There may be stages throughout the application process in which the Ethics Secretary will instruct you to amend your application form. These amendments will be communicated to you via 'Comments' within the eForm.

1. **Generate a List of All Comments**:

   Click the report icon, select *Comments Report* from the Document drop-down field and click *OK*. This list will show all comments created in your application and which page they are applicable to. Click *Cancel* to return to the application form.
2. **Revise your Answers**:

   Open the page which shows a red flag; these denote an Action Comment which you are required to respond to. Revise the relevant question(s) in your application form as required. Remember to click save!
3. **Respond to Action Comments**:

   AFTER you have revised your answers, you must provide a response to each Action Comment explaining to the Committee how you have addressed their communication. Open the Page Comments window and click New Comment to enter your response into the textbox. Click the green tick to save your text.
4. **Mark Comments as Responded**:

   Once you have revised your answers AND finished responding to all comments, reopen Page Comments window, use the checkbox to select the *Action Comments* and click *Mark Selected Comments as Responded*. The colour of the flag will change to yellow and the page will become Read Only.

   Important: *DO NOT mark the comments as 'Responded' until you are completely satisfied with your revised answers - you will lose access to edit the page and the comments.*
5. **Submit Revised Application**:

   Once you have addressed all of the Red Flags, open the *Action* tab and click *Submit Revised Application*. The system will then send the form to the Ethics Secretary for review. Remember to save a copy of your application by clicking the Report icon and generating a PDF or printer-friendly version.

[Office Use Only - Administration]

Application ID - *Assign HRE # using "Manage Applications"*

HRE17-007

Clearance Purpose

Research

For Review:

Assigned Ethics Committee

Low Risk Human Research Ethics Committee

Risk Level *(Enter 'High' or 'Low' or 'Neg')*

Low

Students involved in conduct of project? *(Enter 'Yes' or 'No')*

Yes

Date Accepted by Ethics Secretary

17/01/2017

For Finalisation:

Date Approved

18/01/2017

Approved Start Date for Project

18/01/2017

Approved End Date for Project

18/01/2019

Date Rejected

This question is not answered.

Date Withdrawn

This question is not answered.

Application Process Comments

This question is not answered.

[Office Use Only - Risk Assessment]

NEGLIGIBLE RISK INDICATORS
Applicant has responded YES to:

HIGH RISK INDICATORS
Applicant has responded YES to:

POSSIBLE HIGH RISK INDICATORS
Applicant has responded YES to:

3.2.e. Does the research involve participants in other countries?

LOW RISK INDICATOR
If no statements appear under the headings above, the applicant has not responded yes to any negligible or high risk indicators.

SECTION 1 - PROJECT OVERVIEW

General Details

1.1. **Ethics Category***

Human

1.2. **Project Title***

Psychological Recovery after Aneurysmal Subarachnoid Haemorrhage: The Moderating Effects of Post-traumatic Growth.

1.3. **Project Summary** (Include brief details of aims, methods and significance of the project in plain language. Maximum of 2000 characters)*

Research Aims
The overall aim of this study is to address the lack of empirical research regarding PTG, in people who have experienced an aSAH with good neurological recovery. PTG has previously been investigated in respect to traumatic disasters and illnesses. However, only one small scale study, investigating the link between cognitive processing and PTG in ischaemic stroke patients, has ever been conducted. In addition, a few small scale qualitative studies have investigated PTG in acquired brain injury (ABI) patients, of which one or two participants had experienced stroke. Subsequently, there does not appear to be any previous studies that have explored PTG in aSAH. This study will build upon existing PTG research. In particular, this study will utilise a research design which investigates PTG as a protective factor, which has previously only been conducted in breast cancer patients. This study will seek to determine if PTG is experienced by people who have suffered an aSAH with good neurological recovery, as well as the relationship between PTSS, PTG and two health outcome measures being: depression, and subjective well-being. The potential for PTG to play a protective role in decreasing negative outcomes such as depression and reduced subjective well-being will also be examined. It is anticipated that the findings of this study will assist in the development of a model of PTG after the experience of an aSAH. An online survey study will be conducted due to ease of convenience for participants as it is well known that after an aSAH people experience extreme fatigue (Kutlubaev, Barugh, & Mead, 2012). The confidential online survey will be produced utilising the Qualtrics (2009) program. The utilisation of an online survey will allow participants to access and participate in the study at their own convenience. In addition, this mode of delivery will also allow for participants to be recruited from different geographical locations world-wide.

1.4. **Primary College or Institute for Application***

COLLEGE OF ARTS

Timeline and Funding

1.5. **Period for which ethical approval is sought.** *Note: ethical approval is automatically granted for a period of 2 years from the project commencement date.*
Project commencement date:*

● Immediately upon receiving ethical approval
○ Other date

1.6. **Date the data collection is expected to be completed:***

30/06/2019

1.7. **How will the research be funded?***

☐ External grant
☐ VU grant or funding
☐ Sponsor
☐ Other
☑ Unfunded

If the research is unfunded, indicate how the project can proceed.*

Part of a Ph.D. student - research project

1.8. **Is the research a collaborative effort with another organisation?***

○ Yes
● No

SECTION 2 - PROJECT INVESTIGATORS

Investigators

2.1. **Please list all investigators associated with this project.**
The research team is the group of investigators accountable for the conduct of the project. Include details of the Primary Chief Investigator (primary contact for application), as well as all other Chief Investigators and Associate Investigators. *Student details will be requested separately.* Other staff (e.g. technicians) may perform tasks within the project although they are not necessarily investigators. They should be listed as "Other Staff" if appropriate.*

1	*ID Number*	E5019370
	Surname	SHEARSON
	Given Name	KIM
	Full Name	DR KIM SHEARSON
	College/Institute	O4102
	Email Address	kim.shearson@vu.edu.au
	Role in project	Associate Investigator
	Direct contact number	99192784
	Mobile number (for emergency use only)	[redacted]
	Qualifications, experience and/or skills relevant to the project.	BSc. Honours (Psychology), PhD. Dr Kim Shearson is currently a Coordinator and Lecturer in numerous areas of psychology at Victoria University. She has completed her PhD, which involved in-depth interviews with women experiencing intimate partner violence. Prior to her position at Victoria University, Kim was a research and development officer at Victoria Police where she managed one of the Chief Commissioner's priority research projects in the area of service delivery for family violence. This resulted in 16 recommendations for legislative and procedural change being progressed to the Minister for Police and Emergency Services and the Law Reform Commissioner. Dr Shearson also previously worked at Victoria University, in the Wellness Promotion Unit, where she also gained experience in the ethical conduct of research. Dr Shearson's prior experiences have allowed her to form a deep understanding of the possible risks that accompany being a research participant as well as ways in which such risks can be ethically minimised and responded to.
2	*ID Number*	E5000301
	Surname	SHARPLES
	Given Name	JENNY
	Full Name	PROF JENNY SHARPLES
	College/Institute	O4102
	Email Address	jenny.sharples@vu.edu.au
	Role in project	Chief Investigator
	Primary contact for application? *Note: Although an application may have multiple Chief Investigators, only one CI may be nominated as the Primary Contact.* *For student projects, the Chief Investigator/Primary Contact must be the supervisor, not the student.*	Yes
	Direct contact number	99194448
	Mobile number (for emergency use only)	[redacted]
	Qualifications, experience and/or skills relevant to the project.	BBSc, MPsych (clinical), PhD, registered psychologist with AHPRA with endorsements in clinical and community and is a registered supervisor for clinical psychologists. She is a practicing clinical psychologist and teaches both clinical and community psychology at the masters level. Professor Sharples is an experienced researcher in the field of health and illness and in qualitative methods.

Note: Please click the Question Help icon above for instructions on how to search for personnel and use this table.
Once an Investigator record has been added, click on the name in the table above to open the record and edit the information required.

If you are unable to find a personnel record in this system which must be added to your application, please use the [Request to Add Personnel to Research Database form](#) found on the Quest website.

Student Investigators

2.2. **Will any students be involved in the conduct of this project?***

● Yes
○ No

2.2.a. **If YES, is the project:***

● A STUDENT PROJECT for the degree in which the student is enrolled?
○ A STAFF PROJECT that involves a student(s) undertaking some part of the project?
○ Other

2.2.a.i. **If the research is a STUDENT PROJECT, at what level?***

PhD

* Has this project been approved by the Postgraduate Research Committee? (ie. during confirmation of candidature process)*

● Yes
○ No

2.2.b. **Please list all student investigators involved in this project.**
*Ensure the primary supervisor (not the student), has been marked as the Chief Investigator and primary contact for the application in Q.2.1.**

1	*Student ID*	S3875959
	Surname	Thorburn
	Given Name	Joanne
	Full Name	MS Joanne Thorburn
	College/Institute	O4102
	Email Address	joanne.thorburn@live.vu.edu.au
	Role in project	Student
	Direct contact number	[redacted]
	Mobile number (for emergency use only)	[redacted]
	Student's experience/qualifications relevant to the procedures and techniques to be used in the research and/or to working with the specific target population.	G Dip Psych, B Psych Studies (Honours), M Psych (Clinical), Psychologist registered with AHPRA, Member of the APS Joanne has an extensive background in teaching, advocacy, and supporting individuals from diverse backgrounds, most notably children and people with disabilities and was the former chairperson of the disability sub-committee of the Family Advisory Council at the Royal Children's hospital in Melbourne. Joanne has recently completed clinical placement at the Epworth Hospital in Camberwell as the provisional psychologist responsible for two inpatient rehabilitation wards. During this placement Joanne has extended her skills in understanding, treating and supporting people who have experienced a range of medical diagnoses including Stroke, Parkinson's Disease, COPD, metastatic Cancer, trauma and orthopaedic injuries. In addition, this role also involved Joanne working with a range of diverse client populations from various cultural and ethnic communities often at their most vulnerable and experiencing significant physical and emotional pain.

*Note: Please click the Question Help icon above for instructions on how to search for personnel and use this table.
Once a student's record has been added, click on the name in the table above to open the record and edit the information required.*

If you are unable to find a personnel record in this system which must be added to your application, please use the Request to Add Personnel to Research Database form found on the Quest website.

2.2.c. **What arrangements are in place for the supervision of student(s) when undertaking project activities?***

Monthly supervision will be maintained throughout the study with either/or both the Chief and co-investigator. More frequent supervision sessions will be arranged as deemed as necessary, dependent upon the stage of the study.

Involvement of Other Individuals/Organisations

2.3. **Will any individuals who are not members of the research team be involved in the conduct of this project?** (e.g., medical personnel involved in procedures, research contractors, teachers) *

○ Yes
● No

SECTION 3 - NATURE OF THE PROJECT

Type of Project

3.1.a. **Is the project a pilot study?***

○ Yes
● No

3.1.b. **Is the project a part of a larger study?***

○ Yes
● No

3.1.c. **Is the project a quality assurance or evaluation project (e.g., related to teaching, health-care provision)?***

○ Yes
● No

3.1.d. **Does the research involve a clinical trial (of a substance, device, psychological or physical intervention)?***

○ Yes
● No

3.1.e. **Does the research involve the use of therapeutic/intervention techniques or procedures (non-clinical trial)?***

○ Yes
● No

Target Population

3.2.a. **Does the research focus on Australian Indigenous (Aboriginal and/or Torres Strait Islander) populations?***

○ Yes
● No

3.2.b. **Does the research involve participants under the age of 18 years?***

○ Yes
● No

3.2.c. **Does the research involve participants who are highly dependent on medical care?***

○ Yes
● No

3.2.d. **Does the research involve participants who have a cognitive impairment, intellectual disability or mental illness? ***

○ Yes
● No

3.2.e. **Does the research involve participants in other countries?***

● Yes
○ No

"Supplement F - Research participants in overseas countries" must be completed in Section 11 below.

3.2.f. **Does the research involve pregnant women (with a research focus on the pregnancy) and/or the foetus (in utero or ex utero) or foetal tissue?***

○ Yes
● No

3.2.g. **Does the research involve participants who are likely to be highly vulnerable due to any other reasons?***

○ Yes
● No

Intrusiveness of Project

3.3.a. **Does the research use physically intrusive techniques?***

○ Yes
● No

3.3.b. **Does the research cause discomfort in participants beyond normal levels of inconvenience?***

○ Yes
● No

3.3.c. **Does the research collect potentially sensitive data? (e.g., related to a sensitive topic or vulnerable group; personal health/medical information; sensitive organisational strategies)***

● Yes
○ No

3.3.d. **Does the research involve deception of participants?***

○ Yes
● No

3.3.e. **Does the research involve limited disclosure of information to participants?**

○ Yes
● No

3.3.f. **Does the research involve covert observation of participants?***

○ Yes
● No

3.3.g. **Does the research produce information that, if inadvertently made public, would be harmful to participants?***

○ Yes
● No

3.3.h. **Does the research involve accessing student academic records?***

○ Yes
● No

3.3.i. **Does the research involve human genetic or stem cell research?**

○ Yes
● No

3.3.j. **Does the research involve the use of ionising radiation?***

○ Yes
● No

3.3.k. **Does the research involve the collection of human tissue or fluids?***

○ Yes
● No

3.3.l. **Does the research involve any uploading, downloading or publishing on the internet?***

○ Yes
● No

3.3.m. **Does the research seek disclosure of information relating to illegal activities or is the research likely to lead to disclosure of information relating to illegal activities?***

○ Yes
● No

3.3.n. **Does the research involve procedures that may expose participants to civil, criminal or other legal proceedings?***

○ Yes
● No

3.3.o. **Does the research involve gaining access to medical/health related personal information from records of a Commonwealth or State department/agency or private health service provider?***

○ Yes
● No

3.3.p. **Does the research involve gaining access to personal information (not medical/health) from the records of a Commonwealth or State department/agency or private organisation?***

○ Yes
● No

SECTION 4 - PROJECT DESCRIPTION

General Information

Note: All fields have a maximum of 4000 characters (unless otherwise specified) in plain text only.
If supporting documentation needs to be provided for the following questions (images, graphs etc), please upload as referenced appendices in Section 11 - "Required Attachments" below.

4.1. **Aims of the project.** Provide a concise statement of the aims of the project (maximum 2000 characters in plain language).*

The overall aim of this study is to address the lack of empirical research in respect to the role that PTG plays after an aSAH. The Biopsychosocial-evolutionary (BPSE) model has been posited as the most comprehensive conceptualisation of PTG, however, there is limited empirical evidence to support this view. This study will provide a partial test of this model with a focus on the evolutionary aspect. It is possible that this model may provide a more comprehensive explanation of the role of PTG after life threatening medical conditions such as an aSAH. PTG has been previously investigated in respect to various large scale traumatic disasters as well as a range of medical conditions, however, only one small scale study, investigating the link between cognitive processing and PTG in ischaemic stroke patients, has ever been conducted. Subsequently, there does not appear to be any previous research that has explored PTG in people who have experienced an aSAH. This study will also investigate the potential for PTG to act as a protective factor. In addition, the relationship between PTSS, PTG and outcome measures, depression, and subjective well-being (SWB) will also be investigated. This study will seek to determine: if PTG is experienced by people who have suffered an aSAH; if self-compassion (SC) and social support (SS) predict PTG after an aSAH; and also if PTG moderates the relationship between predictors (PTSS, SC, SS) and psychosocial outcomes (Depression, SWB). Finally, a qualitative phase will be conducted in order to add depth to the initial quantitative findings. This phase will seek to explore aspects of participants' lived experiences of PTG in addition to associated factors such as SC and SS.

4.2. **Briefly describe the relevant background and rationale for the project in plain language.***

Although a number of studies have investigated PTG, there appear to be limited studies that have explored its connection to the psychological recovery of people who have experienced an aSAH. Conversely, previous studies have investigated recovery after an aSAH in respect to: psychosocial adaptation (Powell, et al., 2002a), recovery (Greebe, Rinkel, Hop, Visser-Meily, & Algra, 2010), health related quality of life (HRQoL) (Hedlund, Ronne-Engstrom, Carlsson, & Ekselius, 2010b), depression (Kreiter, et al., 2013) and PTSD (Noble, et al., 2008). In addition, it has also been reported that people experience a higher risk of post-traumatic stress disorder (PTSD) due to the traumatic experience of an aSAH. Subsequently, there is a need to consider psychological as well as neurological recovery after an aSAH. PTG literature is growing in respect to its existence as an important coping mechanism in recovery after critical illness. Therefore, it is important to understand what role PTG plays in the recovery process for people who have experienced an aSAH. In addition, limited research has been conducted investigating SC and SS and their relationship with PTG as well as the role these variables may play in predicting PTG after an aSAH. In addition, the BPSE model that will be utilised for this study incorporates mechanisms such as the adaptive response, the threat and drive systems as well as the ability to self-soothe after a traumatic experience. These evolutionary mechanisms have been previously shown to play an important role in trauma recovery, which may mean that they also play an important role after the experience of an aSAH, however, this has not been previously investigated. There have been limited qualitative studies investigating PTG, most notably there are none in this population. As a result a final qualitative phase will be included to expand upon the quantitative results discovered with a view to uncovering unique themes pertaining to recovery. Similarly, there has not been any previous research investigating SC and SS in this population. Therefore, this study brings together SC, SS and BPSE concepts in order to better understand PTG after a traumatic and life threatening medical condition. Consequently, findings from this research may have the potential to build upon existing knowledge in respect to PTG and also build upon the currently limited research pertaining to psychological recovery after an aSAH. It is also envisaged that the findings from this study may assist in the formulation of an illness specific PTG model after an aSAH. Finally, this study may also assist clinicians in devising treatment interventions, in order to better support clients experiencing ongoing negative psychological outcomes after an aSAH or other stroke related conditions.

4.3. Methodology and procedures

Include specific details relating to any measures, interventions, techniques, and/or equipment used in the research.
Provide step-by-step details of the procedures with particular reference to what participants will be asked to do.
Provide details separately for different phases or conditions of the research or, where appropriate, different participant groups.*

Phase 1- Quantitative
Participants
Participants will be adults aged 18 years and above who have experienced an aSAH.
Materials
Psychometric measures that will be utilised include:
Demographics Questionnaire (Appendice A)
- Will also include questions pertaining to aSAH (i.e., presentation at hospital, location, treatment, etc.).

Assessment of Aneurysmal Subarachnoid haemorrhage
- Modified questions based on the Glasgow Coma Scale (GCS) (Teasdale & Jennett, 1974) will be included to assess aSAH at time of rupture (Appendice B).

Self-Compassion (Appendice J)
- Self-compassion scale (SCS) (Neff, 2003a), 26 items, 5 point Likert scale, with: 1 "Almost never" to 5 "Almost always".

Social Support (Appendice K)
- Medical Outcome Study: Social Support Survey (MOS-SSS) (Sherbourne & Stewart, 1991), 19 items, 5 point Likert scale, with 1 "None of the time" to 5 "All of the time" (Appendice E).

Post-Traumatic Growth (Appendice F)
- Post-Traumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996),

21 Items, 6 point Likert scale, with: 0 "I did not experience this change as a result of my crisis" to 5 "I experienced this change as a result of my crisis".
Post-traumatic Stress (Appendice E)
- Impact of Event Scale – Revised (IES-R) (Horowitz, Wilner, & Alvarez, 1979; Weiss & Marmar 1996), 23 items, 5 point Likert scale, 0 "Not at all" to 4 "Extremely". 3 Sub scales comprising hyperarousal, avoidance and intrusion.

Depression (Appendice F)
- Center for Epidemiological Studies – Depression Scale- Revised (CES-D-R) (Radloff, 1977; Eaton Smith, Ybarra, Muntaner, & Tien, 2004), 20 item measure, 5 point Likert scale with 0 "Not at all or less than 1 day" to 4 "Nearly every day for 2 weeks".

Subjective Well-being
- Scale of Positive and Negative Experience (SPANE) (Diener, et al., 2009), 12 items, Select from 1 "very rarely or never" to 5 "Very often or always" for the following: Positive, Negative, Good, Bad, Pleasant, Unpleasant, Happy, Sad, Afraid, Joyful, Angry and Contented. Provides three sub-scores: Positive, Negative and balance between positive and negative scores (Appendice H).
- Satisfaction with Life Scale (SWLS) (Diener, Emmens, Larsen, & Griffins, 1985).

5 items, with 1 "Strongly disagree" to 7 "Strongly agree" for the following items: "In most ways my life is ideal", "The conditions of my life are excellent", "I am satisfied with my life", "So far I have gotten the important things I want in life", " If I could live my life over, I would change almost nothing" (Appendice I).
- Flourishing Scale (FS) (Diener, et al., 2009), 8 items, 5 point Likert scale with 1 " Strong disagreement" to 5 "Strong agreement" (Appendice G)

Health related Quality of Life
In order to assess level of impairment after an aSAH so that individual responses may be controlled for the following measure has also been included.
- Quality of Life after Brain Injury (QOLBRI) (von Steinbuchel, et. al., 2010a, 2010b),

37 items, 6 sub scales (Cognition, self, daily life and autonomy, social relationships – 5 point Likert scale, with 1 "Not at all satisfied" to 5 "Very satisfied"; Emotions and Physical – 5 point Likert scale (reverse scored) with 1 "Very bothered" to 5 "Not bothered at all") (Appendice C).

Use this textbox if additional room is required for Question 4.3.

Procedure
An online study, utilising the Qualtrics (2009) program, which is maintained on a secure Victoria university server, was chosen due to ease of convenience for participants as it is well known that after an aSAH people experience extreme fatigue (Kutlubaev, Barugh, & Mead, 2012). The online study will allow participants to save responses and sign back in, should they tire or require longer time to complete the measures. Therefore, the utilisation of an online survey will allow participants to access and participate in the study at their own convenience, in their own home. In addition, this mode of delivery will also allow for participants to be recruited from different geographical locations within Australia and in other predominantly English speaking countries world-wide such as the: U.K., U.S.A., Canada, and New Zealand. Online studies have reported advantages including accessibility and increased distribution, vital for studies which are recruiting participants world-wide (Wright, 2005). As an alternative a paper based questionnaire pack will also be made available to participants should they prefer to utilise this in place of the online questionnaire.

Phase 2- Qualitative
Participants
It is envisaged that a small sample of approximately six to ten participants from Victoria, Australia, will be recruited in order to provide sufficient data for this phase of the study. All participants will be adults aged 18 years and above who have experienced an aSAH.
Materials
A semi-structured interview schedule will be constructed and domains investigated therein will be informed by results of the quantitative phases of the study. The overall aim of interviews will be to investigate participants' lived experience of PTG and predictors such as SC and SS.
Procedure
Semi-structured interviews will be utilised for this study. Interviews will be conducted either in the participant's homes, at the university campus or via telephone. A series of open ended questions will be asked over duration of approximately one hour. Content domain will be determined by the results of the quantitative phase of the study. It is envisaged that domains will focus on aspects of the lived experience of PTG after an aSAH. All interviews will be audio taped and transcribed verbatim. Transcription will be conducted by a registered stenographer who is separate from the study. The stenographer will be required to sign a confidentiality agreement (Appendice O). To ensure participant confidentiality and anonymity a pseudonym will be coded and utilised for each interview and assigned prior to commencement of recording. Participants in both phases will be provided with the contact details for both the chief investigator, and associate investigator in addition to Lifeline/Lifeline International, and local support services in their country, in order to discuss any aspects of the study that may have caused them distress. In addition, the contact details for a psychologist independent of the study will also be provided to Australian participants (Appendice P). Participants will be advised that they have the right to withdraw from the study at any time and their data provided from interview will be destroyed.

Data Collection

4.4. **Indicate all types of data to be collected.***

☑ Questionnaire / survey responses*
☑ Individual interview responses*
☐ Other data
☐ Group interview or focus group responses*
☐ Participant observations
☐ Blood or tissue samples
☐ Physiological measures
☐ Biomechanical measures
☐ Accessed health / medical records or data
☐ Accessed student academic records or data
☐ Archival data

* Attach copies of questionnaires to this application in Section 11 - "Required Attachments" below.

* Attach copies of interview schedules to this application in Section 11 - "Required Attachments" below.

4.5. **Does the research only include the collection of anonymous and non-sensitive data (e.g. online survey, observational data) that poses no foreseeable risks or discomfort to participants?** *Any foreseeable risk must be no more than inconvenience.**

○ Yes
● No

4.6. **Does the research only include the use of non-identifiable and non-sensitive data from an existing database? (e.g., data mining).**
*Such data should pose no foreseeable risks or discomfort to individuals whose information is contained in the database, or to individuals/organisations responsible for the database.**

○ Yes
● No

4.7. **Does the research involve photographing or video recording of participants?***

○ Yes
● No

4.8. **Who will be collecting the data?** (give details for all types of data collected and all persons involved)*

Data collected will comprise of responses according the the requisite psychological questionnaires (see attachments). Responses will be provided via a likert scale response whereby participants select the most appropriate response from 1 to 5, or more dependent upon the individual measures requirements.
The second phase of the study will involve individual interviews with participants located in Victoria, Australia.
Data will be primarily collected by the student investigator, however the Chief supervisor and co-supervisor will also have access to the data during the course of collection and on completion of the study.

4.9. **Where will the data be collected?** (give details for all types of data collected and all locations)*

Data will be collected entirely online via the Victoria University owned and managed Qualtrics online survey program located on the university's secure server.
Interview data will be collected via individual interviews conducted either face to face or via telephone. It is important to note that as this study is an explanatory sequential study with an initial quantitative phase informing the direction of the subsequent qualitative phase - an interview schedule for the second phase is not currently available and will be devised after analysing and interpreting the results of the initial phase.
A folder in the Victoria University R drive will serve as the main repository for all data at the conclusion of the study.

4.10. **How will the data be analysed?** (give details for all types of data collected)*

Descriptive statistics will be performed along with correlations and hierarchical multiple regression analyses, in order to determine if there is a relationship between PTG, PTSS, depression and subjective well-being. To test for moderation effects, the interaction term for PTSS and PTG will be entered into the prediction model (i.e., one model for both depression and subjective well-being). SPSS will be utilised for all data analyses.

Interview data will be analysed according to the principles of interpretive phenomenological analysis. All interviews will be de-identified and transcribed verbatim by a registered stenographer who is not part of the study. All participants will be assigned a pseudonym prior to the commencement of recording to maintain their confidentiality. The registered stenographer will be required to sign a confidentiality agreement prior to being provided with participants interview responses (Appendice O).

4.11. **Who will have access to the data collected?** (give details of all persons who will have access to the data)*

Student investigator, chief investigator and co-supervisor will all have access to the data during the course of the study and on completion of the study.

4.12. **Will individuals or organisations external to the research team have access to any data collected?***

○ Yes
● No

SECTION 5 - PARTICIPANTS

Participant Group Details

5.1. **Provide details of all distinct participant groups below.**
Please be as precise as possible, if specific details have not been determined you must indicate that they are approximate.

Group 1
Details of specific participant population:*

All participants will be adults who have experienced an aneurysmal subarachnoid haemorrhage.

Number of participants: *

A sample size of at least 114 participants will be recruited for the study.

Age range of participants:*

18 years and above

Source of participants:*

Participants will be recruited via online advertisements within Australia and in countries listed in Supplement F-section 11 of this document. A link to the online study will be published via Australian and international stroke foundations, neuro-surgical associations, ASSBI and brain foundation websites. In addition the link will also be advertised via social media such as facebook and twitter to closed support groups comprising of survivors of an aSAH. A dedicated facebook and twitter page will be created in order to distribute the study's online link, as well as study updates. Flyers (Appendice M)and postcards (Appendices N and O) will also be produced and displayed in the waiting areas of major neuro-surgical treatment, rehabilitation and allied health outpatient clinics in hospitals in, Australia and world-wide, that is attended by people who have experienced an aSAH.

*Record details for additional group? (Group 2)**

● Yes
○ No

Group 2
Details of specific participant population:*

This group is a subgroup of participants from Group 1. All participants will be adults who have experienced an aneurysmal subarachnoid haemorrhage and be residing in Victoria, Australia

Number of participants: *

At least 6 to 10 participants will be recruited for this study

Age range of participants:*

18 years and above

Source of participants:*

Participants will be recruited as part of the online study- at the conclusion of the study participants will be asked if they would like to participate in further interviews in respect to their recovery and if so, to provide their contact details. The student researcher will make contact with those participants that have indicated they would like to participate further via telephone and/or email and obtain written consent to participate in this study. Participants who reside in Victoria, Australia will only be recruited for this phase of the study.

*Record details for additional group? (Group 3)**

○ Yes
● No

Participant Selection

5.2. **Provide a rationale for the sample size.***

Green (1991) stipulates that a minimum sample size of N > 104 plus the number of predictor variables is sufficient to calculate sample size for regression analyses, therefore a sample size of at least 114 participants will be recruited for the quantitative phase of this study.

For the second qualitative phase It is envisaged that a small sample of approximately six participants will be recruited in order to provide sufficient data for this phase of the study. Small sample sizes are appropriate for phenomenological studies as the emphasis is on gaining comprehensive accounts of the experiences of each of the individuals involved (Smith & Osborn, 2004; Smith, Flowers, & Larkin, 2009). Sampling utilised in phenomenological studies ensures that all participants have experienced the phenomenon in question (Polit, Beck & Hungler, 2001).

5.3. **Does the project include any specific participant selection and/or exclusion criteria beyond those described above in Question 5.1?***

○ Yes
● No

5.4. **Will there be a formal screening process for participants in the project?** (e.g. medical/mental/health screening)*

○ Yes
● No

5.5. **Does the research involve participants who have specific cultural needs or sensitivities?** (e.g., in relation to the provision of informed consent, language, procedural details)*

○ Yes
● No

5.6.a. **Does the research involve a participant population whose principal language is not English?***

○ Yes
● No

5.6.b. **Will documentation about the research (e.g., Information to Participants form and Consent form, questionnaires) be translated into a language other than English?***

○ Yes
● No

SECTION 6 - RECRUITMENT OF PARTICIPANTS

Recruitment and Informed Consent

6.1. **Will individuals other than members of the research team be involved in the recruitment of participants?***

○ Yes
● No

6.2. **How will potential participants be approached and informed about the research and how will they notify the investigators of their interest in participating?**
Attach copies of the "Information to Participants Involved in Research" form and any flyers or other advertising material to be used in the research in Section 11 - "Required Attachments" below.

Participants will be recruited via online advertisements within Australia and overseas. A link to the online study will be published via Australian and International Stroke Foundations, and Brain Foundation websites. In addition the link will also be advertised via social media such as facebook and twitter to closed support groups comprising of survivors of an aSAH. Flyers (Appendice L) and post cards (Appendics M and N)will also be produced and displayed in the waiting areas of major neuro-surgical treatment, outpatient and rehabilitation clinics in hospitals in Melbourne, Australia and internationally. The flyer will contain the link to the confidential and secure online Qualtrics (2009) survey. These clinics are frequented by people who are being treated for an aSAH.

Qualitative Phase: An additional question at the conclusion of the online quantitative study requesting provision of contact details if interested in participating in the next phase will be included in order to recruit participants. This interview option will only be available to Australian participants.

6.3. **Will potential participants be given time to consider and discuss their involvement in the project with others (e.g. family) before being requested to provide consent?***

● Yes
○ No

6.4. **How will informed consent be obtained from participants?***

☑ Participants be required to sign an informed consent form
☐ Consent will be implied e.g. by return of completed questionnaire
☑ Verbal consent will be obtained and recorded (audio, visual or electronic)
☑ Other

Attach copies of Consent Forms to be used in the research in Section 11 - "Required Attachments" below.

Other, provide details: *

A consent statement will be included at the start of the online questionnaire. Participants will be required to read and provide their consent by ticking a box at the bottom of the first screen, prior to being given access to the questionnaire.

6.5. **Provide procedural details for obtaining informed consent:***

The first page of the study will contain a plain language statement for (Appendix S- Australian participants; Appendix U for overseas participants) in respect to the study and an online consent form (Appendix R- overseas). Participants will be required to provide their consent at the commencement of the online study by indicating 'yes'. Only those participants that signify a 'yes' response on the initial online study page will be able to access and complete the study.

In respect to the qualitative phase of the study, participants will be required to complete a paper based consent form (Appendix Q) after reading the plain language statement. Participants who have completed the first online survey phase and provided their contact details will be emailed a copy of the plain language statement and consent form pursuant to the interview phase for them to consider prior to the arrangement of a mutually convenient interview time.

On the day of the interview, participants will be asked if they have read all of the previously provided information in the plain language and consent documents and have any further questions prior to commencement of the interview. Interviews will not proceed until written consent has been provided by participants. Participants will be advised that they are free to withdraw from the study at any time and that all data obtained from interviews will be destroyed. In addition, if participants become distressed during interview they will be given the option of taking and break and then subsequently recommencing interview or withdrawing from the study.

Participants will be provided with the contact details for the Chief investigator, Associate Investigator and Lifeline/Lifeline International, in addition to support agencies located in their requisite country, in order to discuss any aspects of the study that may have caused them distress. Australian participants will be provided with the contact details of Dr Carolyn Deans a clinical psychologist who is independent of the study (Appendix P). Participants will be advised that they have the right to withdraw from the study at anytime. In respect to the online Qualtrics study, participants will be advised that they are able to withdraw from the study up until the point of submission of their responses. .

6.6. **Will you be seeking consent in order to contact participants in the future for related research participation and/or use participants' data for related research purposes?***

○ Yes
● No

Competing Interests

6.7. **Will any dual relationship or conflict of interest exist between any researcher and potential or actual participants?** (e.g., a member of the research team is also a colleague or friend of potential participants)*

○ Yes
● No

6.8. **Does the research involve participants who are in dependent or unequal relationships with any member(s) of the research team or recruiting organisation/agency (e.g. counsellor/client, teacher/student, employer/employee)?***

○ Yes
● No

6.9. **Will you be offering reimbursement or any form of incentive to participants (e.g., payment, voucher, free treatment) which are not part of the research procedures?***

○ Yes
● No

6.10. **Is approval required from an external organisation?** (e.g., for recruitment of participants, data collection, use of premises)*

○ Yes
● No

SECTION 7 - RISKS ASSOCIATED WITH THE RESEARCH

Physical Risks

7.1.a. **Are there any PHYSICAL RISKS beyond the normal experience of everyday life, in either the short or long term, from participation in the research?***

○ Yes
● No

Psychological Risks

7.1.b. **Are there any PSYCHOLOGICAL RISKS beyond the normal experience of everyday life, in either the short or long term, from participation in the research?***

● Yes
○ No

High probability risks:*

Not applicable.

Low probability risks:*

Both phases of the study involve a low risk that participants may experience short-term discomfort as a result of answering questions and discussing their recovery experiences after an aSAH.

How will the risk(s) be minimised?*

HREC guidelines in respect to ethical research practices will be utilised to guide this research. The wellbeing of participants involved in this research is paramount and the overriding priority.

The first page of the online survey (preceding the questionnaires) will include a plain language statement that will inform participants of the nature of the research and the demands that accompany participation. In this plain language statement participants will also be informed that taking part in this research may be emotionally distressful. Participants will also be informed of their rights to cease completing the survey at any time prior to submission of their online questionnaire responses.

Similarly, interview participants will be advised they may withdraw from the study at any stage. In addition, if participants become distressed during interview, they will be provided with the option of taking a break and subsequently if they wish to continue with the interview or withdraw from the study.

The contact information of the chief investigator, associate investigator and support services such as Lifeline and/or a comparative phone counselling support service located internationally will be provided to participants at the beginning and end of the online survey and/or individual interview, as applicable, so that they may seek help and assistance if they feel the need to.

In addition, the contact details of Dr Carolyn Deans a clinical psychologist independent of the study for will be provided to Australian participants (Appendix P).

How will these risks be managed if an adverse event where to happen?*

In case of any adverse events, participants will have the option to contact the chief investigator and/or associate investigator in addition to/ or Lifeline (a 24 hour hotline aimed at crisis support and suicide prevention. 13 11 14), or their comparative phone counselling/support service located in their international location. In addition, Australian participants will be provided with the contact details of a psychologist who is independent of the study should they require further support.

As mentioned earlier, participants will be provided with this information at the beginning (prior to commencing with the survey questions) and end of the online survey as well as prior to and on completion of the individual interview phase of the study.

In the case that the chief investigator and/or associate investigator is contacted and additional assistance is required by participants, then the chief investigator will seek advice and guidance from a clinical psychologist, Dr Carolyn Deans, who is independent of the study (Appendice P), and provide referrals and further support options to participants should this be deemed necessary.

As previously mentioned, should a participant become distressed during the interview phase of the study, they will be given the option of taking a break and subsequently deciding if they wish to discontinue the interview and withdraw from the study.

Confidentially and anonymity will be protected at all times.

Social Risks

7.1.c. **Are there any SOCIAL RISKS beyond the normal experience of everyday life, in either the short or long term, from participation in the research.** (e.g., possible inadvertent public disclosure of personal details or sensitive information)*

○ Yes
● No

Other Risks

7.2. **Does the research involve any risks to the researchers?***

○ Yes
● No

7.3. **Does the research involve any risks to individuals who are not part of the research, such as a participant's family member(s) or social community (e.g., effects of biographical or autobiographical research)?***

○ Yes
● No

7.4. **Are there any legal issues or legal risks associated with any aspect of the research that require specific consideration (i.e., are significant or out of the ordinary), including those related to:**

- participation in the research,
- the aims and nature of the research,
- research methodology and procedures, and/or
- the outcomes of the research?

*

○ Yes
● No

7.5. **Risk-Benefit Statement:**
Please give your assessment of how the potential benefits to the participants or contributions to the general body of knowledge would outweigh the risks. *Even if the risk is negligible, the research must bring some benefit to be ethical.**

There is currently limited research in respect to psychological recovery after an aSAH. Previous research has highlighted some variance in psychological outcomes after an aSAH, particularly for those who have experienced an otherwise good neurological recovery. Of note, findings have highlighted an increased risk of PTSS after an aSAH. PTSS has the potential to develop into PTSD if not appropriately identified and treated. Similarly, the concept of PTG has not been studied in people who have experienced an aSAH at all. Although PTG has been extensively researched in a number of other medical conditions, little is known about its influence in psychological recovery after an aSAH. In addition, the relationship between post-traumatic stress, depression and subjective well-being after an aSAH, has not been extensively investigated at all. It is important to understand the potential for PTG to act as a protective buffer against the development of negative psychological outcomes. The potential for PTG to provide a psychologically protective role after an aSAH has never been investigated. It is envisaged that the findings of this study will assist clinicians working with people in their recovery after an aSAH, particularly in respect to understanding the role PTG plays in that recovery.

SECTION 8 - DATA PROTECTION AND ACCESS

Data Protection

8.1. **Indicate how the data, materials and records will be kept to protect the confidentiality/privacy of the identities of participants and their data, including all hardcopies, electronic files and forms.** *See help for definitions.**

○ Data and records will be entirely anonymous
● Data and records will be coded and non-identifiable
○ Data and records will be coded and re-identifiable
○ Some or all of the retained data and records will include personally identifying information
○ Other

8.2. **Who will be responsible for the security of and access to confidential data and records, including consent forms, collected in the course of the research?***

Student Researcher, Chief Investigator and Associate Investigator.

8.3. **Where will data, materials and records be stored during and after completion of the project?** Provide full details of the location for all types of data.
Note: The VU Research Storage provides secure digital storage and long term retention for research project data including graduate research projects.

During the project:*

All data obtained from the first quantitative phase of the study will be stored on the secure Qualtrics survey system, owned and managed by the secure server operated by Victoria University, for a duration of five years.

Both quantitative and qualitative data collected as part of the study will be de-identified to maintain confidentiality and backed up to a USB/Harddrive which will be securely stored in a locked cabinet by the chief investigator.

Upon completion:*

All data obtained from both the quantitative and qualitative phases of the study will be stored in a designated R drive folder, owned and managed by the Victoria University server, for a duration of five years. Qualitative data will be de-identified and coded prior to transcription and storage.

8.4. **Indicate the minimum period for which data will be retained.** See help for definitions.*

○ Indefinitely
● 5 years post publication
○ 7 years post publication
○ 15 years post publication
○ 25 years after date of birth of participants
○ Other

8.5. **Who will be responsible for re-evaluating the data/materials after the retention period and considering a further retention period for some or all of the data/materials?***

Chief Investigator

8.6. **Will you transfer your data or materials to a managed archive or repository during the project, after the project, or after the retention period? Which discipline specific or institutional archives will be considered?**
*Note: Some funding agencies and publishers may require lodgement with an archive or repository. Retain a copy at VU where possible.**

No

8.7. **When further retention of data and materials is no longer required, responsible disposal methods should be adopted. Disposal software should also be adopted if digital software, computer hardware, disks or storage media are reused or retired. What methods of appropriate disposal or destruction will be employed?**
Note: Personal, sensitive or confidential information, both digital and hardcopy, will require secure destruction or disposal. For other materials you may need to refer to the Hazardous Materials Policy, Animal Ethics Standard Operating Procedures, or the Ethics and Biosafety site found on the VU Office for Research website. *

All data will be destroyed in accordance with Victoria University policy for disposal of data.

SECTION 9 - DISSEMINATION/PUBLICATION OF RESEARCH RESULTS

Publication Details

9.1. **Indicate how the results of this research will be reported or published.***

☑ Thesis
☑ Journal article(s)
☐ Book
☐ Research report to collaborating organisations
☑ Conference presentation(s)
☐ Recorded performance
☐ Other

9.2. **Will any contractual agreement exist between the researchers and a third party that will restrict publication of the research findings?***

○ Yes
● No

9.3. **Are there any other restrictions on publications or reports resulting from this project?***

○ Yes
● No

SECTION 10 - OTHER DETAILS

Comments

10.1. **In your opinion, are there any other ethical issues involved in the research?***

○ Yes
● No

10.2. **Additional information and comments to support this application:**

This question is not answered.

SECTION 11 - DOCUMENTS, ATTACHMENTS AND SUPPLEMENTARY FORMS

Supplement F - Research participants in overseas countries

You have indicated in Question 3.2.e. that the research involves participants in other countries.

Applicants are requested to refer to the NHMRC National Statement Chapter 4.8 when completing this section.

1. **List all countries in which the research will be conducted:***

Australia
U.S.A.
United Kingdom
New Zealand
Canada

2. **Provide a brief summary of all research activities (e.g., recruitment, data collection) to be undertaken in the overseas country(s).***

The majority of recruitment for this study will be conducted online, utilising social media platforms such as Facebook and Twitter, via a link to the online Qualtrics study. The study will also be advertised with flyers and post-cards, situated in outpatient treatment clinics in hospitals located within Australia. In addition a link to the study will be advertised via the websites and newsletters of Brain Foundations and Stroke foundations in each country.

Provide details of investigators' knowledge/experience in conducting research in the country(s) listed above. (In particular, knowledge of culture, values, language, standards for conducting research, ethical and legal aspects)

3.1. Chief Investigator:*

The CI has no experience with conducting research overseas. However, the countries in which the study will be advertised and from which participants will be sourced are very similar to Australia in terms of social, cultural, linguistic, political and legal structure.

3.2. Co-investigators:*

The co-investigator has no experience conducting research overseas. However, the countries in which the study will be advertised and from which participants will be sourced are very similar to Australia in terms of social, cultural, linguistic, political and legal structure. Furthermore, her prior research experience in the area of policing domestic violence involved recruiting a particularly vulnerable population which necessitated a thorough understanding of the possible risks that accompany being a research participant as well as ways in which such risks can be minimised and responded to ethically.

3.3. Student researchers: (if none, indicate what training will be provided to the student(s) and when)*

The student researcher has had no experience in conducting research outside of Australia. The student researcher is a registered psychologist who has recently completed a Masters of clinical psychology. As part of this extensive training over a two year period she has gained experience in providing psychological counselling and support to clients from diverse international backgrounds who presented with a diversity of religious, cultural, gender and sexual/gender orientation factors. This intensive training has provided her with the necessary skills to be able to conduct research with participants located outside of Australia. As this study will only be recruiting participants who reside in countries where English is the predominant language, it is not envisaged that further training will be required. In addition, countries that will be the focus of this study share similarities with Australia in areas such as culture, values, and language. In addition these countries also share similar ethical and legal approaches in respect to the conducting of research, therefore, it is envisaged that these matters will not be problematic in respect to recruiting participants from the abovementioned countries.

4. **Will the student researcher(s) be located in the overseas country(s) during the course of the research?***

○ Yes
● No

Describe the role(s) of each investigator in the overseas component of the research project.

5.1. Chief Investigator:*

Supervise compilation of the on-line survey and analysis of quantitative data obtained from the survey.

5.2. Co-investigators:*

Supervise compilation of the on-line survey and analysis of quantitative data obtained from the survey.

5.3. Student researchers:*

The student researcher will be responsible for recruiting participants, compiling on-line survey and analysing quantitative data from the survey.

6. **Will any of the investigators (not including student researchers) be located in the overseas country(s) during the course of the research?***

○ Yes
● No

If NO, provide contact details of a local person in the country who will be available to respond to participant queries related to the research.

Name:*

Lifeline/Samaritans/Various helplines as listed in plain language document

Location:*

New Zealand/UK/USA/Canada

Telephone number:*

Refer to plain language statement for individual service numbers

Mobile number:*

As above

Email: *

N/A

7. **Will individuals in overseas countries who are not members of the research team be involved in any aspect of the conduct of the research (e.g., recruitment of participants, data collection)?***

○ Yes
● No

8. **Is there an ethical review process (mandatory or voluntary) for research undertaken in the country(s) where the proposed research will take place?***

○ Yes
● No

9. **Are there any risks to participants, beyond the normal experience of everyday life, in either the short or long term, that relate specifically to participating in the research in the overseas country?***

○ Yes
● No

10. **How will the well-being of overseas participants be monitored throughout the duration of the research?***

All participants will be provided with the phone and email contact details for both the Chief investigator and Associate investigator should they need to seek further advice as a result of participating in any aspect of the study.
In addition, the participants will be provided with a plain language statement that includes the contact details for support services in their locality such as: Lifeline, Samaritans and their local Stroke foundations.

11. **Other comments relevant to this section of the application:**

The target population for this study is quite small and it is believed limiting the recruitment criteria to residents of Australia may impede recruiting a sufficient sample size. It is believed people who experience medical events such as an aSAH quite often engage in on line social forums that attract interest internationally; they might welcome this study and be quite interested in participating.

Required Attachments

The following documentation must be attached to your application:

- Scanned copy of the Declaration Form for External Investigators (if applicable)

- Copy of the '**Information to Participants Involved in Research**' form *(Please use the templates provided on the Human Research Ethics website)*

- Copy of Consent Forms to be used in the research *(Please use the templates provided on the Human Research Ethics website)*

- Any flyers or other advertising material to be used in the research

- Copy of questionnaires

- Copy of interview schedules

11. **Please attach each of the items specifically listed above as well as any other supporting documentation.**
All documentation must be accurately titled and referenced to within the body of your application where appropriate (i.e. "Appendix A - Declaration Form", "Appendix F - Risk Factor Assessment Questionnaire", etc.). Please limit file types to .doc, .docx, .xls, .xlsx, .pdf, or small-medium images (ie, .gif, .jpg).*

Description	Reference	Soft copy	Hard copy
Consent Form	Consent form _Australian participants_online study phase_JM Thorburn_asah study.docx	✓	
Information to Participants Involved in Research	Appendice S_Plain language statement_Australian online participants.docx	✓	
Appendix A- Demographics and Aneurysm questionnaire	Appendix A_Demographic and Aneurysm specific questions.docx	✓	
Appendix B- Modified Glasgow outcome scale - extended	Glasgow-Outcome-Scale-Extended_modified.pdf	✓	
Appendix C- Quality of Life after Brain Injury - QOLBRI Scale	QOLIBRI-OS-English.pdf	✓	
Appendix D- Impact of Events Scale Revised - IES-R	Impact of events scale_IES_R.pdf	✓	
Appendix E- Post-traumatic growth inventory (PTGI)	PTGI_scale and scoring.pdf	✓	
Appendix F- Centre for Epidemiological Studies Depression Scale-Revised - CESD-R	CESD-R.pdf	✓	
Appendix G- Flourishing Scale - FS (Subjective Wellbeing measure -1)	Flourishing Scale_FS_SWB1.pdf	✓	
Appendix H- Scale of positive and negative emotions (SPANE)- (Subjective Wellbeing measure -2)	Scale of Positive and Negative Experience.pdf	✓	
Appendix I- Satisfaction with Life Scale-SWLS- (Subjective Wellbeing Measure-3)	Satisfaction with life scale_SWLS_SWB3.docx	✓	
Appendix J - Self Compassion Scale (SCS)	Self_Compassion_Scale_for_researchers.pdf	✓	
Reference List	Reference List_ASAH Study_2017.docx	✓	
Appendix K- Medical Outcome Study Social Support Scale-MOS-SSS	MOS-Social-Support.pdf	✓	
Appendix L- Flyer for Study	Flyer for ASAH Study.docx	✓	
Appendix M- Design for postcard advertising study	PCARD_ASAH_APPM.pdf	✓	
Appendix N- Reverse side details of postcard advertising study	Reverse side of aSAH Study postcard_flyer.docx	✓	
Appendix O- Confidentiality Agreement for external transcriber	Confidentiality Agreement _External transcriber.docx	✓	
Kim Shearson Declaration	Kim Shearson Declaration.txt	✓	
Advertising Material (flyers etc.)	Flyer for ASAH Study.docx	✓	
Appendice P- Email confirmation - psychologist indpendent of study	Appendix P_Email confirmation psychologist independent of study.docx	✓	
Appendice Q- Consent form Australian Participants- Interviews	Appendice Q_Australian participants_interviews.docx	✓	
Appendice R- Consent form - overseas participants- online study phase	Appendice R_consent overseas participants_online phase.docx	✓	
Appendice S- Plain language statement_Australian Online participants	Appendice S_Plain language statement_Australian online participants.docx	✓	
Appendice T Plain Language Interviews	Appendice T- Plain language Australian Interviews.docx	✓	
Appendice U-Overseas online phase plain language document	Appendice U_Overseas plain language document.docx	✓	

Note: Please click the Question Help icon above for instructions on how to upload documents and use this table.

If you are certain that you do not need to supply a Consent Form or Information to Participants Involved in Research (both of which are mandatory), please tick Hard Copy and type 'N/A' in the Reference field.

SECTION 12 - SUBMISSION DETAILS

Declaration

I / we, the undersigned, declare the following:

- I / we accept responsibility for the conduct of the research project detailed above in accordance with:
    a. the principles outlined in the National Statement on Ethical Conduct in Human Research (2007);
    b. the protocols and procedures as approved by the HREC;
    c. relevant legislation and regulations.
- I / we will ensure that HREC approval is sought using the Changes to the Research Project process outlined on the Human Research Ethics website if:
    a. proposing to implement change to the research project;
    b. changes to the research team are required.
- I / we have read the National Statement on Ethical Conduct in Human Research prior to completing this form.
- I / we certify that all members of the research team involved the research project hold the appropriate qualifications, experience, skills and training necessary to undertake their roles.
- I / we will provide Annual / Final reports to the approving HREC within 12 months of approval or upon completion of the project if earlier than 12 months.
- I / we understand and agree that research documents and/or records and data may be subject to inspection by the VUHREC, Ethics Secretary, or an independent body for audit and monitoring purposes.
- I / we understand that information relating to this research, and about the investigators, will be held by the VU Office for Research. This information will be used for reporting purposes only and managed according to the principles established in the Privacy Act 1988 (Cth) and relevant laws in the States and Territories of Australia.

*

1	*Staff/Student ID*	E5019370
	Full Name	DR KIM SHEARSON
	Role in project	Associate Investigator
	Personnel Type	Internal
	Sign Declaration? *By clicking the checkbox below, you are agreeing to conduct the research project in accordance with the above declaration.*	Yes
	Date Signed	16/01/2017
2	*Staff/Student ID*	E5000301
	Full Name	PROF JENNY SHARPLES
	Role in project	Chief Investigator
	Personnel Type	Internal
	Sign Declaration? *By clicking the checkbox below, you are agreeing to conduct the research project in accordance with the above declaration.*	Yes
	Date Signed	15/01/2017
3	*Staff/Student ID*	S3875959
	Full Name	MS Joanne Thorburn
	Role in project	Student
	Personnel Type	Student
	Sign Declaration? *By clicking the checkbox below, you are agreeing to conduct the research project in accordance with the above declaration.*	Yes
	Date Signed	05/01/2017

Note: Please click on your name in the table above to complete your declaration; or click on the name of an External Investigator to acknowledge that their declaration has been supplied.

Declaration Instructions and Information

- A digital signature must be supplied by each and every member of the research team using the declaration table above.
- The 'Needs Signature' icon shows which records you are responsible for signing.
- Physical signatures are not required for VU staff and students in applications using form version v.13-07.
- External Investigators do not have access to Quest. The Chief Investigator must supply a completed physical declaration on their behalf by following the steps below:
    1. Send the person a copy of the full application form (including any attachments), as well as the **Declaration Form for External Investigators** document.
    2. Once returned, attach the signed *External Investigator Declaration Form* document in 'Section 11 - Required Attachments'.
    3. Enter into the External Investigator's record in the above declaration table and mark the checkbox to indicate these steps have been completed, include the date you have done so.
       The 'sighted by' field will automatically populate with your name. *(Only the Chief Investigator will have permission to complete this step.)*
- The application cannot be submitted until all members of the research team have logged in and completed this declaration.

Finalise Application

Reminders

- All applications must be sighted and approved by all members of the research team and any relevant parties. Please ensure each member of the research team has completed their declaration in *'Section 12 - Declaration'* above, including any declaration forms supplied on behalf of External Investigators. *Applications will not be reviewed without appropriate authorisation.*

- It is strongly recommended that you save a PDF version of your application before submitting as you will lose access to the electronic record while it undergoes formal review.

- **You are reminded that your project may not commence without formal written approval from the appropriate Human Research Ethics Committee.**

Ready to Submit?

- * Once the form is complete and all documents are attached, **click on the *'Action'* tab** above the left-hand form navigation, then **click *'Submit Application'*** to forward the application to the Ethics Secretary to be reviewed and assigned to a Committee meeting.

- You will receive an automatic email notification from Quest when your application has been successfully submitted.

- *Note: Only a Chief Investigator is able to submit an application for ethical approval. The Chief Investigator who is marked as the primary contact for this application is:*

PROF JENNY SHARPLES

INFORMATION TO PARTICIPANTS INVOLVED IN RESEARCH

You are invited to participate

You are invited to participate in a research project entitled: **Psychological Recovery after Aneurysmal Subarachnoid Haemorrhage: The Moderating effects of Post-traumatic Growth.**

This project is being conducted by a student researcher Ms Joanne Thorburn as part of a PhD study at Victoria University under the supervision of Professor Jenny Sharples and Dr Kim Shearson from the Psychology discipline, College of Health and Biomedicine, Victoria University.

Project explanation

Aneurysmal subarachnoid haemorrhage (aSAH) is a life threatening type of haemorrhagic stroke with a high mortality rate. People who have experienced an aSAH are at higher risk of experiencing ongoing disabilities including: visual, physical, cognitive, and memory impairments. In addition, it has been found that after an aSAH people are also at high risk of experiencing negative psychological outcomes including: post-traumatic stress disorder (PTSD), depression and anxiety, as well as lower levels of overall well-being and quality of life. Despite this, there has been limited research conducted investigating factors involved in psychological recovery after an aSAH. Clearly there is a need for further investigation into what biopsychosocial factors influence aspects of negative and positive psychological recovery as well as potential psychologically protective factors that may occur after an aSAH. Therefore, if you are aged 18 years and above and have experienced an aSAH, your participation is important.

What will I be asked to do?

Participants are asked to complete a confidential online survey as part of this study. The survey asks you to provide some background (demographic) information and then proceeds with a series of questions designed to assess your views and experiences in respect to a range of factors related to your experience of an aSAH, and psychosocial factors related to your well-being. The survey can be completed in the privacy of your own home, and at your convenience. It is accessed via a secure online link. Victoria University is a licensee of the Qualtrics on-line survey program and it is widely used by researchers throughout the university. Participation in the study will take approximately thirty to forty minutes.

At the conclusion of the online study an opportunity to participate in the second phase of this research study will appear. This phase of the study involves individual interviews via telephone or face to face, for a duration of approximately one hour, in order to better understand unique experiences of psychological recovery after an aSAH. Participation in this secondary phase is entirely optional. Should you agree to participate you will be requested to provide your contact details in order for the researchers to arrange a mutually convenient time to conduct interviews. Should you provide your contact details these will also remain confidential and only accessible to the researchers involved in this study.

What will I gain from participating?

Although you will receive no direct benefit from participating in this study, your contribution is important to assist clinicians to better understand factors that influence psychological recovery after an aSAH.

How will the information I give be used?

All data collected in this study will be stored securely and confidentially. Only members of the research team will have access to the data. You cannot be identified by the data. The data will be downloaded from the on-line survey site and subsequently analysed using a statistical data analysis package to assess psychosocial factors that impact people during recovery after an aSAH. Analysis will also assess whether post-traumatic growth plays psychologically protective role after an aSAH. The data you provide will only be used for the specific research purposes of this study.

What are the potential risks of participating in this project?

Participation in this study should involve no physical discomfort or risks beyond those of everyday living. However, the study does ask you about your personal experiences and occasionally reflecting on those experiences may cause some degree of emotional discomfort If any aspect of the survey causes you to feel distressed please do not hesitate to contact Lifeline or one of the support services provided at the conclusion of the study to discuss your concerns. In addition, you may also contact Dr Carolyn Deans, a clinical psychologist who is independent of the study on 03-9919-2334 or via Carolyn.deans@vu.edu.au to obtain further support and advice. Additionally, a list of resources and services for people who have experienced an aSAH is included at the end of this document. If you have any queries or concerns about the study, please contact the chief investigator, Professor Jenny Sharples or Associate investigator Dr Kim Shearson, before proceeding with the survey. Please note, you are free to withdraw from the study at any time if you choose. However, in respect to the online phase of the study you are able to withdraw up to the point of submission only. Before proceeding with the online study, there is a section to read and agree to in order to indicate that you have been informed of the study purposes and freely consent to participate.

How will this project be conducted?

The study will be conducted entirely online via the secure Qualtrics survey program linked directly to Victoria University. All responses are anonymous and confidential. All data will then be analysed and reported upon. All data will be securely stored to ensure ongoing confidentiality of participant responses.

Who is conducting the study?

Chief investigator: Professor Jenny Sharples +61-03-9919-4448 or email: jenny.sharples@vu.edu.au

Associate investigator: Dr Kim Shearson +61-03-9919-2784 or email: kim.shearson@vu.edu.au

Student investigator: Ms Joanne Thorburn email: joanne.thorburn@live.vu.edu.au

Any queries about your participation in this project may be directed to the Chief Investigator listed above.
If you have any queries or complaints about the way you have been treated, you may contact the Ethics Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University, PO Box 14428, Melbourne, VIC, 8001, email researchethics@vu.edu.au or phone (03) 9919 4781 or 4461.

Support Services

Australia
Lifeline- 13 11 14
Beyond Blue - 1300-224-636
Stroke Foundation of Australia - 1800-787-653

INFORMATION TO PARTICIPANTS INVOLVED IN RESEARCH

You are invited to participate

You are invited to participate in a research project entitled: **Psychological Recovery after Aneurysmal Subarachnoid Haemorrhage: The Moderating effects of Post-traumatic Growth.**

This project is being conducted by a student researcher Ms Joanne Thorburn as part of a PhD study at Victoria University under the supervision of Professor Jenny Sharples and Dr Kim Shearson from the Psychology discipline, College of Health and Biomedicine, Victoria University.

Project explanation

Aneurysmal subarachnoid haemorrhage (aSAH) is a life threatening type of haemorrhagic stroke with a high mortality rate. People who have experienced an aSAH are at higher risk of experiencing ongoing disabilities including: visual, physical, cognitive, and memory impairments. In addition, it has been found that after an aSAH people are also at high risk of experiencing negative psychological outcomes including: post-traumatic stress disorder (PTSD), depression and anxiety, as well as lower levels of overall well-being and quality of life. Despite this, there has been limited research conducted investigating factors involved in psychological recovery after an aSAH. Clearly there is a need for further investigation into what biopsychosocial factors influence aspects of negative and positive psychological recovery as well as potential psychologically protective factors that may occur after an aSAH. Therefore, if you are aged 18 years and above and have experienced an aSAH, your participation is important.

What will I be asked to do?

Participants are asked to complete an online survey as part of the first phase of the study. The survey asks you to provide some background (demographic) information and then proceeds with a series of questions designed to assess your views and experiences in respect to a range of factors related to your experience of an aSAH, and psychosocial factors related to your well-being. The survey can be completed in the privacy of your own home, and at your convenience. It is accessed via a secure online link. Victoria University is a licensee of the Qualtrics on-line survey program and it is widely used by researchers throughout the university. Participation in the study will take approximately thirty to forty minutes.

What will I gain from participating?

Although you will receive no direct benefit from participating in this study, your contribution is important to assist clinicians to better understand factors that influence psychological recovery after an aSAH.

How will the information I give be used?

All data collected in this study will be stored securely and confidentially. Only members of the research team will have access to the data. You cannot be identified by the data. The data will be downloaded from the on-line survey site and subsequently analysed using a statistical data analysis package to assess psychosocial factors that impact people during recovery after an aSAH. The data you provide will only be used for the specific research purposes of this study.

What are the potential risks of participating in this project?

Participation in this study should involve no physical discomfort or risks beyond those of everyday living. However, the study does ask you about your personal experiences and occasionally reflecting on those experiences may cause some degree of emotional discomfort If any aspect of the survey causes you to feel distressed please do not hesitate to contact Lifeline or one of the telephone counselling services provided at the conclusion of the study to discuss your concerns. Additionally, a list of resources and services for people who have experienced an aSAH is included at the end of this document. If you have any queries or concerns about the study, please contact the chief investigator, Professor Jenny Sharples or Associate investigator Dr Kim Shearson, before proceeding with the survey. Please note, you are free to withdraw from the study at any time if you choose. However, in respect to the online phase of the study you are only able to withdraw up to the point of submission only. Before proceeding with the online study, there is a section to read and agree to in order to indicate that you have been informed of the study purposes and freely consent to participate.

How will this project be conducted?

The study will be conducted entirely online via the secure Qualtrics survey program linked directly to Victoria University. All responses are anonymous and confidential.

Who is conducting the study?

Chief investigator: Professor Jenny Sharples +61-03-9919-4448 or email: jenny.sharples@vu.edu.au

Associate investigator: Dr Kim Shearson +61-03-9919-2784 or email: kim.shearson@vu.edu.au

Student investigator: Ms Joanne Thorburn email: joanne.thorburn@live.vu.edu.au

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Support Services

New Zealand

Lifeline Aoteaora - 0800 543 354

Stroke Foundation of New Zealand - 0800-787-653

United Kingdom

Samaritans - 08457 909090
Stroke Association of the United Kingdom - 0303-3033-100

United States of America

Lifeline - 1-800-273-8255
National Stroke Association - 1800-787-6537

Canada

Heart and Stroke Association of Canada 613-727-5060

Helpline 1: 604-872-3311 (Greater Vancouver)
Helpline 2: 18666613311 (Toll free-Howe Sound/Sunshine Coast)
Helpline 3: 1-866-872-0113 (TTY)
Helpline 4: 1-800-SUICIDE (784-2433) (BC-wide)
Mental Health Crisis Line 1-866-996-0991 (Ottawa and Eastern Ontario)
Mental Help Health Line 1-866-531-2600 (Ontario)
Heart and Stroke foundation of Canada - 613-727-5060

Appendix D - Australian Participants- Online Study Phase Consent

VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH

INFORMATION TO PARTICIPANTS:

We would like to invite you to be a part of a study into aspects of psychological recovery after an aneurysmal subarachnoid haemorrhage (aSAH).

A life threatening medical condition such as an aneurysmal subarachnoid haemorrhage (aSAH) is regarded as a traumatic experience. Despite this there has been limited research conducted investigating this as well as other important psychosocial factors after the experience of an aSAH. Research is needed to better understand the factors that impact upon psychological recovery after an aSAH. This study aims to investigate a number of factors as well as whether or not positive psychological gains occur and subsequently, act as a protective factor after experiencing an aSAH. Therefore, if you are aged 18 years and above and have experienced an aSAH, your participation is important.

Participants are asked to complete an online survey. The survey asks you to provide some background (demographic) information and then proceeds with a series of questions designed to assess your views and experiences in respect to a range of factors related to your experience of an aSAH, and psychosocial factors related to your well-being. The survey can be completed in the privacy of your own home, and at your convenience. It is accessed via a secure online link. Victoria University is a licensee of the Qualtrics on-line survey program and it is widely used by researchers throughout the university. Participation in the study will take approximately thirty to forty minutes. At the conclusion of the online study an opportunity to participate in the second phase of this research study will appear. This phase of the study involves individual interviews via telephone or face to face, for a duration of approximately one hour, in order to better understand unique experiences of psychological recovery after an aSAH. Participation in this secondary phase is entirely optional. Should you agree to participate you will be requested to provide your contact details in order for the researchers to arrange a mutually convenient time to conduct interviews. Should you provide your contact details these will also remain confidential and only accessible to the researchers involved in this study.

Participation in this study should involve no physical discomfort or risks beyond those of everyday living. However, the study does ask you about your personal experiences and occasionally reflecting on those experiences may cause some degree of emotional discomfort If any aspect of the survey causes you to feel distressed please do not hesitate to contact Lifeline one of the telephone counselling services provided at the conclusion of the study to discuss your concerns. Additionally, a list of resources and services for people who have experienced an aSAH is included at the end of the survey. Should participation in this study cause distress you may also contact Dr Carolyn Deans, a Clinical psychologist who is independent of the study for further advice and support information. Dr Deans can be contacted on 03-9919-2334 or Carolyn.deans@vu.edu.au. If you have any queries or concerns about the study, please contact the chief investigator, Professor Jenny Sharples or Associate investigator Dr Kim Shearson, before proceeding with the survey. Please note, you are free to withdraw from the study at any time if you choose. Before proceeding with the online study, there is a section to read and agree to in order to indicate that you have been informed of the study purposes and freely consent to participate.

CERTIFICATION BY PARTICIPANT

I,
of

certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the study: **Psychological Recovery after Aneurysmal Subarachnoid Haemorrhage: The Moderating effects of Post-traumatic Growth** being conducted at Victoria University by: Professor Jenny Sharples, Chief investigator and Dr Kim Shearson, associate supervisor.

VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

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certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the study: **Psychological Recovery after Aneurysmal Subarachnoid Haemorrhage: The Moderating effects of Post-traumatic Growth** being conducted at Victoria University by: Professor Jenny Sharples, Chief investigator and Dr Kim Shearson, associate supervisor.

VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

Appendix E- Consent-overseas online phase

I certify that the objectives of the study, together with any risks and safeguards associated with the procedures listed hereunder to be carried out in the research, have been fully explained to me by: Ms Joanne Thorburn, student researcher and that I freely consent to participation involving the below mentioned procedures

- Online study comprising psychological questionnaires incorporating demographic, psychosocial, positive and negative psychological outcomes

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time up until the point of submission in respect to the online study and at any time prior to submission of online responses and that this withdrawal will not jeopardise me in any way.

I have been informed that the information I provide will be kept confidential.

Signed:

Date:

Any queries about your participation in this project may be directed to the researchers:

Professor Jenny Sharples, Chief Investigator	Dr Kim Shearson
+61-03-9919-4448 or	+61-03-9919-2784
email: jenny.sharples@vu.edu.au	or email: kim.shearson@vu.edu.au

If you have any queries or complaints about the way you have been treated, you may contact the Ethics Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University, PO Box 14428, Melbourne.

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Stroke Foundation of New Zealand - 0800-787-653

United Kingdom

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Canada

Heart and Stroke Association of Canada 613-727-5060

Helpline 1: 604-872-3311 (Greater Vancouver)
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VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH

INFORMATION TO PARTICIPANTS:

We would like to invite you to be a part of a study into aspects of psychological recovery after an aneurysmal subarachnoid haemorrhage (aSAH).

A life threatening medical condition such as an aneurysmal subarachnoid haemorrhage (aSAH) is regarded as a traumatic experience. Despite this there has been limited research conducted investigating this as well as other important psychosocial factors after the experience of an aSAH. Research is needed to better understand the factors that impact upon psychological recovery after an aSAH. This study aims to investigate a number of factors as well as whether or not positive psychological gains occur and subsequently, act as a protective factor after experiencing an aSAH. Therefore, if you are aged 18 years and above and have experienced an aSAH, your participation is important.

This phase of the study involves individual interviews conducted either face to face or via telephone, for a duration of approximately one hour, in order to better understand unique experiences of psychological recovery after an aSAH. Participants are asked to answer a series of questions designed to assess your views and experiences in respect to a range of factors related to your experience of an aSAH, and psychosocial factors related to your well-being. All interviews will be recorded and transcribed prior to being analysed. All participants will be provided with a pseudonym prior to recording in order to ensure all responses are confidential and de-identified.

Participation in this study should involve no physical discomfort or risks beyond those of everyday living. However, the study does ask you about your personal experiences and occasionally reflecting on those experiences may cause some degree of emotional discomfort If any aspect of the study causes you to feel distressed please do not hesitate to contact Lifeline or one of the other support services listed below and in the plain language document. In addition, you may also contact Dr Carolyn Deans, a clinical psychologist who is independent of the study for further support and advice. Dr Deans can be contacted on 03-9919-2334 or Carolyn.deans@vu.edu.au. If you have any queries or concerns about the study, please contact the chief investigator, Professor Jenny Sharples or Associate investigator Dr Kim Shearson. Please note, you are free to withdraw from the study at any time if you choose. Should you become distressed during interview you will be asked if you would like to take a break or discontinue your participation in the interview.

CERTIFICATION BY PARTICIPANT

I,
of

certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the study: **Psychological Recovery after Aneurysmal Subarachnoid Haemorrhage: The Moderating effects of Post-traumatic Growth** being conducted at Victoria University by: Professor Jenny Sharples, Chief investigator and Dr Kim Shearson, associate supervisor.

I certify that the objectives of the study, together with any risks and safeguards associated with the procedures listed hereunder to be carried out in the research, have been fully explained to me by: Ms Joanne Thorburn, student researcher

and that I freely consent to participation involving the below mentioned procedures- Please select which phase of the study you consent to participating in by ticking the relevant box:

- Individual face to face or telephone interviews with student researcher for a duration of approximately one hour

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time up until the point of submission in respect to the online study and at any time in respect to the individual interview phase of the study and that this withdrawal will not jeopardise me in any way.

I have been informed that the information I provide will be kept confidential.

Signed:

Date:

Any queries about your participation in this project may be directed to the researchers:

Professor Jenny Sharples, Chief Investigator	Dr Kim Shearson
+61-03-9919-4448 or	+61-03-9919-2784 or
email: jenny.sharples@vu.edu.au	email:kim.shearson@vu.edu.au

If you have any queries or complaints about the way you have been treated, you may contact the Ethics Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University, PO Box 14428, Melbourne.

Support Services

Lifeline- 13 11 14

Beyond Blue - 1300-224-636

Stroke Foundation of Australia - 1800-787-653

Appendix G- Demographics and Aneurysm experience questions

1. Gender?
2. Age?
3. Relationship Status?
4. Parental status?
5. If you are a parent, how many children are you currently caring for?
6. Country of Birth?
7. What country are you currently residing in?
8. Do you recognise yourself as an Indigenous or first nation's person?
9. If so, to which Indigenous group do you belong to?
10. What is the main language spoken at home?
11. What is the highest educational level you have completed?
12. Are you currently working?
13. What is your current occupation?
14. Is this the same occupation that you were working in prior to aneurysm rupture?
15. What is your current financial status?
16. Have you experienced a ruptured brain aneurysm?
17. Did you know you had a brain aneurysm prior to it rupturing?
18. How long ago did you experience a ruptured brain aneurysm?
19. Was this your first experience of a ruptured brain aneurysm?
20. Do you know the location of your brain aneurysm within the brain?
21. What treatment type did you receive after you experienced your ruptured brain aneurysm?
22. How many brain aneurysms have you experienced to date?
23. Have any members of your family ever experienced a ruptured brain aneurysm?
24. If so, which family members have experienced a ruptured brain aneurysm?
25. In what hospital and country were you treated for your ruptured brain aneurysm?
26. Have you experienced any ongoing complications since your ruptured brain aneurysm?
27. Are you currently taking any prescribed medication as a result of your ruptured brain aneurysm?
28. Did you have any high risk factors for brain aneurysms prior to your rupture?
29. Did you have any pre-existing mental health conditions prior to your ruptured aneurysm as diagnosed by a G.P. , Clinical psychologist or Psychiatrist?
30. Since your ruptured brain aneurysm have you been diagnosed with any mental health conditions such as anxiety, depression or PTSD as diagnosed by a G.P., Clinical psychologist or psychiatrist?
31. Have you been diagnosed with any medical conditions since your ruptured brain aneurysm?
32. If so, what are the medical conditions that you have been diagnosed with?

Appendice H- Modified Glasgow Coma Scale

1 = Dead • Condition of unawareness with only reflex responses but with periods of spontaneous eye opening.

2 = Vegetative State (VS) • Patient who is dependent for daily support for mental or physical disability, usually a combination of both. If the patient can be left alone for more than 8h at home it is upper level of SD, if not then it is low level of SD.

3 = Low Severe Disability (SD-)

4 = Upper Severe Disability (SD+) • Patients have some disability such as aphasia, hemiparesis or epilepsy and/or deficits of memory or personality but are able to look after themselves. They are independent at home but dependent outside. If they are able to return to work even with special arrangement it is upper level of MD, if not then it is low level of MD.

5 = Low Moderate Disability (MD-)

6 = Upper Moderate Disability (MD+) • Resumption of normal life with the capacity to work even if pre-injury status has not been achieved. Some patients have minor neurological or psychological deficits. If these deficits are not disabling then it is upper level of GR, if disabling then it is lower level of GR.

7 = Low Good Recovery (GR-)

8 = Upper Good Recovery (GR+) Glasgow Outcome Extended A+

Appendix I: QOLBRI (Quality of Life)

QOLIBRI - QUALITY OF LIFE AFTER BRAIN INJURY

In the first part of this questionnaire we would like to know **how satisfied** you are with different aspects of your life since your brain injury. For each question please choose the answer which is closest to how you feel now (including the past week) and mark the box with an “X”. If you have problems filling out the questionnaire, please ask for help.

PART 1

A. These questions are about your thinking abilities now (including the past week).

	Not at all	Slightly	Moderately	Quite	Very
1. How satisfied are you with your ability to concentrate, for example when reading or keeping track of a conversation?					
2. How satisfied are you with your ability to express yourself and understand others in a conversation?					
3. How satisfied are you with your ability to remember everyday things, for example where you have put things?					
4. How satisfied are you with your ability to plan and work out solutions to everyday practical problems, for example what to do when you lose your keys?					
5. How satisfied are you with your ability to make decisions?					
6. How satisfied are you with your ability to find your way around?					
7. How satisfied are you with your speed of thinking?					

B. These questions are about your emotions and view of yourself now (including the past week).

	Not at all	Slightly	Moderately	Quite	Very
1. How satisfied are you with your level of energy?					
2. How satisfied are you with your level of motivation to do things?					
3. How satisfied are you with your self-esteem, how valuable you feel?					
4. How satisfied are you with the way you look?					
5. How satisfied are you with what you have achieved since your brain injury?					
6. How satisfied are you with the way you perceive yourself?					
7. How satisfied are you with the way you see your future?					

C. These questions are about your independence and how you function in daily life now (including the past week).

	Not at all	Slightly	Moderately	Quite	Very
1. How satisfied are you with the extent of your independence from others?					
2. How satisfied are you with your ability to get out and about?					
3. How satisfied are you with your ability to carry out domestic activities, for example cooking or repairing things?					
4. How satisfied are you with your ability to run your personal finances?					
5. How satisfied are you with your participation in work or education?					
6. How satisfied are you with your participation in social and leisure activities, for example sports, hobbies, parties?					
7. How satisfied are you with the extent to which you are in charge of your own life?					

D. These questions are about your social relationships now (including the past week)

	Not at all	Slightly	Moderately	Quite	Very
1. How satisfied are you with your ability to feel affection towards others, for example your partner, family, friends?					
2. How satisfied are you with your relationships with members of your family?					
3. How satisfied are you with your relationships with your friends?					
4. How satisfied are you with your relationship with a partner or with not having a partner?					
5. How satisfied are you with your sex life?					
6. How satisfied are you with the attitudes of other people towards you?					

PART 2

In the second part we would like to know **how bothered** you feel by different problems. For each question please choose the answer which is closest to how you feel now (including the past week) and mark the box with an “X”. If you have problems filling out the questionnaire, please ask for help.

E. These questions are about how bothered you are by your feelings now (including the past week).

	Not at all	Slightly	Moderately	Quite	Very
1. How bothered are you by feeling lonely, even when you are with other people?					
2. How bothered are you by feeling bored?					
3. How bothered are you by feeling anxious?					
4. How bothered are you by feeling sad or depressed?					
5. How bothered are you by feeling angry or aggressive?					

F. These questions are about how bothered you are by physical problems now (including the past week).

	Not at all	Slightly	Moderately	Quite	Very
1. How bothered are you by slowness and/or clumsiness of movement?					
2. How bothered are you by effects of any other injuries you sustained at the same time as your brain injury?					
3. How bothered are you by pain, including headaches?					
4. How bothered are you by problems with seeing or hearing?					
5. Overall, how bothered are you by the effects of your brain injury?					

www.qolibrinet.com.

For details contact nvsteinbuechel@med.uni-goettingen.de.

IMPACT OF EVENTS SCALE-Revised (IES-R)

INSTRUCTIONS: Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to your ruptured brain aneurysm ____________(event) that occurred on ______________(date). How much have you been distressed or bothered by these difficulties?

	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Any reminder brought back feelings about it	0	1	2	3	4
2. I had trouble staying asleep	0	1	2	3	4
3. Other things kept making me think about it.	0	1	2	3	4
4. I felt irritable and angry	0	1	2	3	4
5. I avoided letting myself get upset when I thought about it or was reminded of it	0	1	2	3	4
6. I thought about it when I didn't mean to	0	1	2	3	4
7. I felt as if it hadn't happened or wasn't real.	0	1	2	3	4
8. I stayed away from reminders of it.	0	1	2	3	4
9. Pictures about it popped into my mind.	0	1	2	3	4
10. I was jumpy and easily startled.	0	1	2	3	4
11. I tried not to think about it.	0	1	2	3	4
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.	0	1	2	3	4
13. My feelings about it were kind of numb.	0	1	2	3	4
14. I found myself acting or feeling like I was back at that time.	0	1	2	3	4
15. I had trouble falling asleep.	0	1	2	3	4
16. I had waves of strong feelings about it.	0	1	2	3	4
17. I tried to remove it from my memory.	0	1	2	3	4
18. I had trouble concentrating.	0	1	2	3	4
19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	0	1	2	3	4
20. I had dreams about it.	0	1	2	3	4
21. I felt watchful and on-guard.	0	1	2	3	4
22. I tried not to talk about it.	0	1	2	3	4

Total IES-R Score:________________

INT: 1, 2, 3, 6, 9, 14, 16, 20
AVD: 5, 7, 8, 11, 12, 13, 17, 22
HYP: 4, 10, 15, 18, 19, 21

Weiss, D.S. (2007). The Impact of Event Scale-Revised. In J.P. Wilson, & T.M. Keane (Eds.) *Assessing psychological trauma and PTSD: a practitioner's handbook* (2nd ed., pp. 168-189). New York: Guilford Press.

Revised Impact of Event Scale (22 questions):

The revised version of the Impact of Event Scale (IES-r) has seven additional questions and a scoring range of 0 to 88.

On this test, scores that exceed 24 can be quite meaningful. High scores have the following associations.

Score (IES-r)	**Consequence**
24 or more	PTSD is a clinical concern.[6] Those with scores this high who do not have full PTSD will have partial PTSD or at least some of the symptoms.
33 and above	This represents the best cutoff for a probable diagnosis of PTSD.[7]
37 or more	**This is high enough to suppress your immune system's functioning** (even 10 years after an impact event).[8]

The IES-R is very helpful in measuring the affect of routine life stress, everyday traumas and acute stress

References:

1. Horowitz, M. Wilner, N. & Alvarez, W. (1979). Impact of Event Scale: A measure of subjective stress. Psychosomatic Medicine, 41, 209-218.
2. Weiss, D.S., & Marmar, C.R. (1997). The Impact of Event Scale-Revised. In J.P. Wilson & T.M. Keane (Eds.), Assessing Psychological Trauma and PTSD (pp.399-411). New York: Guilford.
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4. Coffey, S.F. & Berglind, G. (2006). Screening for PTSD in motor vehicle accident survivors using PSS-SR and IES. Journal of Traumatic Stress. 19 (1): 119-128.
5. Neal, L.A., Walter, B., Rollins, J., et al. (1994). Convergent Validity of Measures of Post-Traumatic Stress Disorder in a Mixed Military and Civilian Population. Journal of Traumatic Stress. 7 (3): 447-455.
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8. Kawamura, N. Yoshiharu, K. & Nozomu, A. (2001) Suppression of Cellular Immunity in Men with a Past History of Post Traumatic Stress Disorder. American Journal of Psychiatry. 158: 484-486

Appendix K- Medical Outcomes study Social Support Survey- MOS-SSS

Assessment:

Medical Outcomes Study (MOS) Social Support Survey

People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?

Response categories:

None of the time

A little of the time

Some of the time

Most of the time

All of the time

Emotional/informational support

1. Someone you can count on to listen to when you need to talk

2. Someone to give you information to help you understand a situation.

3. Someone to give you good advice about a crisis

4. Someone to confide in or talk to about yourself or your problems

5. Someone whose advice you really want

6. Someone to share your most private worries and fears with

7. Someone to turn to for suggestions about how to deal with a personal problem

8. Someone who understands your problems

Tangible Support

9. Someone to help you if you were confined to bed

10. Someone to take you to the doctor if you needed it

11. Someone to prepare your meals if you were unable to do it yourself

12. Someone to help with daily chores if you were sick

Affectionate Support

13. Someone who shows you love and affection

14. Someone to love you and make you feel wanted

15. Someone who hugs you

Positive Social Interaction

16. Someone to have a good time with

17. Someone to get together with for relaxation

18. Someone to do something enjoyable with

Additional item

19. Someone to do things with to help you get your minds off things.

Appendix L: SCS (Self-compassion scale

To Whom it May Concern:

Please feel free to use the Self-Compassion Scale in your research. Masters and dissertation students also have my permission to use and publish the Self-Compassion Scale in their theses. The appropriate reference is listed below.

Best,

Kristin Neff, Ph. D.
Associate Professor
Educational Psychology Dept.
University of Texas at Austin

e-mail: kneff@austin.utexas.edu

Reference:
Neff, K. D. (2003). Development and validation of a scale to measure self-compassion. *Self and Identity, 2, 223-250.*

Coding Key:
Self-Kindness Items: 5, 12, 19, 23, 26
Self-Judgment Items: 1, 8, 11, 16, 21
Common Humanity Items: 3, 7, 10, 15
Isolation Items: 4, 13, 18, 25
Mindfulness Items: 9, 14, 17, 22
Over-identified Items: 2, 6, 20, 24

Subscale scores are computed by calculating the mean of subscale item responses. To compute a total self-compassion score, reverse score the negative subscale items before calculating subscale means - self-judgment, isolation, and over-identification (i.e., 1 = 5, 2 = 4, 3 = 3. 4 = 2, 5 = 1) - then compute a grand mean of all six subscale means. Researchers can choose to analyze their data either by using individual sub-scale sores or by using a total score.

(This method of calculating the total score is slightly different than that used in the article referenced above, in which each subscale was added together. However, I find it is easier to interpret the total score if a mean is used.)

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never				**Almost always**
1	**2**	**3**	**4**	**5**

_____ 1. I’m disapproving and judgmental about my own flaws and inadequacies.

_____ 2. When I’m feeling down I tend to obsess and fixate on everything that’s wrong.

_____ 3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.

_____ 4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.

_____ 5. I try to be loving towards myself when I’m feeling emotional pain.

_____ 6. When I fail at something important to me I become consumed by feelings of inadequacy.

_____ 7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.

_____ 8. When times are really difficult, I tend to be tough on myself.

_____ 9. When something upsets me I try to keep my emotions in balance.

_____ 10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

_____ 11. I’m intolerant and impatient towards those aspects of my personality I don't like.

_____ 12. When I’m going through a very hard time, I give myself the caring and tenderness I need.

_____ 13. When I’m feeling down, I tend to feel like most other people are probably happier than I am.

_____ 14. When something painful happens I try to take a balanced view of the situation.

_____ 15. I try to see my failings as part of the human condition.

_____ 16. When I see aspects of myself that I don’t like, I get down on myself.

_____ 17. When I fail at something important to me I try to keep things in perspective.

_____ 18. When I’m really struggling, I tend to feel like other people must be having an easier time of it.

_____ 19. I’m kind to myself when I’m experiencing suffering.

_____ 20. When something upsets me I get carried away with my feelings.

_____ 21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.

_____ 22. When I'm feeling down I try to approach my feelings with curiosity and openness.

_____ 23. I’m tolerant of my own flaws and inadequacies.

_____ 24. When something painful happens I tend to blow the incident out of proportion.

_____ 25. When I fail at something that's important to me, I tend to feel alone in my failure.

_____ 26. I try to be understanding and patient towards those aspects of my personality I don't like.

Post Traumatic Growth Inventory

Client Name:________________________________ Today's Date:_______________

For each of the statement below please indicate the degree to which this change occurred in your life as a result of your ruptured brain aneurysm, using the following scale.

0 = I did not experience this change as a result of my crisis.
1 = I experienced this change to a very small degree as a result of my crisis.
2 = I experienced this change to a small degree as a result of my crisis.
3 = I experienced this change to a moderate degree as a result of my crisis.
4 = I experienced this change to a great degree as a result of my crisis.
5 = I experienced this change to a very great degree as a result of my crisis.

Possible Areas of Growth and Change	0	1	2	3	4	5
1. I changed my priorities about what is important in life.						
2. I have a greater appreciation for the value of my own life.						
3. I developed new interests.						
4. I have a greater feeling of self-reliance.						
5. I have a better understanding of spiritual matters.						
6. I more clearly see that I can count on people in times of trouble.						
7. I established a new path for my life.						
8. I have a greater sense of closeness with others.						
9. I am more willing to express my emotions.						
10. I know better that I can handle difficulties.						
11. I am able to do better things with my life.						
12. I am better able to accept the way things work out.						
13. I can better appreciate each day.						
14. New opportunities are available which wouldn't have been otherwise.						
15. I have more compassion for others.						
16. I put more effort into my relationships.						
17. I am more likely to try to change things which need changing.						
18. I have a stronger religious faith.						
19. I discovered that I'm stronger than I thought I was.						
20. I learned a great deal about how wonderful people are.						
21. I better accept needing others.						

Post Traumatic Growth Inventory Scoring

The Post Traumatic Growth Inventory (PTGI) is scored by adding all the responses. Individual factors are scored by adding responses to items on each factor. Factors are indicated by the Roman numerals after each item below. Items to which factors belong are not listed on the form administered to clients.

PTGI Factors

Factor I: Relating to Others
Factor II: New Possibilities
Factor III: Personal Strength
Factor IV: Spiritual Change
Factor V: Appreciation of Life

1. I changed my priorities about what is important in life. (V)
2. I have a greater appreciation for the value of my own life. (V)
3. I developed new interests. (II)
4. I have a greater feeling of self-reliance. (Ill)
5. I have a better understanding of spiritual matters. (IV)
6. I more clearly see that I can count on people in times of trouble. (I)
7. I established a new path for my life. (II)
8. I have a greater sense of closeness with others. (I)
9. I am more willing to express my emotions. (I)
10. I know better that I can handle difficulties. (III)
11. I am able to do better things with my life. (II)
12. I am better able to accept the way things work out. (Ill)
13. I can better appreciate each day. (V)
14. New opportunities are available which wouldn't have been otherwise. (II)
15. I have more compassion for others. (I)
16. I put more effort into my relationships. (I)
17. I am more likely to try to change things which need changing. (II)
18. I have a stronger religious faith. *(N)*
19. I discovered that I'm stronger than I thought I was. (III)
20. I learned a great deal about how wonderful people are. (I)
21. I better accept needing others. (I)

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In Reciprocation

There is no charge for the PTGI, and there is no charge for the reproduction of the scale for use in research. In reciprocation, we would like you to send us a gratis copy of any manuscripts, theses, dissertations, research reports, preprints, and publications you prepare in which our materials, or any version of them, is used. Both L. G. Calhoun and R. G. Tedeschi can be contacted at: Department of Psychology - UNC Charlotte - Charlotte, NC 28223 USA.

Center for Epidemiologic Studies Depression Scale Revised (CESD-R-20)

About: This scale is a self-report measure of depression. Questions measure 8 different subscales, including:

Sadness (Dysphoria): (Q. 2, 4, 6), *Loss of Interest (Anhedonia):* (Q. 8, 10), *Appetite:* (Q. 1, 18), *Sleep:* (Q. 5, 11, 19), *Thinking / concentration:* (Q. 3, 20), *Guilt (Worthlessness):* (Q. 9, 17), *Tired (Fatigue):* (Q. 7, 16), *Movement (Agitation):* (Q. 12, 13), *Suicidal Ideation*: (Q. 14, 15)

Items: 20

Reliability:
Internal consistency for the CES-D-20 = (Cronbach's α=0.85 – 0.90)
Test-retest reliability for the CES-D-20 = (0.45 - 0.70).

Validity: The CES-D was moderately correlated to the Hamilton Clinician's Rating scale and the Raskin Rating scale (.44 to .54).

Scoring:

	Not at all or less than one day = 0	**1-2 days = 1**	**3-4 days = 2**	**5-7 days = 3**	**Nearly every day for 2 weeks = 4**
Questions 4, 8, 12, & 16	**4**	**3**	**2**	**1**	**0**
All other questions	**0**	**1**	**2**	**3**	**4**

The total score is calculated by finding the sum of 20 items. Scores range from 0-60. A score equal to or above 16 indicates a person at risk for clinical depression.

Meets criteria for Major depressive episode: Anhedonia or dysphoria nearly every day for the past two weeks, and symptoms in an additional 4 DSM symptom groups noted as occurring nearly every day for the past two weeks;

Probable major depressive episode: Anhedonia or dysphoria nearly every day for the past two weeks, and symptoms in an additional 3 DSM symptom groups reported as occurring either nearly every day for the past two weeks, or 5-7 days in the past week;

Possible major depressive episode: Anhedonia or dysphoria nearly every day for the past two weeks, and symptoms in an additional 2 other DSM symptom groups reported as occurring either nearly every day for the past two weeks, or 5-7 days in the past week;

Subthreshhold depression symptoms: People who have a CESD-style score of at least 16 but do not meet above criteria;

No clinical significance: People who have a total CESD-style score less than 16 across all 20 questions.

References:

Radloff, L. S. (1977). The CES-D scale: A self report depression scale for research in the general population. *Applied Psychological Measurements,* 1, 385-401.

Center for Epidemiologic Studies Depression Scale (CESD)

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

1 = Rarely or None of the Time (Less than 1 Day)
2 = Some or a Little of the Time (1-2 Days)
3 = Occasionally or a Moderate Amount of Time (3-4 Days)
4 = Most or All of the Time (5-7 Days)

During the past week:

	Rarely or none of the time (less than 1 day)	**Some or a little of the time** (1-2 days)	**Occasionally or a moderate amount of time** (3-4 days)	**Most or all of the time** (5-7 days)
1. I was bothered by things that usually don't bother me.	☐	☐	☐	☐
2. I did not feel like eating; my appetite was poor.	☐	☐	☐	☐
3. I felt that I could not shake off the blues even with help from my family or friends.	☐	☐	☐	☐
4. I felt that I was just as good as other people.	☐	☐	☐	☐
5. I had trouble keeping my mind on what I was doing.	☐	☐	☐	☐
6. I felt depressed.	☐	☐	☐	☐
7. I felt that everything I did was an effort.	☐	☐	☐	☐
8. I felt hopeful about the future.	☐	☐	☐	☐
9. I thought my life had been a failure.	☐	☐	☐	☐
10. I felt fearful.	☐	☐	☐	☐
11. My sleep was restless.	☐	☐	☐	☐
12. I was happy.	☐	☐	☐	☐
13. I talked less than usual.	☐	☐	☐	☐
14. I felt lonely.	☐	☐	☐	☐
15. People were unfriendly.	☐	☐	☐	☐
16. I enjoyed life.	☐	☐	☐	☐
17. I had crying spells.	☐	☐	☐	☐
18. I felt sad.	☐	☐	☐	☐
19. I felt that people dislike me.	☐	☐	☐	☐
20. I could not get “going”.	☐	☐	☐	☐

Appendix O: SPANE

Scale of Positive and Negative Experience (SPANE)

Please think about what you have been doing and experiencing during the past four weeks. Then report how much you experienced each of the following feelings, using the scale below. For each item, select a number from 1 to 5, and indicate that number on your response sheet.

1. Very Rarely or Never
2. Rarely
3. Sometimes
4. Often
5. Very Often or Always

Positive
Negative
Good
Bad
Pleasant
Unpleasant
Happy
Sad
Afraid
Joyful
Angry
Contented

Scoring:

The measure can be used to derive an overall affect balance score, but can also be divided into positive and negative feelings scales.

Positive Feelings (SPANE-P): Add the scores, varying from 1 to 5, for the six items: positive, good, pleasant, happy, joyful, and contented. The score can vary from 6 (lowest possible) to 30 (highest positive feelings score).

Negative Feelings (SPANE-N): Add the scores, varying from 1 to 5, for the six items: negative, bad, unpleasant, sad, afraid, and angry. The score can vary from 6 (lowest possible) to 30 (highest negative feelings score).

Affect Balance (SPANE-B): The negative feelings score is subtracted from the positive feelings score, and the resultant difference score can vary from -24 (unhappiest possible) to 24 (highest affect balance possible). A respondent with a very high score of 24 reports that she or he rarely or never experiences any of the negative feelings, and very often or always has all of the positive feelings.

Appendix P – Satisfaction with Life Scale

Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

____ In most ways my life is close to my ideal.

____ The conditions of my life are excellent.

____ I am satisfied with my life.

____ So far I have gotten the important things I want in life.

____ If I could live my life over, I would change almost nothing.

- 31 - 35 Extremely satisfied
- 26 - 30 Satisfied
- 21 - 25 Slightly satisfied
- 20 Neutral
- 15 - 19 Slightly dissatisfied
- 10 - 14 Dissatisfied
- 5 - 9 Extremely dissatisfied

Appendix Q_Flourishing scale

FLOURISHING SCALE

Below are 8 statements with which you may agree or disagree. Using the 1–7 scale below, indicate your agreement with each item by indicating that response for each statement.

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

____ I lead a purposeful and meaningful life

____ My social relationships are supportive and rewarding

____ I am engaged and interested in my daily activities

____ I actively contribute to the happiness and well-being of others

____ I am competent and capable in the activities that are important to me

____ I am a good person and live a good life

____ I am optimistic about my future

____ People respect me

Scoring:

Add the responses, varying from 1 to 7, for all eight items. The possible range of scores is from 8 (lowest possible) to 56 (highest PWB possible). A high score represents a person with many psychological resources and strengths

Frequencies

Statistics

		Gender	Age	Relationship Status	Household Financial Situation	Employment Status
N	Valid	251	251	251	251	251
	Missing	0	0	0	0	0
Mean		1.76	4.02	.64	3.24	.49
Median		2.00	4.00	1.00	3.00	.00
Std. Deviation		.650	1.023	.481	1.327	.501
Skewness		-2.360	-.296	-.593	.011	.024
Std. Error of Skewness		.154	.154	.154	.154	.154
Kurtosis		3.597	.252	-1.661	-.510	-2.016
Std. Error of Kurtosis		.306	.306	.306	.306	.306
Range		2	5	1	5	1
Minimum		0	1	0	1	0
Maximum		2	6	1	6	1

Statistics

		Duration of Time since ASAH	First Time ASAH occured	Location of Aneurysm in the Brain	Quality of Life
N	Valid	251	251	251	251
	Missing	0	0	0	0
Mean		2.71	.99	4.52	114.92
Median		3.00	1.00	5.00	112.00
Std. Deviation		.979	.089	2.288	28.198
Skewness		-.084	-11.135	-.282	.168
Std. Error of Skewness		.154	.154	.154	.154
Kurtosis		-1.082	122.968	-1.531	-.324
Std. Error of Kurtosis		.306	.306	.306	.306
Range		3	1	6	134
Minimum		1	0	1	48
Maximum		4	1	7	182

Statistics

		Post-Traumatic Stress Symptom	Self_Compassion	SWB_Flourishing	Depression	Social_Support
N	Valid	251	251	251	251	251
	Missing	0	0	0	0	0
Mean		28.89	2.60	38.87	30.38	3.23
Median		26.00	2.54	39.00	29.00	3.21
Std. Deviation		17.319	.647	8.976	15.623	.991
Skewness		.337	.310	-.305	.264	-.052
Std. Error of Skewness		.154	.154	.154	.154	.154
Kurtosis		-.745	-.085	-.130	-.534	-.800
Std. Error of Kurtosis		.306	.306	.306	.306	.306
Range		76	3	43	68	4
Minimum		0	1	13	1	1
Maximum		76	5	56	69	5

Statistics

		Subjective Wellbeing_Positive_Feelings	Subjective Wellbeing_Negative_Feelings	Subjective Wellbeing_Affect_Balance (SPANE-B_	Subjective Wellbeing_Life_Satisfaction
N	Valid	251	251	251	251
	Missing	0	0	0	0
Mean		18.82	17.23	1.59	17.74
Median		18.00	18.00	.00	17.00
Std. Deviation		4.795	5.055	9.015	7.137
Skewness		.310	-.221	.367	.245
Std. Error of Skewness		.154	.154	.154	.154
Kurtosis		-.154	-.377	-.202	-.751
Std. Error of Kurtosis		.306	.306	.306	.306
Range		23	24	42	30
Minimum		7	6	-18	5
Maximum		30	30	24	35

Statistics

		Post Traumatic Growth	QOL_Cognition Problems	QOL_Physical problems and impairments.	MR_Pre Existing Psychological Diagnosis
N	Valid	251	251	251	251
	Missing	0	0	0	0
Mean		69.15	20.39	19.25	.27
Median		70.00	20.00	20.00	.00
Std. Deviation		20.277	7.097	3.668	.445
Skewness		.206	.150	-1.079	1.037
Std. Error of Skewness		.154	.154	.154	.154
Kurtosis		-.419	-.841	1.411	-.932
Std. Error of Kurtosis		.306	.306	.306	.306
Range		97	28	20	1
Minimum		21	7	5	0
Maximum		118	35	25	1

Statistics

		Modified Glasgow Coma Scale	QOL_Cognition Problems	QOL_Self	QOL_Daily Life and Independence	QOL_Social Relationships
N	Valid	251	251	251	251	251
	Missing	0	0	0	0	0
Mean		2.47	1.00	17.31	21.02	17.74
Median		3.00	1.00	16.00	20.00	18.00
Std. Deviation		.931	.000	7.007	7.935	5.857
Skewness		-.036		.656	.142	-.001
Std. Error of Skewness		.154	.154	.154	.154	.154
Kurtosis		-.860		-.191	-1.122	-.646
Std. Error of Kurtosis		.306	.306	.306	.306	.306
Range		3	0	28	28	24
Minimum		1	1	7	7	6
Maximum		4	1	35	35	30

Statistics

		QOL_Feelings and Emotions	PTG_Relating to Others	PTG_New Possibilities	PTG_Personal Strength
N	Valid	251	251	251	251
	Missing	0	0	0	0
Mean		19.22	23.48	14.28	13.14
Median		20.00	24.00	13.00	13.00
Std. Deviation		3.842	7.691	6.502	5.108
Skewness		-.969	.065	.457	.059
Std. Error of Skewness		.154	.154	.154	.154
Kurtosis		.810	-.608	-.724	-.774
Std. Error of Kurtosis		.306	.306	.306	.306
Range		20	35	25	20
Minimum		5	7	5	4
Maximum		25	42	30	24

Statistics

		PTG_Spiritual Change	PTG_Appreciation of Life	Self Compassion-Self Kindness	Self Compassion-Self Judgement
N	Valid	251	251	251	251
	Missing	0	0	0	0
Mean		5.29	12.96	13.29	13.53
Median		5.00	13.00	13.00	14.00
Std. Deviation		3.438	3.371	4.249	4.298
Skewness		.616	-.479	.288	.166
Std. Error of Skewness		.154	.154	.154	.154
Kurtosis		-.968	-.347	-.184	-.431
Std. Error of Kurtosis		.306	.306	.306	.306
Range		10	15	20	20
Minimum		2	3	5	5
Maximum		12	18	25	25

Statistics

		Self Compassion - Common Humanity	Self Compassion - Isolation	Self Compassion - Mindfulness	Self Compassion - Over Identification
N	Valid	251	251	251	251
	Missing	0	0	0	0
Mean		11.67	11.14	12.22	11.31
Median		12.00	11.00	12.00	11.00
Std. Deviation		3.356	3.882	3.297	3.674
Skewness		-.087	.120	.126	.259
Std. Error of Skewness		.154	.154	.154	.154
Kurtosis		-.112	-.546	-.155	-.354
Std. Error of Kurtosis		.306	.306	.306	.306
Range		16	16	16	16
Minimum		4	4	4	4
Maximum		20	20	20	20

Statistics

		Post Surgical Medical Complications Experienced	Pre Existing Psychological Diagnoses before ASAH	MR_Currently taking Prescribed Medications	MR_Post ASAH Psychological Diagnosis
N	Valid	251	251	251	251
	Missing	0	0	0	0
Mean		1.80	.47	.62	.51
Median		.00	.00	1.00	1.00
Std. Deviation		2.805	.811	.486	.501
Skewness		1.076	1.239	-.504	-.056
Std. Error of Skewness		.154	.154	.154	.154
Kurtosis		-.712	-.323	-1.760	-2.013
Std. Error of Kurtosis		.306	.306	.306	.306
Range		7	2	1	1
Minimum		0	0	0	0
Maximum		7	2	1	1

Statistics

		MR_Pre ASAH Risk Factors Experienced	MR_Medical Diagnoses Post ASAH	Social Support - Emotional and Informational Support	Social Support-Tangible Support
N	Valid	223	251	251	251
	Missing	28	0	0	0
Mean		.77	.41	23.67	13.69
Median		1.00	.00	23.00	14.00
Std. Deviation		.424	.494	8.396	4.863
Skewness		-1.271	.350	.200	-.379
Std. Error of Skewness		.163	.154	.154	.154
Kurtosis		-.389	-1.893	-.808	-.925
Std. Error of Kurtosis		.324	.306	.306	.306
Range		1	1	32	16
Minimum		0	0	8	4
Maximum		1	1	40	20

Statistics

		Social Support-Affectionate Support	Social Support-Positive Social Interaction	Depression-Dysphoria	Depression-Anhedonia
N	Valid	251	251	251	251
	Missing	0	0	0	0
Mean		10.80	9.98	4.5936	3.6215
Median		12.00	10.00	5.0000	4.0000
Std. Deviation		3.807	3.506	2.76301	1.92358
Skewness		-.468	-.077	.206	.056
Std. Error of Skewness		.154	.154	.154	.154
Kurtosis		-1.032	-1.020	-.698	-.426
Std. Error of Kurtosis		.306	.306	.306	.306
Range		12	12	12.00	8.00
Minimum		3	3	.00	.00
Maximum		15	15	12.00	8.00

Statistics

		Depression- Appetite	Depression- Sleep	Depression- Cognitions	Depression- Worthlessness
N	Valid	251	251	251	251
	Missing	0	0	0	0
Mean		2.7291	4.7689	2.9363	1.9363
Median		3.0000	4.0000	3.0000	1.0000
Std. Deviation		1.93864	2.68373	2.03664	1.95036
Skewness		.424	.417	.425	.931
Std. Error of Skewness		.154	.154	.154	.154
Kurtosis		-.574	-.418	-.472	.150
Std. Error of Kurtosis		.306	.306	.306	.306
Range		8.00	12.00	8.00	8.00
Minimum		.00	.00	.00	.00
Maximum		8.00	12.00	8.00	8.00

Statistics

		Depression- Fatigue	Depression-Agitation	Depression-Suicidal Ideation
N	Valid	251	251	251
	Missing	0	0	0
Mean		4.0239	3.4502	3.1076
Median		4.0000	4.0000	3.0000
Std. Deviation		2.00385	1.81342	2.29268
Skewness		-.216	-.029	.439
Std. Error of Skewness		.154	.154	.154
Kurtosis		-.591	-.227	-.719
Std. Error of Kurtosis		.306	.306	.306
Range		8.00	8.00	8.00
Minimum		.00	.00	.00
Maximum		8.00	8.00	8.00

Frequency Table

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	30	12.0	12.0	12.0
	Female	221	88.0	88.0	100.0
	Total	251	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 - 24	3	1.2	1.2	1.2
	25 - 34	16	6.4	6.4	7.6
	35 - 44	45	17.9	17.9	25.5
	45 - 54	112	44.6	44.6	70.1
	55 - 64	58	23.1	23.1	93.2
	65 - 74	17	6.8	6.8	100.0
	Total	251	100.0	100.0	

Relationship Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not in a relationship	90	35.9	35.9	35.9
	In a relationship	161	64.1	64.1	100.0
	Total	251	100.0	100.0	

Household Financial Situation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	You are having difficulty paying the bills, no matter what you do	32	12.7	12.7	12.7
	You have money to pay the bills, but only because you have cut back on items	37	14.7	14.7	27.5
	You have enough money to pay the bills, but little spare money to buy extra or special items	71	28.3	28.3	55.8
	After paying the bills, you still have enough money for the items that you want to buy	73	29.1	29.1	84.9
	You can easily pay the bills and have plenty of money left over for extra items or activities that you want to buy or do	25	10.0	10.0	94.8
	Do not wish to answer	13	5.2	5.2	100.0
	Total	251	100.0	100.0	

Employment Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Employed	127	50.6	50.6	50.6
	Currently Employed	124	49.4	49.4	100.0
	Total	251	100.0	100.0	

Duration of Time since ASAH

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than six months ago	27	10.8	10.8	10.8
	1 to 2 years ago	86	34.3	34.3	45.0
	3 to 5 years ago	71	28.3	28.3	73.3
	More than 5 years ago	67	26.7	26.7	100.0
	Total	251	100.0	100.0	

First Time ASAH occured

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	2	.8	.8	.8
	Yes	249	99.2	99.2	100.0
	Total	251	100.0	100.0	

Location of Aneurysm in the Brain

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Anterior communicating artery	33	13.1	13.1	13.1
	Posterior communicating artery	41	16.3	16.3	29.5
	Middle cerebral artery	23	9.2	9.2	38.6
	Internal carotid artery	18	7.2	7.2	45.8
	Basilliar artery	17	6.8	6.8	52.6
	Other, please describe where your brain aneurysm is located within your brain	39	15.5	15.5	68.1
	Unsure, do not know	80	31.9	31.9	100.0
	Total	251	100.0	100.0	

Quality of Life

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	48	1	.4	.4	.4
	50	2	.8	.8	1.2
	55	1	.4	.4	1.6
	56	1	.4	.4	2.0
	57	1	.4	.4	2.4
	62	2	.8	.8	3.2
	64	1	.4	.4	3.6
	65	1	.4	.4	4.0
	68	1	.4	.4	4.4
	69	1	.4	.4	4.8
	72	1	.4	.4	5.2
	73	2	.8	.8	6.0
	76	1	.4	.4	6.4
	77	5	2.0	2.0	8.4
	78	1	.4	.4	8.8
	79	1	.4	.4	9.2
	80	1	.4	.4	9.6
	81	2	.8	.8	10.4
	82	4	1.6	1.6	12.0
	83	3	1.2	1.2	13.1
	84	1	.4	.4	13.5
	85	1	.4	.4	13.9
	86	1	.4	.4	14.3
	87	3	1.2	1.2	15.5
	88	3	1.2	1.2	16.7
	89	2	.8	.8	17.5
	91	3	1.2	1.2	18.7
	92	2	.8	.8	19.5
	93	4	1.6	1.6	21.1
	94	3	1.2	1.2	22.3
	95	6	2.4	2.4	24.7
	96	9	3.6	3.6	28.3
	97	2	.8	.8	29.1
	98	4	1.6	1.6	30.7
	99	4	1.6	1.6	32.3

	100	2	.8	.8	33.1
	101	4	1.6	1.6	34.7
	102	3	1.2	1.2	35.9
	103	1	.4	.4	36.3
	104	6	2.4	2.4	38.6
	105	4	1.6	1.6	40.2
	106	5	2.0	2.0	42.2
	107	5	2.0	2.0	44.2
	108	3	1.2	1.2	45.4
	109	5	2.0	2.0	47.4
	111	6	2.4	2.4	49.8
	112	3	1.2	1.2	51.0
	113	2	.8	.8	51.8
	114	1	.4	.4	52.2
	115	1	.4	.4	52.6
	116	2	.8	.8	53.4
	117	4	1.6	1.6	55.0
	118	6	2.4	2.4	57.4
	119	3	1.2	1.2	58.6
	120	4	1.6	1.6	60.2
	122	3	1.2	1.2	61.4
	123	6	2.4	2.4	63.7
	124	4	1.6	1.6	65.3
	125	2	.8	.8	66.1
	126	3	1.2	1.2	67.3
	127	2	.8	.8	68.1
	128	4	1.6	1.6	69.7
	129	3	1.2	1.2	70.9
	130	1	.4	.4	71.3
	131	1	.4	.4	71.7
	132	1	.4	.4	72.1
	133	1	.4	.4	72.5
	134	4	1.6	1.6	74.1
	135	2	.8	.8	74.9
	136	6	2.4	2.4	77.3
	137	3	1.2	1.2	78.5
	138	4	1.6	1.6	80.1
	139	1	.4	.4	80.5

	140	2	.8	.8	81.3
	141	1	.4	.4	81.7
	142	1	.4	.4	82.1
	143	2	.8	.8	82.9
	144	1	.4	.4	83.3
	145	2	.8	.8	84.1
	146	5	2.0	2.0	86.1
	147	4	1.6	1.6	87.6
	151	1	.4	.4	88.0
	152	1	.4	.4	88.4
	153	1	.4	.4	88.8
	155	1	.4	.4	89.2
	156	4	1.6	1.6	90.8
	157	2	.8	.8	91.6
	158	4	1.6	1.6	93.2
	159	2	.8	.8	94.0
	162	2	.8	.8	94.8
	164	2	.8	.8	95.6
	165	1	.4	.4	96.0
	167	1	.4	.4	96.4
	168	1	.4	.4	96.8
	169	1	.4	.4	97.2
	175	1	.4	.4	97.6
	178	2	.8	.8	98.4
	179	1	.4	.4	98.8
	181	2	.8	.8	99.6
	182	1	.4	.4	100.0
	Total	251	100.0	100.0	

Post Traumatic Stress Symptom

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	1.6	1.6	1.6
	1	3	1.2	1.2	2.8
	2	2	.8	.8	3.6
	3	4	1.6	1.6	5.2
	5	2	.8	.8	6.0
	6	11	4.4	4.4	10.4
	7	3	1.2	1.2	11.6
	8	3	1.2	1.2	12.7
	9	4	1.6	1.6	14.3
	10	3	1.2	1.2	15.5
	11	6	2.4	2.4	17.9
	12	5	2.0	2.0	19.9
	13	5	2.0	2.0	21.9
	14	3	1.2	1.2	23.1
	15	8	3.2	3.2	26.3
	16	6	2.4	2.4	28.7
	17	4	1.6	1.6	30.3
	18	4	1.6	1.6	31.9
	19	8	3.2	3.2	35.1
	20	4	1.6	1.6	36.7
	21	10	4.0	4.0	40.6
	22	4	1.6	1.6	42.2
	23	7	2.8	2.8	45.0
	24	2	.8	.8	45.8
	25	6	2.4	2.4	48.2
	26	6	2.4	2.4	50.6
	27	3	1.2	1.2	51.8
	28	6	2.4	2.4	54.2
	29	4	1.6	1.6	55.8
	30	3	1.2	1.2	57.0
	31	4	1.6	1.6	58.6
	32	5	2.0	2.0	60.6
	33	3	1.2	1.2	61.8
	34	3	1.2	1.2	62.9
	35	3	1.2	1.2	64.1

	36	1	.4	.4	64.5
	37	3	1.2	1.2	65.7
	38	4	1.6	1.6	67.3
	39	5	2.0	2.0	69.3
	40	5	2.0	2.0	71.3
	41	3	1.2	1.2	72.5
	42	4	1.6	1.6	74.1
	43	5	2.0	2.0	76.1
	44	5	2.0	2.0	78.1
	45	3	1.2	1.2	79.3
	46	5	2.0	2.0	81.3
	47	5	2.0	2.0	83.3
	48	4	1.6	1.6	84.9
	49	2	.8	.8	85.7
	50	4	1.6	1.6	87.3
	51	3	1.2	1.2	88.4
	52	1	.4	.4	88.8
	53	4	1.6	1.6	90.4
	54	5	2.0	2.0	92.4
	55	2	.8	.8	93.2
	57	2	.8	.8	94.0
	58	4	1.6	1.6	95.6
	59	1	.4	.4	96.0
	60	2	.8	.8	96.8
	61	2	.8	.8	97.6
	62	1	.4	.4	98.0
	63	1	.4	.4	98.4
	67	1	.4	.4	98.8
	72	1	.4	.4	99.2
	73	1	.4	.4	99.6
	76	1	.4	.4	100.0
	Total	251	100.0	100.0	

Self_Compassion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	.4	.4	.4
	1	2	.8	.8	1.2
	1	1	.4	.4	1.6
	1	2	.8	.8	2.4
	2	2	.8	.8	3.2
	2	5	2.0	2.0	5.2
	2	2	.8	.8	6.0
	2	3	1.2	1.2	7.2
	2	2	.8	.8	8.0
	2	2	.8	.8	8.8
	2	5	2.0	2.0	10.8
	2	1	.4	.4	11.2
	2	5	2.0	2.0	13.1
	2	9	3.6	3.6	16.7
	2	4	1.6	1.6	18.3
	2	7	2.8	2.8	21.1
	2	4	1.6	1.6	22.7
	2	4	1.6	1.6	24.3
	2	4	1.6	1.6	25.9
	2	8	3.2	3.2	29.1
	2	4	1.6	1.6	30.7
	2	3	1.2	1.2	31.9
	2	6	2.4	2.4	34.3
	2	7	2.8	2.8	37.1
	2	10	4.0	4.0	41.0
	2	6	2.4	2.4	43.4
	2	8	3.2	3.2	46.6
	3	6	2.4	2.4	49.0
	3	8	3.2	3.2	52.2
	3	5	2.0	2.0	54.2
	3	4	1.6	1.6	55.8
	3	4	1.6	1.6	57.4
	3	7	2.8	2.8	60.2
	3	5	2.0	2.0	62.2
	3	4	1.6	1.6	63.7

3	7	2.8	2.8	66.5
3	5	2.0	2.0	68.5
3	4	1.6	1.6	70.1
3	5	2.0	2.0	72.1
3	6	2.4	2.4	74.5
3	3	1.2	1.2	75.7
3	5	2.0	2.0	77.7
3	4	1.6	1.6	79.3
3	7	2.8	2.8	82.1
3	1	.4	.4	82.5
3	2	.8	.8	83.3
3	5	2.0	2.0	85.3
3	3	1.2	1.2	86.5
3	1	.4	.4	86.9
3	3	1.2	1.2	88.0
3	2	.8	.8	88.8
3	2	.8	.8	89.6
4	3	1.2	1.2	90.8
4	3	1.2	1.2	92.0
4	2	.8	.8	92.8
4	1	.4	.4	93.2
4	1	.4	.4	93.6
4	3	1.2	1.2	94.8
4	2	.8	.8	95.6
4	2	.8	.8	96.4
4	1	.4	.4	96.8
4	2	.8	.8	97.6
4	1	.4	.4	98.0
4	1	.4	.4	98.4
4	1	.4	.4	98.8
4	1	.4	.4	99.2
4	1	.4	.4	99.6
5	1	.4	.4	100.0
Total	251	100.0	100.0	

SWB_Flourishing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	13	1	.4	.4	.4
	14	1	.4	.4	.8
	15	1	.4	.4	1.2
	17	2	.8	.8	2.0
	18	1	.4	.4	2.4
	21	3	1.2	1.2	3.6
	22	2	.8	.8	4.4
	23	4	1.6	1.6	6.0
	24	3	1.2	1.2	7.2
	25	2	.8	.8	8.0
	26	3	1.2	1.2	9.2
	27	2	.8	.8	10.0
	28	2	.8	.8	10.8
	29	9	3.6	3.6	14.3
	30	7	2.8	2.8	17.1
	31	6	2.4	2.4	19.5
	32	9	3.6	3.6	23.1
	33	8	3.2	3.2	26.3
	34	6	2.4	2.4	28.7
	35	12	4.8	4.8	33.5
	36	7	2.8	2.8	36.3
	37	14	5.6	5.6	41.8
	38	19	7.6	7.6	49.4
	39	7	2.8	2.8	52.2
	40	17	6.8	6.8	59.0
	41	9	3.6	3.6	62.5
	42	10	4.0	4.0	66.5
	43	7	2.8	2.8	69.3
	44	8	3.2	3.2	72.5
	45	4	1.6	1.6	74.1
	46	7	2.8	2.8	76.9
	47	6	2.4	2.4	79.3
	48	14	5.6	5.6	84.9
	49	7	2.8	2.8	87.6
	50	7	2.8	2.8	90.4

	51	6	2.4	2.4	92.8
	52	1	.4	.4	93.2
	53	3	1.2	1.2	94.4
	54	4	1.6	1.6	96.0
	55	9	3.6	3.6	99.6
	56	1	.4	.4	100.0
	Total	251	100.0	100.0	

Depression

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	.8	.8	.8
	2	3	1.2	1.2	2.0
	3	1	.4	.4	2.4
	4	2	.8	.8	3.2
	5	4	1.6	1.6	4.8
	6	4	1.6	1.6	6.4
	7	1	.4	.4	6.8
	8	4	1.6	1.6	8.4
	10	9	3.6	3.6	12.0
	11	1	.4	.4	12.4
	12	3	1.2	1.2	13.5
	13	2	.8	.8	14.3
	14	6	2.4	2.4	16.7
	15	4	1.6	1.6	18.3
	16	5	2.0	2.0	20.3
	17	4	1.6	1.6	21.9
	18	6	2.4	2.4	24.3
	19	6	2.4	2.4	26.7
	20	8	3.2	3.2	29.9
	21	3	1.2	1.2	31.1
	22	9	3.6	3.6	34.7
	23	2	.8	.8	35.5
	24	11	4.4	4.4	39.8
	25	2	.8	.8	40.6
	26	5	2.0	2.0	42.6

	27	4	1.6	1.6	44.2
	28	7	2.8	2.8	47.0
	29	8	3.2	3.2	50.2
	30	4	1.6	1.6	51.8
	31	7	2.8	2.8	54.6
	32	9	3.6	3.6	58.2
	33	5	2.0	2.0	60.2
	34	3	1.2	1.2	61.4
	35	5	2.0	2.0	63.3
	36	8	3.2	3.2	66.5
	37	5	2.0	2.0	68.5
	38	4	1.6	1.6	70.1
	39	4	1.6	1.6	71.7
	40	3	1.2	1.2	72.9
	41	7	2.8	2.8	75.7
	42	2	.8	.8	76.5
	43	4	1.6	1.6	78.1
	44	4	1.6	1.6	79.7
	45	5	2.0	2.0	81.7
	46	3	1.2	1.2	82.9
	47	4	1.6	1.6	84.5
	48	4	1.6	1.6	86.1
	49	5	2.0	2.0	88.0
	50	3	1.2	1.2	89.2
	51	4	1.6	1.6	90.8
	52	2	.8	.8	91.6
	53	1	.4	.4	92.0
	54	1	.4	.4	92.4
	55	3	1.2	1.2	93.6
	56	1	.4	.4	94.0
	57	2	.8	.8	94.8
	58	1	.4	.4	95.2
	60	2	.8	.8	96.0
	61	2	.8	.8	96.8
	62	1	.4	.4	97.2
	63	1	.4	.4	97.6
	64	1	.4	.4	98.0
	66	2	.8	.8	98.8

	67	1	.4	.4	99.2
	68	1	.4	.4	99.6
	69	1	.4	.4	100.0
	Total	251	100.0	100.0	

Social_Support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	.4	.4	.4
	1	1	.4	.4	.8
	1	1	.4	.4	1.2
	1	2	.8	.8	2.0
	1	3	1.2	1.2	3.2
	1	3	1.2	1.2	4.4
	1	1	.4	.4	4.8
	2	1	.4	.4	5.2
	2	2	.8	.8	6.0
	2	3	1.2	1.2	7.2
	2	1	.4	.4	7.6
	2	2	.8	.8	8.4
	2	5	2.0	2.0	10.4
	2	4	1.6	1.6	12.0
	2	3	1.2	1.2	13.1
	2	4	1.6	1.6	14.7
	2	1	.4	.4	15.1
	2	5	2.0	2.0	17.1
	2	8	3.2	3.2	20.3
	2	7	2.8	2.8	23.1
	2	1	.4	.4	23.5
	2	2	.8	.8	24.3
	2	2	.8	.8	25.1
	3	3	1.2	1.2	26.3
	3	1	.4	.4	26.7
	3	4	1.6	1.6	28.3
	3	2	.8	.8	29.1
	3	9	3.6	3.6	32.7

	3	7	2.8	2.8	35.5
	3	2	.8	.8	36.3
	3	3	1.2	1.2	37.5
	3	5	2.0	2.0	39.4
	3	6	2.4	2.4	41.8
	3	4	1.6	1.6	43.4
	3	7	2.8	2.8	46.2
	3	4	1.6	1.6	47.8
	3	7	2.8	2.8	50.6
	3	8	3.2	3.2	53.8
	3	7	2.8	2.8	56.6
	3	7	2.8	2.8	59.4
	3	2	.8	.8	60.2
	3	4	1.6	1.6	61.8
	4	3	1.2	1.2	62.9
	4	1	.4	.4	63.3
	4	2	.8	.8	64.1
	4	6	2.4	2.4	66.5
	4	3	1.2	1.2	67.7
	4	4	1.6	1.6	69.3
	4	6	2.4	2.4	71.7
	4	4	1.6	1.6	73.3
	4	2	.8	.8	74.1
	4	4	1.6	1.6	75.7
	4	2	.8	.8	76.5
	4	2	.8	.8	77.3
	4	7	2.8	2.8	80.1
	4	4	1.6	1.6	81.7
	4	2	.8	.8	82.5
	4	3	1.2	1.2	83.7
	4	3	1.2	1.2	84.9
	4	8	3.2	3.2	88.0
	4	1	.4	.4	88.4
	5	6	2.4	2.4	90.8
	5	2	.8	.8	91.6
	5	2	.8	.8	92.4
	5	1	.4	.4	92.8
	5	1	.4	.4	93.2

	5	1	.4	.4	93.6
	5	3	1.2	1.2	94.8
	5	2	.8	.8	95.6
	5	11	4.4	4.4	100.0
	Total	251	100.0	100.0	

Subjective Wellbeing_Positive_Feelings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7	1	.4	.4	.4
	8	2	.8	.8	1.2
	9	2	.8	.8	2.0
	10	3	1.2	1.2	3.2
	11	5	2.0	2.0	5.2
	12	5	2.0	2.0	7.2
	13	8	3.2	3.2	10.4
	14	18	7.2	7.2	17.5
	15	19	7.6	7.6	25.1
	16	18	7.2	7.2	32.3
	17	29	11.6	11.6	43.8
	18	25	10.0	10.0	53.8
	19	18	7.2	7.2	61.0
	20	11	4.4	4.4	65.3
	21	15	6.0	6.0	71.3
	22	14	5.6	5.6	76.9
	23	17	6.8	6.8	83.7
	24	11	4.4	4.4	88.0
	25	5	2.0	2.0	90.0
	26	8	3.2	3.2	93.2
	27	3	1.2	1.2	94.4
	28	2	.8	.8	95.2
	29	5	2.0	2.0	97.2
	30	7	2.8	2.8	100.0
	Total	251	100.0	100.0	

Subjective Wellbeing_Negative_Feelings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6	4	1.6	1.6	1.6
	7	7	2.8	2.8	4.4
	8	7	2.8	2.8	7.2
	9	4	1.6	1.6	8.8
	10	7	2.8	2.8	11.6
	11	6	2.4	2.4	13.9
	12	9	3.6	3.6	17.5
	13	16	6.4	6.4	23.9
	14	15	6.0	6.0	29.9
	15	7	2.8	2.8	32.7
	16	16	6.4	6.4	39.0
	17	23	9.2	9.2	48.2
	18	27	10.8	10.8	59.0
	19	19	7.6	7.6	66.5
	20	17	6.8	6.8	73.3
	21	14	5.6	5.6	78.9
	22	16	6.4	6.4	85.3
	23	12	4.8	4.8	90.0
	24	10	4.0	4.0	94.0
	25	5	2.0	2.0	96.0
	26	3	1.2	1.2	97.2
	27	4	1.6	1.6	98.8
	28	2	.8	.8	99.6
	30	1	.4	.4	100.0
	Total	251	100.0	100.0	

Subjective Wellbeing_Affect_Balance (SPANE-B_

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-18	2	.8	.8	.8
	-17	2	.8	.8	1.6
	-16	1	.4	.4	2.0
	-15	2	.8	.8	2.8
	-14	1	.4	.4	3.2
	-13	3	1.2	1.2	4.4
	-12	3	1.2	1.2	5.6
	-11	3	1.2	1.2	6.8
	-10	12	4.8	4.8	11.6
	-9	2	.8	.8	12.4
	-8	7	2.8	2.8	15.1
	-7	5	2.0	2.0	17.1
	-6	12	4.8	4.8	21.9
	-5	6	2.4	2.4	24.3
	-4	9	3.6	3.6	27.9
	-3	13	5.2	5.2	33.1
	-2	11	4.4	4.4	37.5
	-1	16	6.4	6.4	43.8
	0	17	6.8	6.8	50.6
	1	14	5.6	5.6	56.2
	2	12	4.8	4.8	61.0
	3	10	4.0	4.0	64.9
	4	5	2.0	2.0	66.9
	5	8	3.2	3.2	70.1
	6	12	4.8	4.8	74.9
	7	2	.8	.8	75.7
	8	5	2.0	2.0	77.7
	9	6	2.4	2.4	80.1
	10	4	1.6	1.6	81.7
	11	7	2.8	2.8	84.5
	12	3	1.2	1.2	85.7
	13	8	3.2	3.2	88.8
	14	4	1.6	1.6	90.4
	15	4	1.6	1.6	92.0
	16	2	.8	.8	92.8

	17	2	.8	.8	93.6
	18	2	.8	.8	94.4
	19	4	1.6	1.6	96.0
	21	4	1.6	1.6	97.6
	22	3	1.2	1.2	98.8
	23	1	.4	.4	99.2
	24	2	.8	.8	100.0
	Total	251	100.0	100.0	

Subjective Wellbeing_Life_Satisfaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	7	2.8	2.8	2.8
	6	3	1.2	1.2	4.0
	7	6	2.4	2.4	6.4
	8	8	3.2	3.2	9.6
	9	7	2.8	2.8	12.4
	10	11	4.4	4.4	16.7
	11	15	6.0	6.0	22.7
	12	13	5.2	5.2	27.9
	13	12	4.8	4.8	32.7
	14	13	5.2	5.2	37.8
	15	10	4.0	4.0	41.8
	16	15	6.0	6.0	47.8
	17	9	3.6	3.6	51.4
	18	8	3.2	3.2	54.6
	19	11	4.4	4.4	59.0
	20	8	3.2	3.2	62.2
	21	18	7.2	7.2	69.3
	22	13	5.2	5.2	74.5
	23	9	3.6	3.6	78.1
	24	3	1.2	1.2	79.3
	25	11	4.4	4.4	83.7
	26	9	3.6	3.6	87.3
	27	8	3.2	3.2	90.4
	28	2	.8	.8	91.2

	29	5	2.0	2.0	93.2
	30	8	3.2	3.2	96.4
	32	4	1.6	1.6	98.0
	33	3	1.2	1.2	99.2
	34	1	.4	.4	99.6
	35	1	.4	.4	100.0
	Total	251	100.0	100.0	

Post Traumatic Growth

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21	1	.4	.4	.4
	22	1	.4	.4	.8
	29	1	.4	.4	1.2
	33	2	.8	.8	2.0
	35	1	.4	.4	2.4
	36	3	1.2	1.2	3.6
	37	2	.8	.8	4.4
	38	1	.4	.4	4.8
	39	2	.8	.8	5.6
	40	3	1.2	1.2	6.8
	41	8	3.2	3.2	10.0
	42	4	1.6	1.6	11.6
	43	2	.8	.8	12.4
	44	2	.8	.8	13.1
	45	2	.8	.8	13.9
	46	2	.8	.8	14.7
	47	1	.4	.4	15.1
	48	3	1.2	1.2	16.3
	49	4	1.6	1.6	17.9
	50	4	1.6	1.6	19.5
	51	6	2.4	2.4	21.9
	52	2	.8	.8	22.7
	53	7	2.8	2.8	25.5
	54	2	.8	.8	26.3
	55	4	1.6	1.6	27.9

	56	3	1.2	1.2	29.1
	57	6	2.4	2.4	31.5
	58	5	2.0	2.0	33.5
	59	4	1.6	1.6	35.1
	60	1	.4	.4	35.5
	61	4	1.6	1.6	37.1
	62	3	1.2	1.2	38.2
	63	3	1.2	1.2	39.4
	64	3	1.2	1.2	40.6
	65	3	1.2	1.2	41.8
	66	7	2.8	2.8	44.6
	67	4	1.6	1.6	46.2
	68	4	1.6	1.6	47.8
	69	3	1.2	1.2	49.0
	70	7	2.8	2.8	51.8
	71	4	1.6	1.6	53.4
	72	7	2.8	2.8	56.2
	73	3	1.2	1.2	57.4
	74	9	3.6	3.6	61.0
	75	9	3.6	3.6	64.5
	76	4	1.6	1.6	66.1
	77	2	.8	.8	66.9
	78	4	1.6	1.6	68.5
	79	7	2.8	2.8	71.3
	80	6	2.4	2.4	73.7
	81	2	.8	.8	74.5
	82	5	2.0	2.0	76.5
	83	3	1.2	1.2	77.7
	84	5	2.0	2.0	79.7
	85	2	.8	.8	80.5
	86	5	2.0	2.0	82.5
	87	3	1.2	1.2	83.7
	88	3	1.2	1.2	84.9
	90	1	.4	.4	85.3
	91	1	.4	.4	85.7
	93	2	.8	.8	86.5
	94	1	.4	.4	86.9
	95	2	.8	.8	87.6

	96	3	1.2	1.2	88.8
	97	2	.8	.8	89.6
	98	3	1.2	1.2	90.8
	99	2	.8	.8	91.6
	100	2	.8	.8	92.4
	101	1	.4	.4	92.8
	103	2	.8	.8	93.6
	104	1	.4	.4	94.0
	105	1	.4	.4	94.4
	106	2	.8	.8	95.2
	107	1	.4	.4	95.6
	108	1	.4	.4	96.0
	109	1	.4	.4	96.4
	110	1	.4	.4	96.8
	111	2	.8	.8	97.6
	112	1	.4	.4	98.0
	113	1	.4	.4	98.4
	115	2	.8	.8	99.2
	117	1	.4	.4	99.6
	118	1	.4	.4	100.0
	Total	251	100.0	100.0	

QOL_Cognition Problems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7	5	2.0	2.0	2.0
	8	4	1.6	1.6	3.6
	9	2	.8	.8	4.4
	10	6	2.4	2.4	6.8
	11	9	3.6	3.6	10.4
	12	8	3.2	3.2	13.5
	13	20	8.0	8.0	21.5
	14	16	6.4	6.4	27.9
	15	6	2.4	2.4	30.3
	16	5	2.0	2.0	32.3
	17	14	5.6	5.6	37.8

	18	6	2.4	2.4	40.2
	19	10	4.0	4.0	44.2
	20	19	7.6	7.6	51.8
	21	15	6.0	6.0	57.8
	22	8	3.2	3.2	61.0
	23	12	4.8	4.8	65.7
	24	14	5.6	5.6	71.3
	25	7	2.8	2.8	74.1
	26	9	3.6	3.6	77.7
	27	8	3.2	3.2	80.9
	28	11	4.4	4.4	85.3
	29	5	2.0	2.0	87.3
	30	13	5.2	5.2	92.4
	31	2	.8	.8	93.2
	32	1	.4	.4	93.6
	33	4	1.6	1.6	95.2
	34	9	3.6	3.6	98.8
	35	3	1.2	1.2	100.0
	Total	251	100.0	100.0	

QOL_Physical problems and impairments.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	1	.4	.4	.4
	8	1	.4	.4	.8
	9	8	3.2	3.2	4.0
	11	1	.4	.4	4.4
	12	3	1.2	1.2	5.6
	13	6	2.4	2.4	8.0
	14	2	.8	.8	8.8
	15	14	5.6	5.6	14.3
	16	10	4.0	4.0	18.3
	17	16	6.4	6.4	24.7
	18	24	9.6	9.6	34.3
	19	30	12.0	12.0	46.2
	20	30	12.0	12.0	58.2

	21	32	12.7	12.7	70.9
	22	29	11.6	11.6	82.5
	23	25	10.0	10.0	92.4
	24	11	4.4	4.4	96.8
	25	8	3.2	3.2	100.0
	Total	251	100.0	100.0	

MR_Pre Existing Psychological Diagnosis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No pre existing psychological diagnosis	183	72.9	72.9	72.9
	Diagnosed with a pre existing psychological diagnoses	68	27.1	27.1	100.0
	Total	251	100.0	100.0	

Modified Glasgow Coma Scale

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Good - still able to communicate and understand what was happening around you	43	17.1	17.1	17.1
	Moderate- experienced impairment, but still able to function independently	82	32.7	32.7	49.8
	Severely disabled - experienced a high degree of disability, completely reliant on others to provide support	92	36.7	36.7	86.5
	Vegetative State	34	13.5	13.5	100.0
	Total	251	100.0	100.0	

QOL_Cognition Problems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	251	100.0	100.0	100.0

QOL_Self

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7	13	5.2	5.2	5.2
	8	8	3.2	3.2	8.4
	9	11	4.4	4.4	12.7
	10	12	4.8	4.8	17.5
	11	10	4.0	4.0	21.5
	12	13	5.2	5.2	26.7
	13	21	8.4	8.4	35.1
	14	15	6.0	6.0	41.0
	15	16	6.4	6.4	47.4
	16	7	2.8	2.8	50.2
	17	18	7.2	7.2	57.4
	18	7	2.8	2.8	60.2
	19	18	7.2	7.2	67.3
	20	11	4.4	4.4	71.7
	21	10	4.0	4.0	75.7
	22	7	2.8	2.8	78.5
	23	6	2.4	2.4	80.9
	24	5	2.0	2.0	82.9
	25	8	3.2	3.2	86.1
	26	6	2.4	2.4	88.4
	27	4	1.6	1.6	90.0
	28	4	1.6	1.6	91.6
	29	3	1.2	1.2	92.8
	30	4	1.6	1.6	94.4
	31	1	.4	.4	94.8
	32	2	.8	.8	95.6
	33	3	1.2	1.2	96.8
	34	4	1.6	1.6	98.4
	35	4	1.6	1.6	100.0

	Total	251	100.0	100.0	

QOL_Daily Life and Independence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7	2	.8	.8	.8
	8	6	2.4	2.4	3.2
	9	8	3.2	3.2	6.4
	10	9	3.6	3.6	10.0
	11	7	2.8	2.8	12.7
	12	13	5.2	5.2	17.9
	13	6	2.4	2.4	20.3
	14	12	4.8	4.8	25.1
	15	8	3.2	3.2	28.3
	16	17	6.8	6.8	35.1
	17	11	4.4	4.4	39.4
	18	9	3.6	3.6	43.0
	19	11	4.4	4.4	47.4
	20	10	4.0	4.0	51.4
	21	8	3.2	3.2	54.6
	22	10	4.0	4.0	58.6
	23	6	2.4	2.4	61.0
	24	5	2.0	2.0	62.9
	25	9	3.6	3.6	66.5
	26	8	3.2	3.2	69.7
	27	10	4.0	4.0	73.7
	28	8	3.2	3.2	76.9
	29	14	5.6	5.6	82.5
	30	8	3.2	3.2	85.7
	31	4	1.6	1.6	87.3
	32	8	3.2	3.2	90.4
	33	6	2.4	2.4	92.8
	34	5	2.0	2.0	94.8
	35	13	5.2	5.2	100.0
	Total	251	100.0	100.0	

QOL_Social Relationships

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6	6	2.4	2.4	2.4
	7	5	2.0	2.0	4.4
	8	5	2.0	2.0	6.4
	9	6	2.4	2.4	8.8
	10	8	3.2	3.2	12.0
	11	15	6.0	6.0	17.9
	12	7	2.8	2.8	20.7
	13	13	5.2	5.2	25.9
	14	12	4.8	4.8	30.7
	15	11	4.4	4.4	35.1
	16	15	6.0	6.0	41.0
	17	13	5.2	5.2	46.2
	18	23	9.2	9.2	55.4
	19	12	4.8	4.8	60.2
	20	14	5.6	5.6	65.7
	21	18	7.2	7.2	72.9
	22	13	5.2	5.2	78.1
	23	14	5.6	5.6	83.7
	24	9	3.6	3.6	87.3
	25	7	2.8	2.8	90.0
	26	7	2.8	2.8	92.8
	27	3	1.2	1.2	94.0
	28	6	2.4	2.4	96.4
	29	4	1.6	1.6	98.0
	30	5	2.0	2.0	100.0
	Total	251	100.0	100.0	

QOL_Feelings and Emotions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	1	.4	.4	.4
	7	1	.4	.4	.8
	8	2	.8	.8	1.6
	9	3	1.2	1.2	2.8
	11	4	1.6	1.6	4.4
	12	3	1.2	1.2	5.6
	13	13	5.2	5.2	10.8
	14	5	2.0	2.0	12.7
	15	7	2.8	2.8	15.5
	16	10	4.0	4.0	19.5
	17	21	8.4	8.4	27.9
	18	22	8.8	8.8	36.7
	19	23	9.2	9.2	45.8
	20	22	8.8	8.8	54.6
	21	35	13.9	13.9	68.5
	22	26	10.4	10.4	78.9
	23	30	12.0	12.0	90.8
	24	17	6.8	6.8	97.6
	25	6	2.4	2.4	100.0
	Total	251	100.0	100.0	

PTG_Relating to Others

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7	3	1.2	1.2	1.2
	8	2	.8	.8	2.0
	9	1	.4	.4	2.4
	10	3	1.2	1.2	3.6
	11	2	.8	.8	4.4
	12	6	2.4	2.4	6.8
	13	8	3.2	3.2	10.0
	14	12	4.8	4.8	14.7

	15	4	1.6	1.6	16.3
	16	18	7.2	7.2	23.5
	17	9	3.6	3.6	27.1
	18	8	3.2	3.2	30.3
	19	10	4.0	4.0	34.3
	20	8	3.2	3.2	37.5
	21	7	2.8	2.8	40.2
	22	7	2.8	2.8	43.0
	23	10	4.0	4.0	47.0
	24	10	4.0	4.0	51.0
	25	11	4.4	4.4	55.4
	26	17	6.8	6.8	62.2
	27	15	6.0	6.0	68.1
	28	17	6.8	6.8	74.9
	29	13	5.2	5.2	80.1
	30	9	3.6	3.6	83.7
	31	4	1.6	1.6	85.3
	32	7	2.8	2.8	88.0
	33	5	2.0	2.0	90.0
	34	1	.4	.4	90.4
	35	6	2.4	2.4	92.8
	36	7	2.8	2.8	95.6
	37	2	.8	.8	96.4
	38	1	.4	.4	96.8
	39	4	1.6	1.6	98.4
	40	1	.4	.4	98.8
	41	2	.8	.8	99.6
	42	1	.4	.4	100.0
	Total	251	100.0	100.0	

PTG_New Possibilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	16	6.4	6.4	6.4
	6	9	3.6	3.6	10.0
	7	16	6.4	6.4	16.3
	8	17	6.8	6.8	23.1
	9	20	8.0	8.0	31.1
	10	13	5.2	5.2	36.3
	11	13	5.2	5.2	41.4
	12	8	3.2	3.2	44.6
	13	14	5.6	5.6	50.2
	14	13	5.2	5.2	55.4
	15	9	3.6	3.6	59.0
	16	9	3.6	3.6	62.5
	17	13	5.2	5.2	67.7
	18	13	5.2	5.2	72.9
	19	12	4.8	4.8	77.7
	20	8	3.2	3.2	80.9
	21	9	3.6	3.6	84.5
	22	7	2.8	2.8	87.3
	23	8	3.2	3.2	90.4
	24	3	1.2	1.2	91.6
	25	4	1.6	1.6	93.2
	26	5	2.0	2.0	95.2
	27	5	2.0	2.0	97.2
	29	6	2.4	2.4	99.6
	30	1	.4	.4	100.0
	Total	251	100.0	100.0	

PTG_Personal Strength

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	10	4.0	4.0	4.0
	5	10	4.0	4.0	8.0
	6	13	5.2	5.2	13.1
	7	9	3.6	3.6	16.7
	8	9	3.6	3.6	20.3
	9	15	6.0	6.0	26.3
	10	13	5.2	5.2	31.5
	11	18	7.2	7.2	38.6
	12	18	7.2	7.2	45.8
	13	13	5.2	5.2	51.0
	14	23	9.2	9.2	60.2
	15	16	6.4	6.4	66.5
	16	15	6.0	6.0	72.5
	17	19	7.6	7.6	80.1
	18	8	3.2	3.2	83.3
	19	12	4.8	4.8	88.0
	20	7	2.8	2.8	90.8
	21	8	3.2	3.2	94.0
	22	8	3.2	3.2	97.2
	23	3	1.2	1.2	98.4
	24	4	1.6	1.6	100.0
	Total	251	100.0	100.0	

PTG_Spiritual Change

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	99	39.4	39.4	39.4
	3	12	4.8	4.8	44.2
	4	13	5.2	5.2	49.4
	5	18	7.2	7.2	56.6
	6	23	9.2	9.2	65.7
	7	18	7.2	7.2	72.9

	8	11	4.4	4.4	77.3
	9	18	7.2	7.2	84.5
	10	11	4.4	4.4	88.8
	11	8	3.2	3.2	92.0
	12	20	8.0	8.0	100.0
	Total	251	100.0	100.0	

PTG_Appreciation of Life

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	2	.8	.8	.8
	5	2	.8	.8	1.6
	6	6	2.4	2.4	4.0
	7	7	2.8	2.8	6.8
	8	13	5.2	5.2	12.0
	9	16	6.4	6.4	18.3
	10	9	3.6	3.6	21.9
	11	23	9.2	9.2	31.1
	12	25	10.0	10.0	41.0
	13	29	11.6	11.6	52.6
	14	27	10.8	10.8	63.3
	15	31	12.4	12.4	75.7
	16	17	6.8	6.8	82.5
	17	24	9.6	9.6	92.0
	18	20	8.0	8.0	100.0
	Total	251	100.0	100.0	

Self Compassion- Self Kindness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	5	2.0	2.0	2.0
	6	6	2.4	2.4	4.4
	7	9	3.6	3.6	8.0
	8	16	6.4	6.4	14.3
	9	17	6.8	6.8	21.1

	10	19	7.6	7.6	28.7
	11	18	7.2	7.2	35.9
	12	17	6.8	6.8	42.6
	13	19	7.6	7.6	50.2
	14	27	10.8	10.8	61.0
	15	28	11.2	11.2	72.1
	16	17	6.8	6.8	78.9
	17	11	4.4	4.4	83.3
	18	13	5.2	5.2	88.4
	19	12	4.8	4.8	93.2
	20	6	2.4	2.4	95.6
	21	3	1.2	1.2	96.8
	22	1	.4	.4	97.2
	23	2	.8	.8	98.0
	24	2	.8	.8	98.8
	25	3	1.2	1.2	100.0
	Total	251	100.0	100.0	

Self Compassion- Self Judgement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	7	2.8	2.8	2.8
	6	2	.8	.8	3.6
	7	15	6.0	6.0	9.6
	8	8	3.2	3.2	12.7
	9	14	5.6	5.6	18.3
	10	21	8.4	8.4	26.7
	11	20	8.0	8.0	34.7
	12	11	4.4	4.4	39.0
	13	27	10.8	10.8	49.8
	14	23	9.2	9.2	59.0
	15	27	10.8	10.8	69.7
	16	17	6.8	6.8	76.5
	17	12	4.8	4.8	81.3
	18	14	5.6	5.6	86.9
	19	9	3.6	3.6	90.4

	20	9	3.6	3.6	94.0
	21	4	1.6	1.6	95.6
	22	6	2.4	2.4	98.0
	23	3	1.2	1.2	99.2
	24	1	.4	.4	99.6
	25	1	.4	.4	100.0
	Total	251	100.0	100.0	

Self Compassion - Common Humanity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	5	2.0	2.0	2.0
	5	5	2.0	2.0	4.0
	6	11	4.4	4.4	8.4
	7	10	4.0	4.0	12.4
	8	16	6.4	6.4	18.7
	9	13	5.2	5.2	23.9
	10	22	8.8	8.8	32.7
	11	31	12.4	12.4	45.0
	12	31	12.4	12.4	57.4
	13	39	15.5	15.5	72.9
	14	24	9.6	9.6	82.5
	15	15	6.0	6.0	88.4
	16	10	4.0	4.0	92.4
	17	10	4.0	4.0	96.4
	18	2	.8	.8	97.2
	19	4	1.6	1.6	98.8
	20	3	1.2	1.2	100.0
	Total	251	100.0	100.0	

Self Compassion - Isolation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	12	4.8	4.8	4.8
	5	8	3.2	3.2	8.0

	6	16	6.4	6.4	14.3
	7	11	4.4	4.4	18.7
	8	16	6.4	6.4	25.1
	9	24	9.6	9.6	34.7
	10	22	8.8	8.8	43.4
	11	24	9.6	9.6	53.0
	12	35	13.9	13.9	66.9
	13	14	5.6	5.6	72.5
	14	16	6.4	6.4	78.9
	15	18	7.2	7.2	86.1
	16	9	3.6	3.6	89.6
	17	13	5.2	5.2	94.8
	18	5	2.0	2.0	96.8
	19	3	1.2	1.2	98.0
	20	5	2.0	2.0	100.0
	Total	251	100.0	100.0	

Self Compassion - Mindfulness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	3	1.2	1.2	1.2
	6	8	3.2	3.2	4.4
	7	5	2.0	2.0	6.4
	8	18	7.2	7.2	13.5
	9	13	5.2	5.2	18.7
	10	30	12.0	12.0	30.7
	11	32	12.7	12.7	43.4
	12	28	11.2	11.2	54.6
	13	28	11.2	11.2	65.7
	14	27	10.8	10.8	76.5
	15	24	9.6	9.6	86.1
	16	9	3.6	3.6	89.6
	17	5	2.0	2.0	91.6
	18	11	4.4	4.4	96.0
	19	6	2.4	2.4	98.4
	20	4	1.6	1.6	100.0

	Total	251	100.0	100.0	

Self Compassion - Over Identification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	7	2.8	2.8	2.8
	5	6	2.4	2.4	5.2
	6	10	4.0	4.0	9.2
	7	14	5.6	5.6	14.7
	8	16	6.4	6.4	21.1
	9	32	12.7	12.7	33.9
	10	24	9.6	9.6	43.4
	11	25	10.0	10.0	53.4
	12	35	13.9	13.9	67.3
	13	17	6.8	6.8	74.1
	14	16	6.4	6.4	80.5
	15	15	6.0	6.0	86.5
	16	8	3.2	3.2	89.6
	17	6	2.4	2.4	92.0
	18	11	4.4	4.4	96.4
	19	6	2.4	2.4	98.8
	20	3	1.2	1.2	100.0
	Total	251	100.0	100.0	

Post Surgical Medical Complications Experienced

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Medical Complications	165	65.7	65.7	65.7
	Vasospasm	11	4.4	4.4	70.1
	Stroke	7	2.8	2.8	72.9
	Seizures	4	1.6	1.6	74.5
	Rebleeding	1	.4	.4	74.9
	Wound Infection	1	.4	.4	75.3
	Headaches/Migraines	29	11.6	11.6	86.9
	Other	33	13.1	13.1	100.0
	Total	251	100.0	100.0	

Pre Existing Psychological Diagnoses before ASAH

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No pre existing psychological diagnoses	183	72.9	72.9	72.9
	Anxiety	17	6.8	6.8	79.7
	Depression	51	20.3	20.3	100.0
	Total	251	100.0	100.0	

MR_Currently taking Prescribed Medications

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not currently taking prescribed medication	95	37.8	37.8	37.8
	Currently taking prescribed medication	156	62.2	62.2	100.0
	Total	251	100.0	100.0	

MR_Post ASAH Psychological Diagnosis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Do not have a psychological diagnosis post ASAH	122	48.6	48.6	48.6
	Diagnosed with a psychological condition post ASAH	129	51.4	51.4	100.0
	Total	251	100.0	100.0	

MR_Pre ASAH Risk Factors Experienced

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Did not experience any pre ASAH risk factors	52	20.7	23.3	23.3
	Experienced Pre ASAH risk factors	171	68.1	76.7	100.0
	Total	223	88.8	100.0	
Missing	System	28	11.2		
Total		251	100.0		

MR_Medical Diagnoses Post ASAH

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Medical Diagnoses post ASAH	147	58.6	58.6	58.6
	Diagnosed with Medical conditions post ASAH	104	41.4	41.4	100.0
	Total	251	100.0	100.0	

Social Support - Emotional and Informational Support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	8	2	.8	.8	.8
	9	4	1.6	1.6	2.4
	10	3	1.2	1.2	3.6
	11	9	3.6	3.6	7.2
	12	5	2.0	2.0	9.2
	13	9	3.6	3.6	12.7
	14	7	2.8	2.8	15.5
	15	11	4.4	4.4	19.9
	16	10	4.0	4.0	23.9
	17	7	2.8	2.8	26.7
	18	15	6.0	6.0	32.7
	19	7	2.8	2.8	35.5
	20	8	3.2	3.2	38.6
	21	10	4.0	4.0	42.6
	22	6	2.4	2.4	45.0
	23	15	6.0	6.0	51.0
	24	7	2.8	2.8	53.8
	25	14	5.6	5.6	59.4
	26	11	4.4	4.4	63.7
	27	4	1.6	1.6	65.3
	28	9	3.6	3.6	68.9
	29	12	4.8	4.8	73.7
	30	11	4.4	4.4	78.1
	31	6	2.4	2.4	80.5
	32	9	3.6	3.6	84.1
	33	8	3.2	3.2	87.3
	34	6	2.4	2.4	89.6
	35	3	1.2	1.2	90.8
	36	1	.4	.4	91.2
	37	2	.8	.8	92.0
	38	2	.8	.8	92.8
	39	4	1.6	1.6	94.4
	40	14	5.6	5.6	100.0
	Total	251	100.0	100.0	

Social Support-Tangible Support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	8	3.2	3.2	3.2
	5	9	3.6	3.6	6.8
	6	12	4.8	4.8	11.6
	7	10	4.0	4.0	15.5
	8	15	6.0	6.0	21.5
	9	2	.8	.8	22.3
	10	5	2.0	2.0	24.3
	11	12	4.8	4.8	29.1
	12	24	9.6	9.6	38.6
	13	15	6.0	6.0	44.6
	14	15	6.0	6.0	50.6
	15	14	5.6	5.6	56.2
	16	41	16.3	16.3	72.5
	17	7	2.8	2.8	75.3
	18	4	1.6	1.6	76.9
	19	12	4.8	4.8	81.7
	20	46	18.3	18.3	100.0
	Total	251	100.0	100.0	

Social Support- Affectionate Support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	11	4.4	4.4	4.4
	4	5	2.0	2.0	6.4
	5	11	4.4	4.4	10.8
	6	21	8.4	8.4	19.1
	7	12	4.8	4.8	23.9
	8	15	6.0	6.0	29.9
	9	18	7.2	7.2	37.1
	10	12	4.8	4.8	41.8
	11	15	6.0	6.0	47.8
	12	35	13.9	13.9	61.8

	13	10	4.0	4.0	65.7
	14	14	5.6	5.6	71.3
	15	72	28.7	28.7	100.0
	Total	251	100.0	100.0	

Social Support- Positive Social Interaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	8	3.2	3.2	3.2
	4	7	2.8	2.8	6.0
	5	7	2.8	2.8	8.8
	6	33	13.1	13.1	21.9
	7	15	6.0	6.0	27.9
	8	14	5.6	5.6	33.5
	9	36	14.3	14.3	47.8
	10	22	8.8	8.8	56.6
	11	12	4.8	4.8	61.4
	12	34	13.5	13.5	74.9
	13	10	4.0	4.0	78.9
	14	7	2.8	2.8	81.7
	15	46	18.3	18.3	100.0
	Total	251	100.0	100.0	

Depression- Dysphoria

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	16	6.4	6.4	6.4
	1.00	24	9.6	9.6	15.9
	2.00	26	10.4	10.4	26.3
	3.00	26	10.4	10.4	36.7
	4.00	33	13.1	13.1	49.8
	5.00	33	13.1	13.1	62.9
	6.00	28	11.2	11.2	74.1
	7.00	22	8.8	8.8	82.9
	8.00	22	8.8	8.8	91.6

	9.00	10	4.0	4.0	95.6
	10.00	8	3.2	3.2	98.8
	11.00	2	.8	.8	99.6
	12.00	1	.4	.4	100.0
	Total	251	100.0	100.0	

Depression- Anhedonia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	17	6.8	6.8	6.8
	1.00	18	7.2	7.2	13.9
	2.00	36	14.3	14.3	28.3
	3.00	45	17.9	17.9	46.2
	4.00	58	23.1	23.1	69.3
	5.00	34	13.5	13.5	82.9
	6.00	25	10.0	10.0	92.8
	7.00	12	4.8	4.8	97.6
	8.00	6	2.4	2.4	100.0
	Total	251	100.0	100.0	

Depression- Appetite

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	35	13.9	13.9	13.9
	1.00	41	16.3	16.3	30.3
	2.00	49	19.5	19.5	49.8
	3.00	41	16.3	16.3	66.1
	4.00	38	15.1	15.1	81.3
	5.00	22	8.8	8.8	90.0
	6.00	15	6.0	6.0	96.0
	7.00	9	3.6	3.6	99.6
	8.00	1	.4	.4	100.0
	Total	251	100.0	100.0	

Depression- Sleep

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	2.4	2.4	2.4
	1.00	22	8.8	8.8	11.2
	2.00	26	10.4	10.4	21.5
	3.00	37	14.7	14.7	36.3
	4.00	35	13.9	13.9	50.2
	5.00	34	13.5	13.5	63.7
	6.00	27	10.8	10.8	74.5
	7.00	16	6.4	6.4	80.9
	8.00	24	9.6	9.6	90.4
	9.00	13	5.2	5.2	95.6
	10.00	5	2.0	2.0	97.6
	11.00	3	1.2	1.2	98.8
	12.00	3	1.2	1.2	100.0
	Total	251	100.0	100.0	

Depression- Cognitions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	31	12.4	12.4	12.4
	1.00	41	16.3	16.3	28.7
	2.00	40	15.9	15.9	44.6
	3.00	44	17.5	17.5	62.2
	4.00	40	15.9	15.9	78.1
	5.00	25	10.0	10.0	88.0
	6.00	17	6.8	6.8	94.8
	7.00	7	2.8	2.8	97.6
	8.00	6	2.4	2.4	100.0
	Total	251	100.0	100.0	

Depression- Worthlessness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	77	30.7	30.7	30.7
	1.00	56	22.3	22.3	53.0
	2.00	33	13.1	13.1	66.1
	3.00	29	11.6	11.6	77.7
	4.00	26	10.4	10.4	88.0
	5.00	16	6.4	6.4	94.4
	6.00	8	3.2	3.2	97.6
	7.00	3	1.2	1.2	98.8
	8.00	3	1.2	1.2	100.0
	Total	251	100.0	100.0	

Depression- Fatigue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	16	6.4	6.4	6.4
	1.00	15	6.0	6.0	12.4
	2.00	24	9.6	9.6	21.9
	3.00	38	15.1	15.1	37.1
	4.00	57	22.7	22.7	59.8
	5.00	35	13.9	13.9	73.7
	6.00	37	14.7	14.7	88.4
	7.00	24	9.6	9.6	98.0
	8.00	5	2.0	2.0	100.0
	Total	251	100.0	100.0	

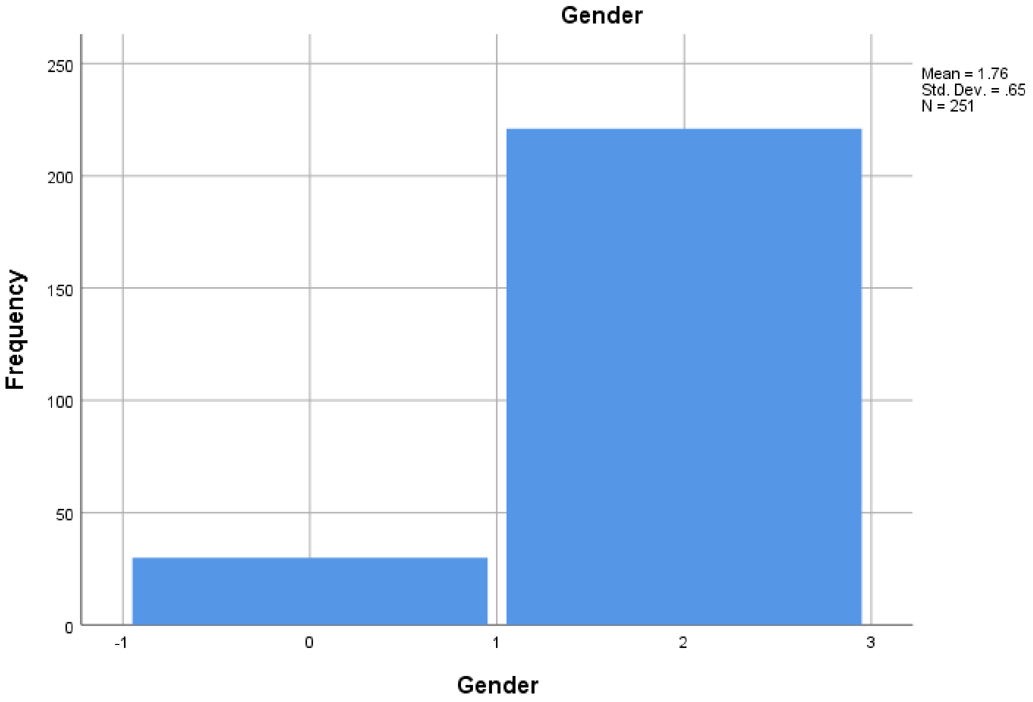
Depression-Agitation

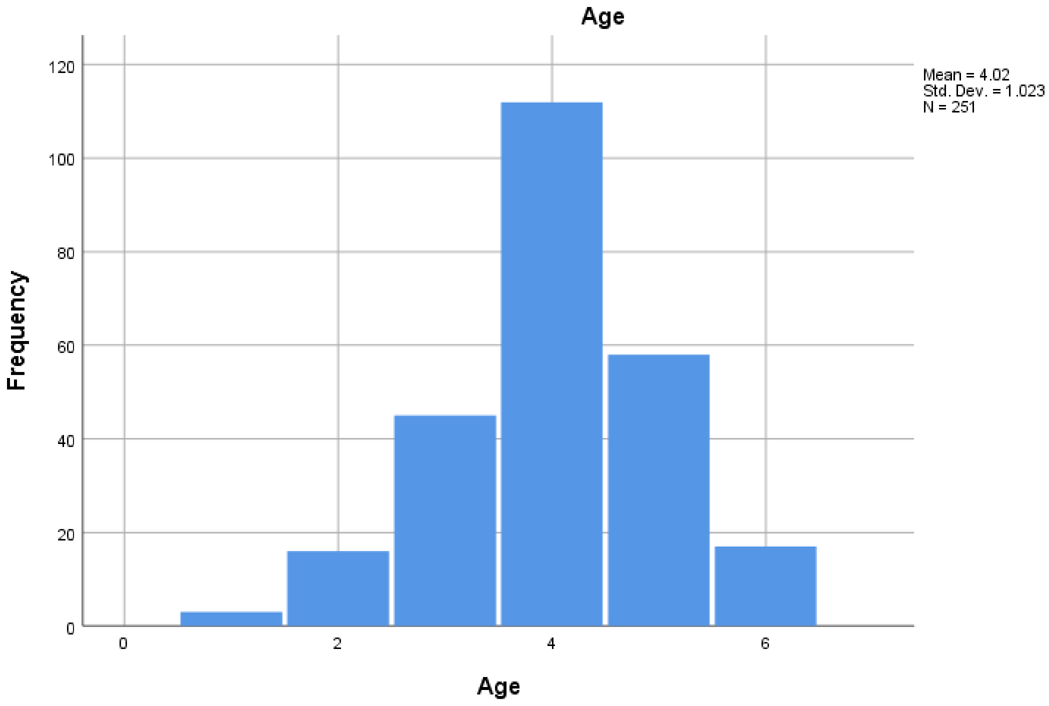
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	18	7.2	7.2	7.2
	1.00	24	9.6	9.6	16.7
	2.00	29	11.6	11.6	28.3
	3.00	43	17.1	17.1	45.4
	4.00	74	29.5	29.5	74.9
	5.00	35	13.9	13.9	88.8
	6.00	16	6.4	6.4	95.2
	7.00	8	3.2	3.2	98.4
	8.00	4	1.6	1.6	100.0
	Total	251	100.0	100.0	

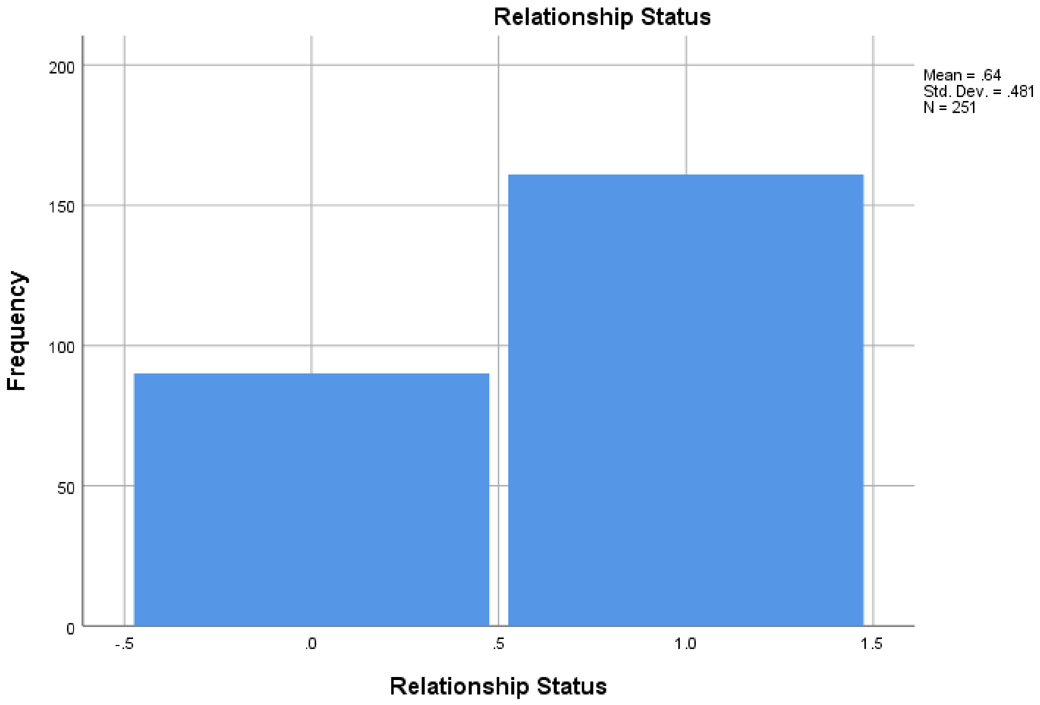
Depression-Suicidal Ideation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	35	13.9	13.9	13.9
	1.00	41	16.3	16.3	30.3
	2.00	36	14.3	14.3	44.6
	3.00	37	14.7	14.7	59.4
	4.00	33	13.1	13.1	72.5
	5.00	26	10.4	10.4	82.9
	6.00	20	8.0	8.0	90.8
	7.00	10	4.0	4.0	94.8
	8.00	13	5.2	5.2	100.0
	Total	251	100.0	100.0	

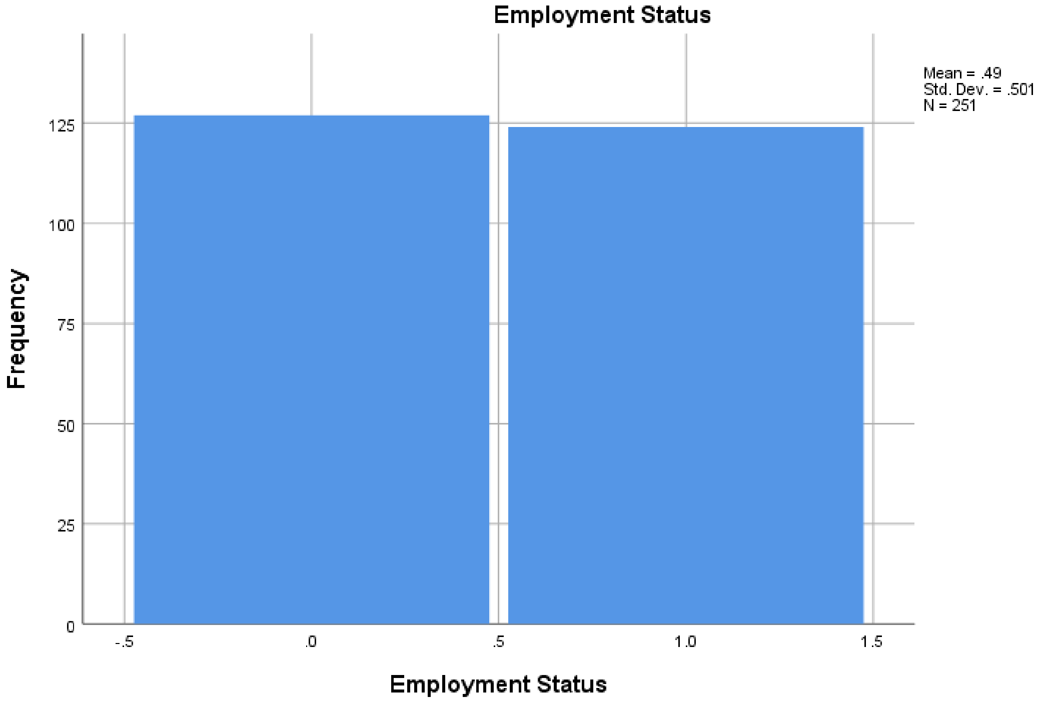
Histogram

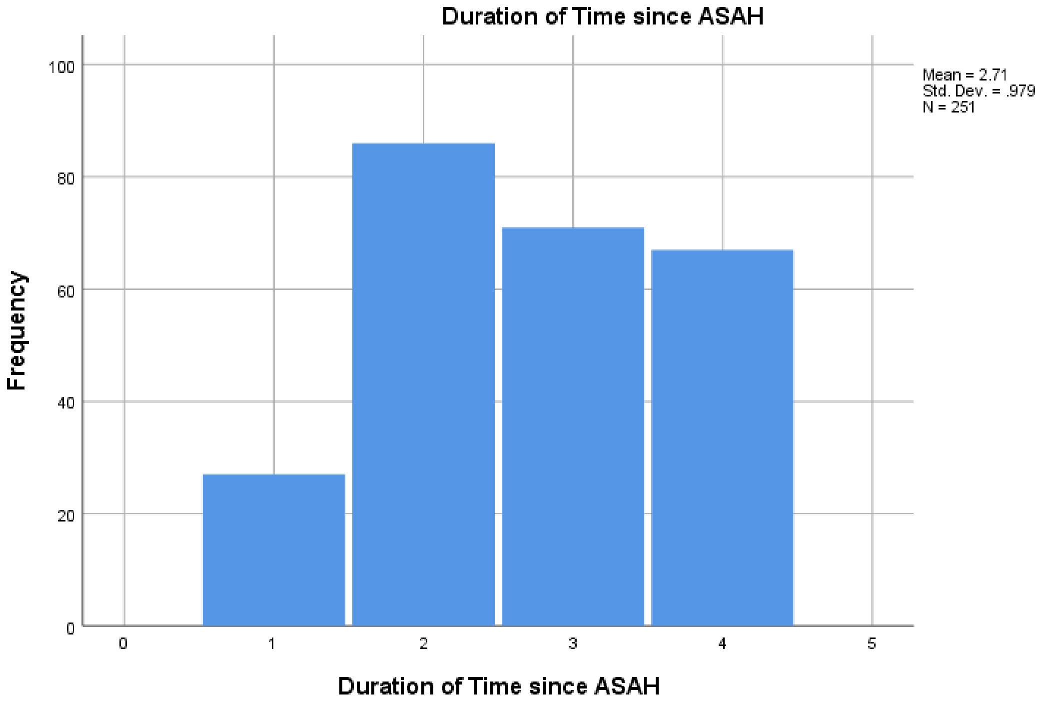

Gender
Mean = 1.76
Std. Dev. = .65
N = 251
Frequency
0
50
100
150
200
250
-1
0
1
2
3
Gender

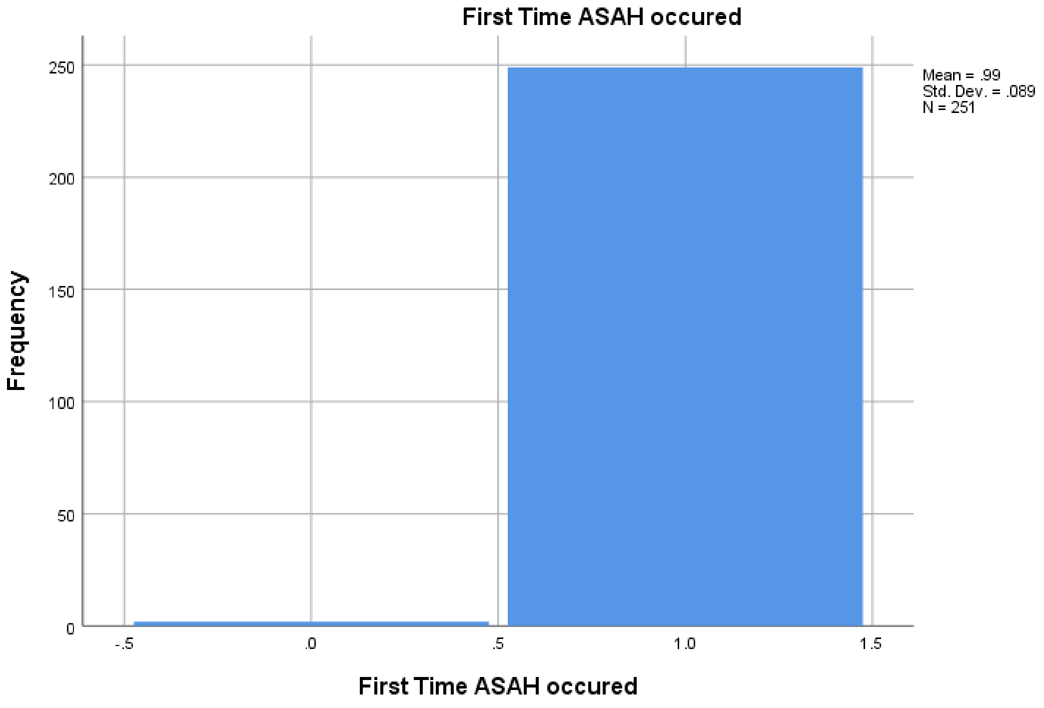

Age
Mean = 4.02
Std. Dev. = 1.023
N = 251
Frequency
120
100
80
60
40
20
0
0
2
4
6
Age

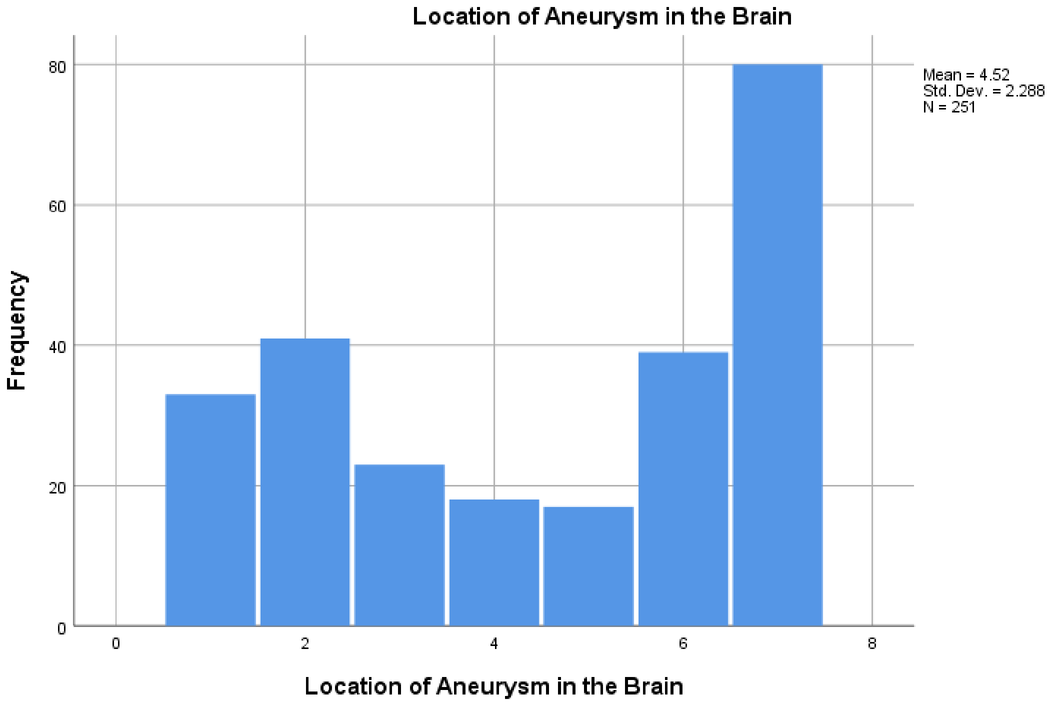

Relationship Status
Mean = .64
Std. Dev. = .481
N = 251
Frequency
200
150
100
50
0
-.5
.0
.5
1.0
1.5
Relationship Status

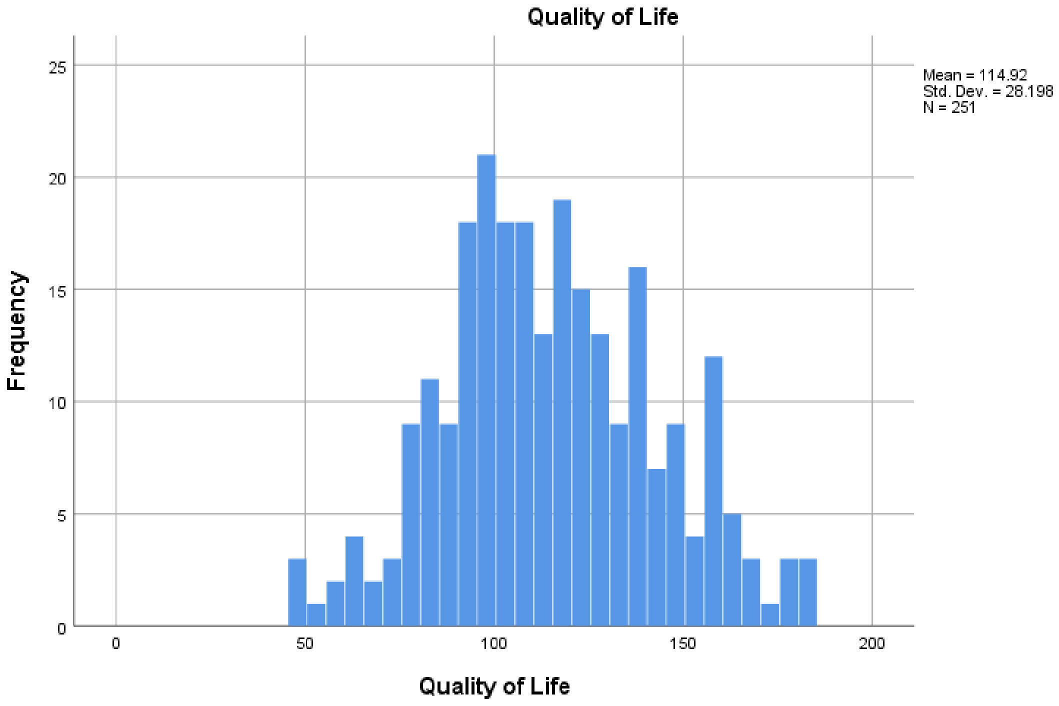

Household Financial Situation
Frequency
80
60
40
20
0
0
2
4
6
Household Financial Situation
Mean = 3.24
Std. Dev. = 1.327
N = 251

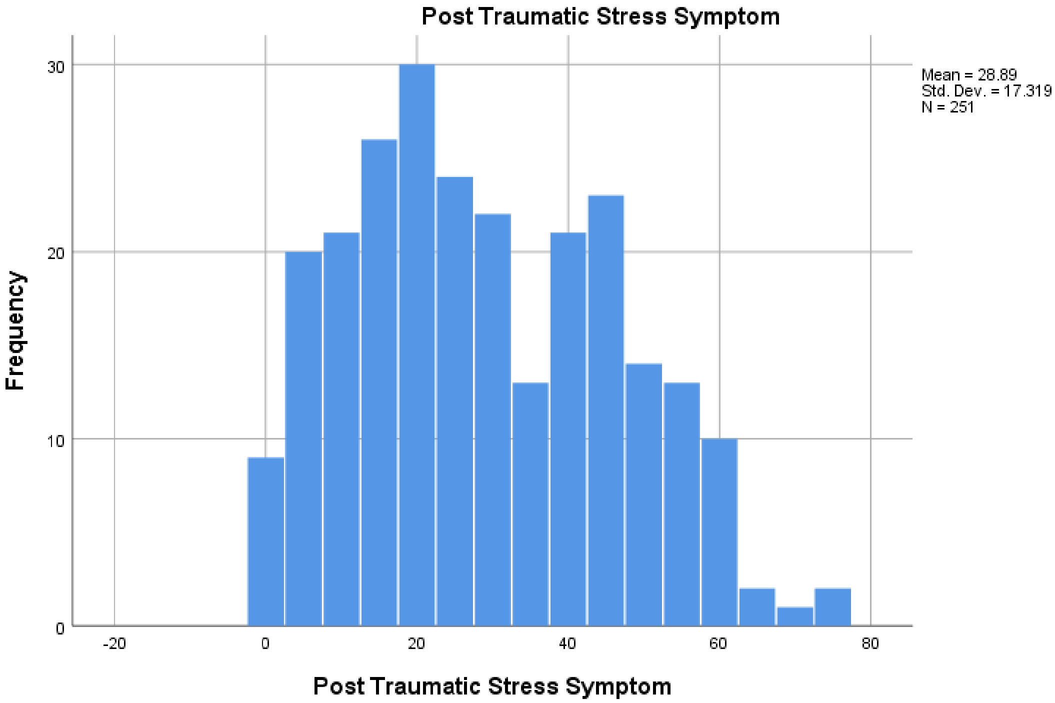

Employment Status
Frequency
125
100
75
50
25
0
-.5
.0
.5
1.0
1.5
Employment Status
Mean = .49
Std. Dev. = .501
N = 251

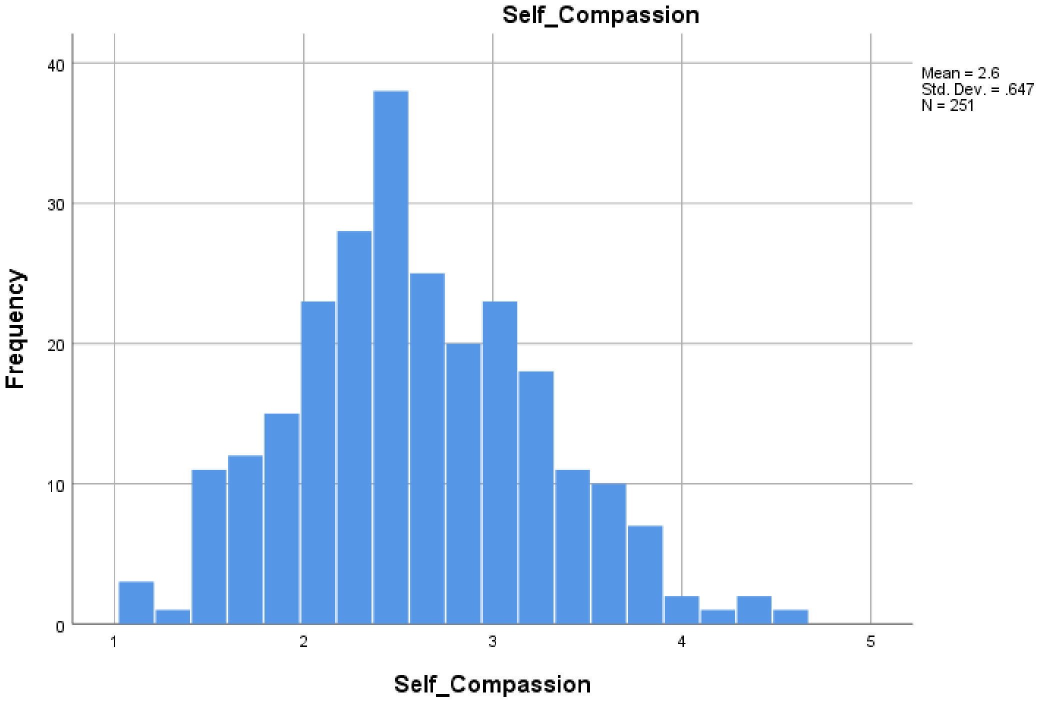

Duration of Time since ASAH
Frequency
100
80
60
40
20
0
0
1
2
3
4
5
Duration of Time since ASAH
Mean = 2.71
Std. Dev. = .979
N = 251

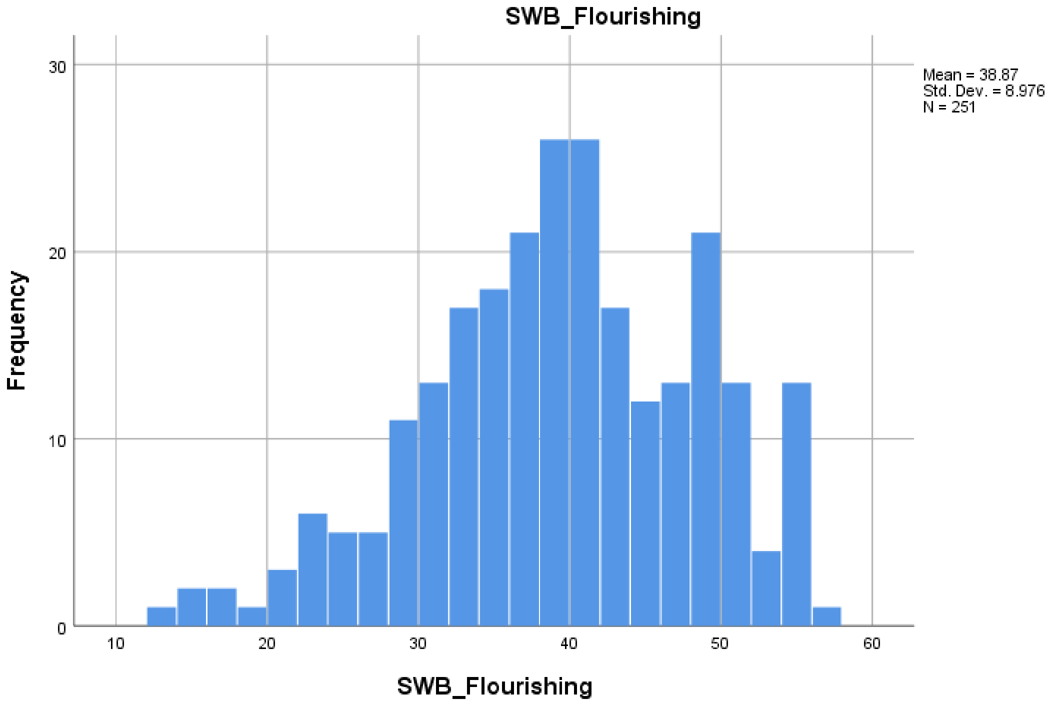

First Time ASAH occured
Frequency
250
200
150
100
50
0
-.5
.0
.5
1.0
1.5
First Time ASAH occured
Mean = .99
Std. Dev. = .089
N = 251

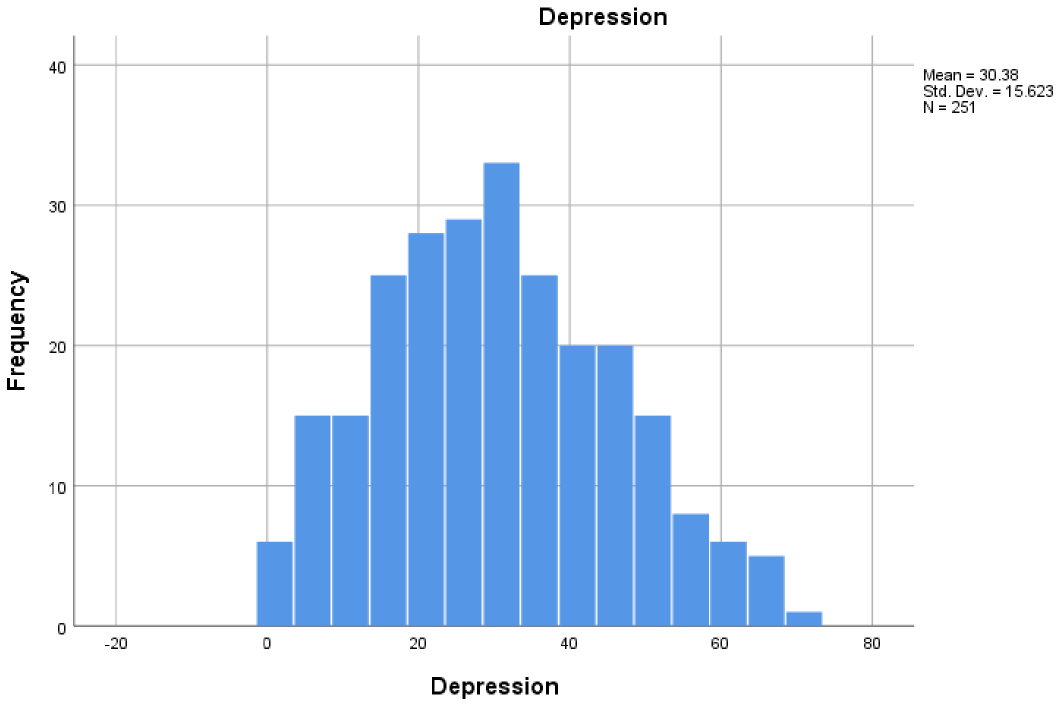

Location of Aneurysm in the Brain
Frequency
80
60
40
20
0
0
2
4
6
8
Location of Aneurysm in the Brain
Mean = 4.52
Std. Dev. = 2.288
N = 251

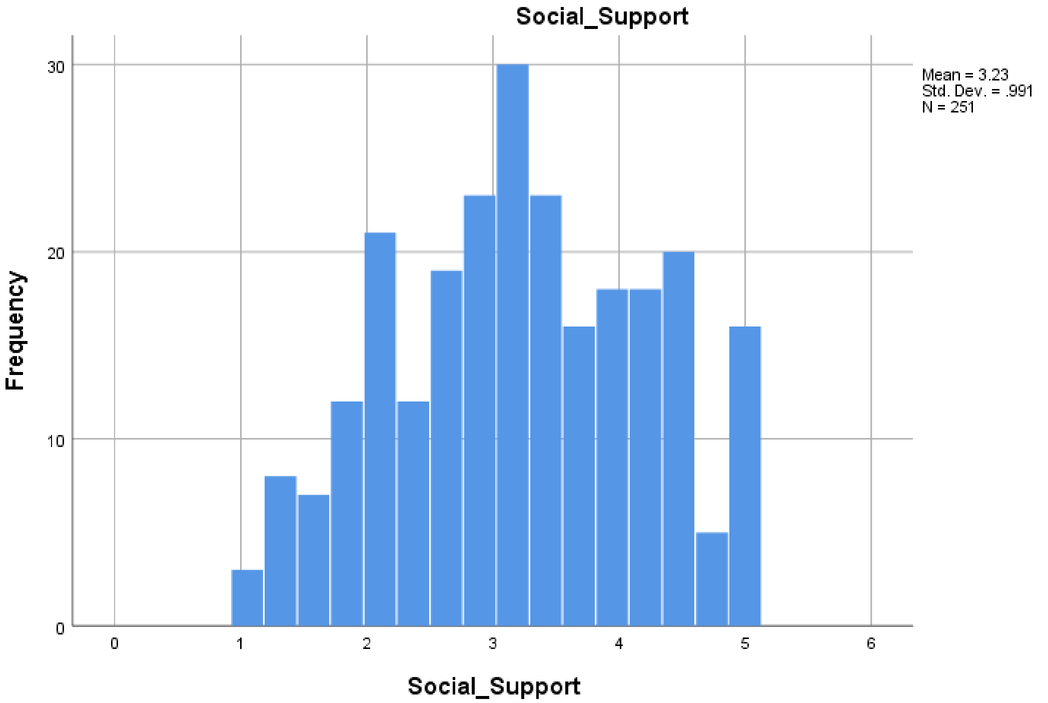

Quality of Life
Frequency
25
20
15
10
5
0
0
50
100
150
200
Quality of Life
Mean = 114.92
Std. Dev. = 28.198
N = 251

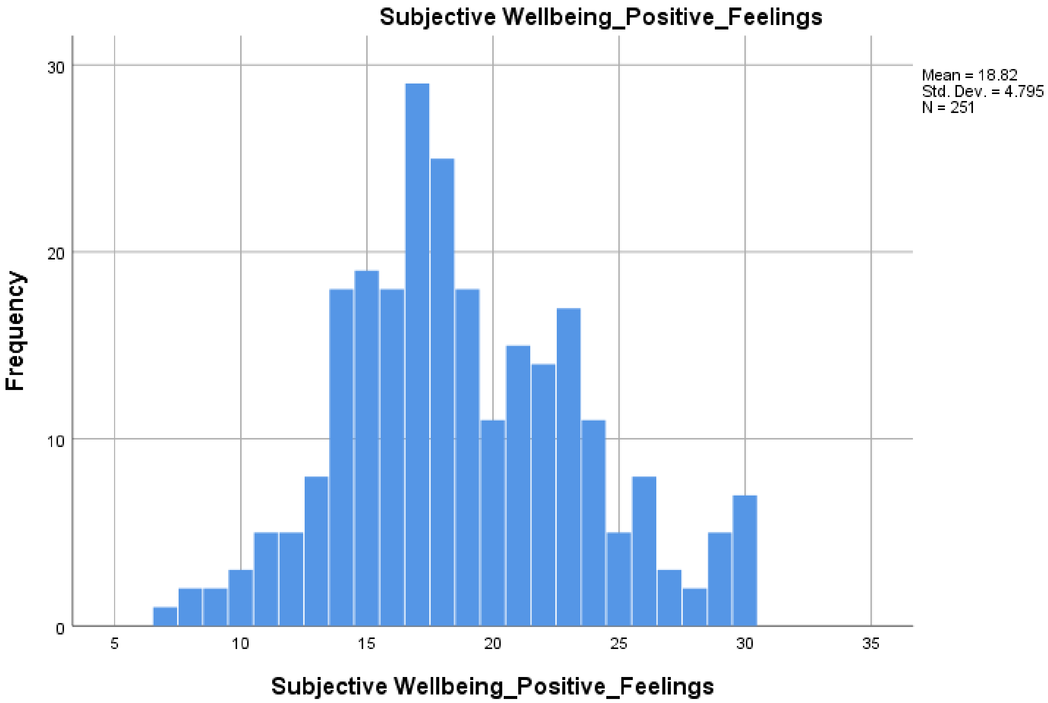

Post Traumatic Stress Symptom
Mean = 28.89
Std. Dev. = 17.319
N = 251
Frequency
0
10
20
30
-20
0
20
40
60
80
Post Traumatic Stress Symptom

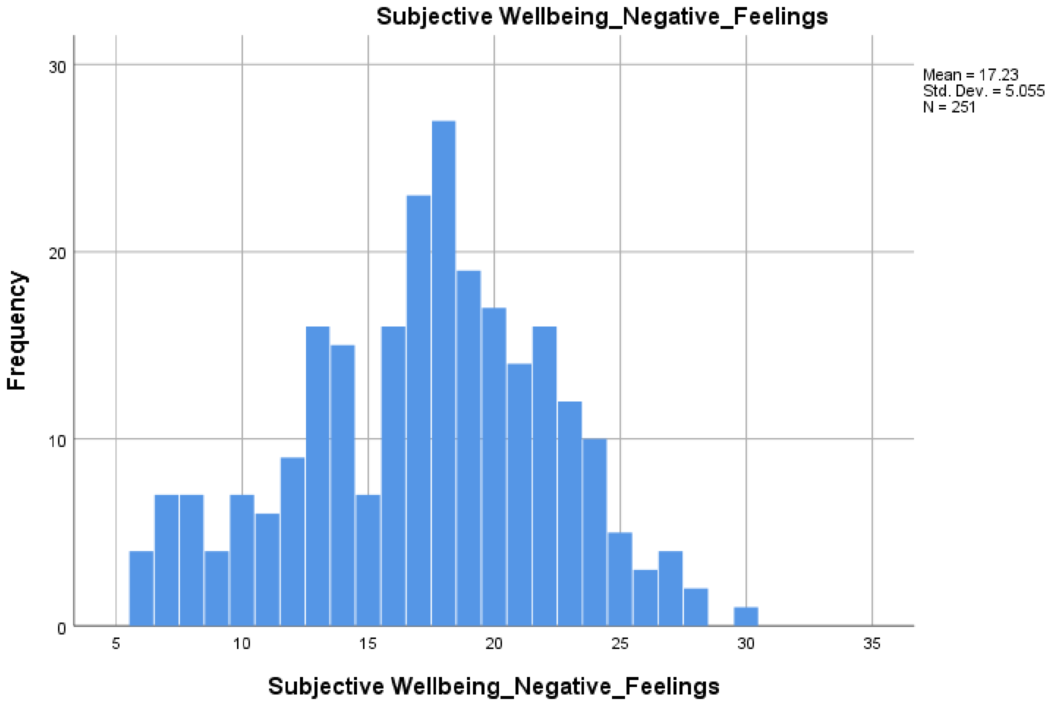

Self_Compassion
Mean = 2.6
Std. Dev. = .647
N = 251
Frequency
0
10
20
30
40
1
2
3
4
5
Self_Compassion

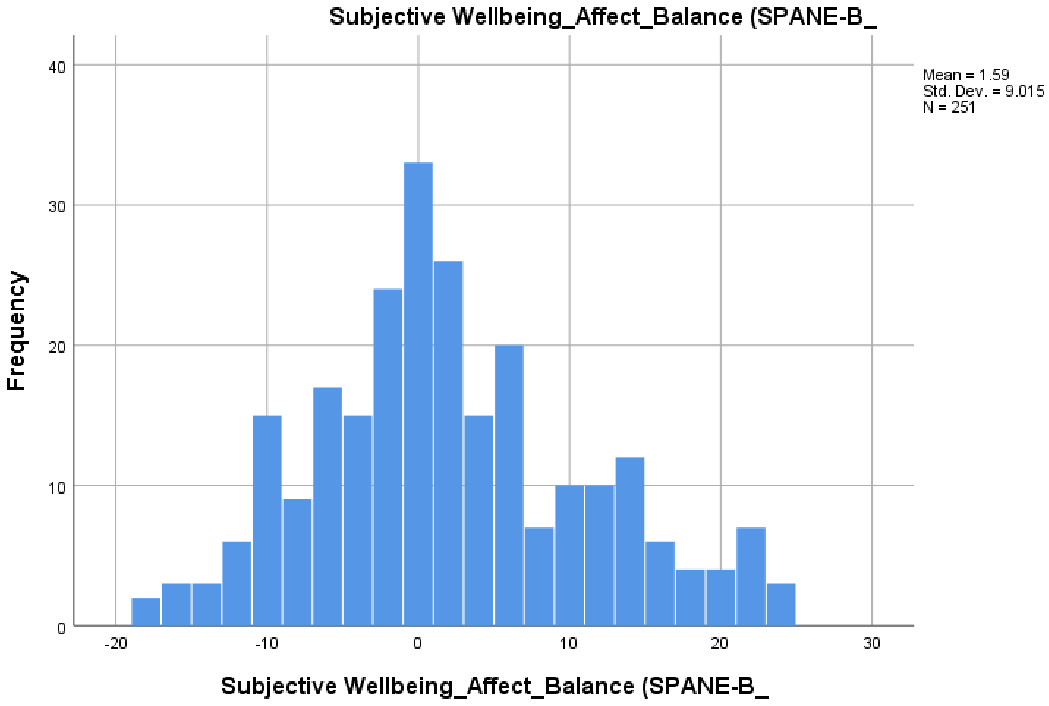

SWB_Flourishing
Mean = 38.87
Std. Dev. = 8.976
N = 251
Frequency
0
10
20
30
10
20
30
40
50
60
SWB_Flourishing

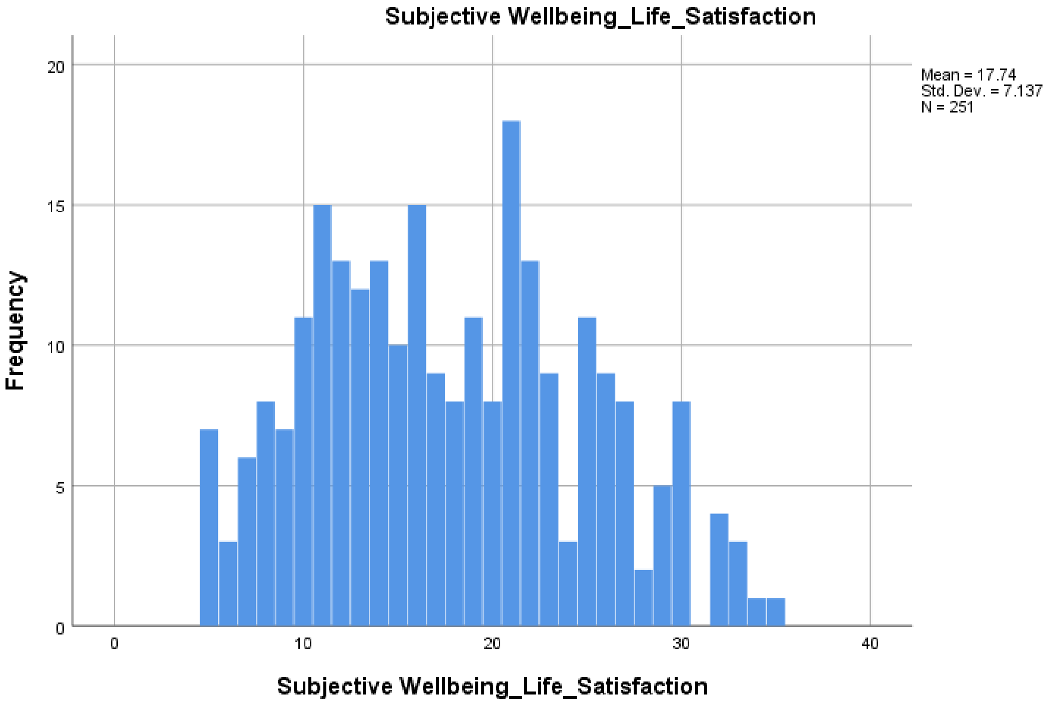

Depression
Mean = 30.38
Std. Dev. = 15.623
N = 251
Frequency
0
10
20
30
40
-20
0
20
40
60
80
Depression

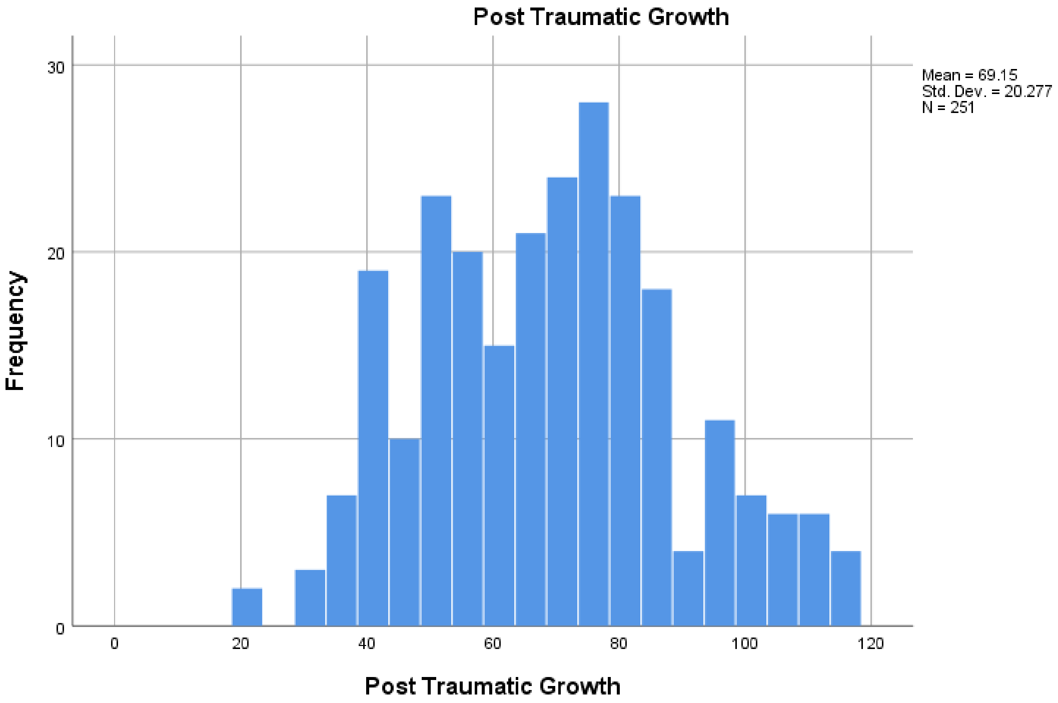

Social_Support
Frequency
30
20
10
0
0
1
2
3
4
5
6
Social_Support
Mean = 3.23
Std. Dev. = .991
N = 251

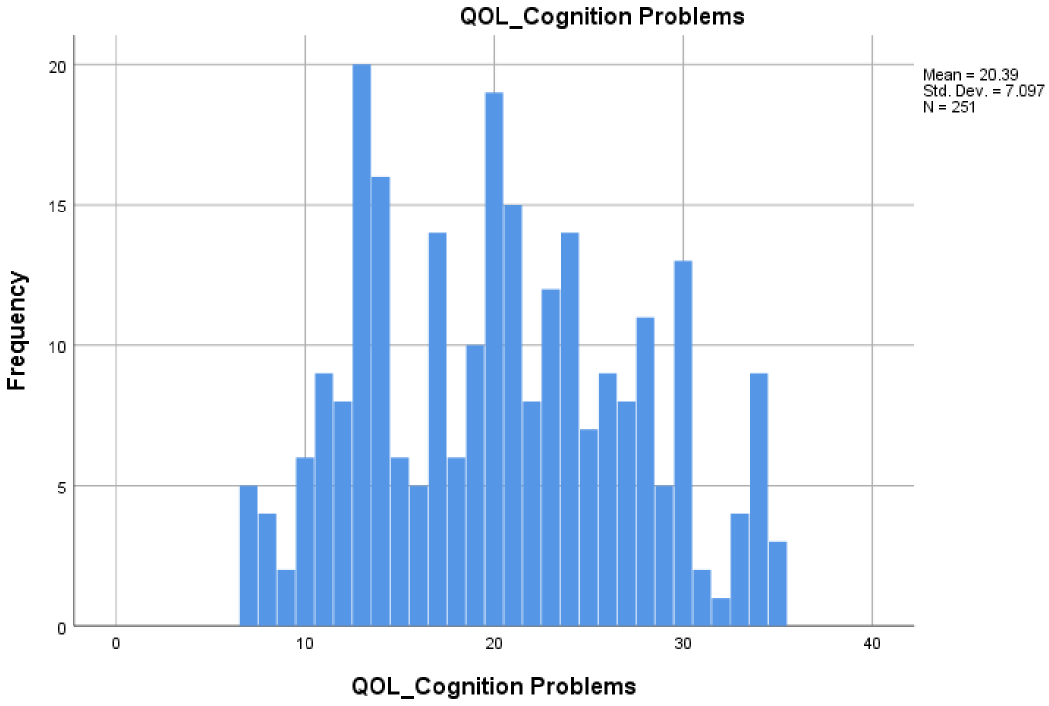

Subjective Wellbeing_Positive_Feelings
Frequency
30
20
10
0
5
10
15
20
25
30
35
Subjective Wellbeing_Positive_Feelings
Mean = 18.82
Std. Dev. = 4.795
N = 251

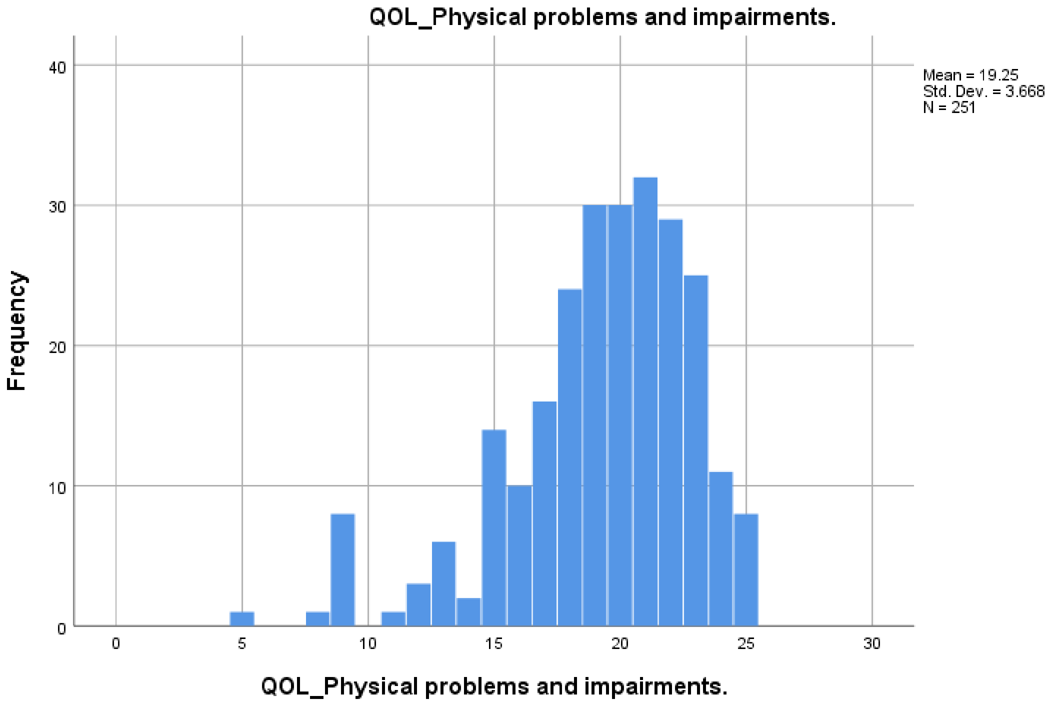

Subjective Wellbeing_Negative_Feelings
Frequency
0
10
20
30
5
10
15
20
25
30
35
Subjective Wellbeing_Negative_Feelings
Mean = 17.23
Std. Dev. = 5.055
N = 251

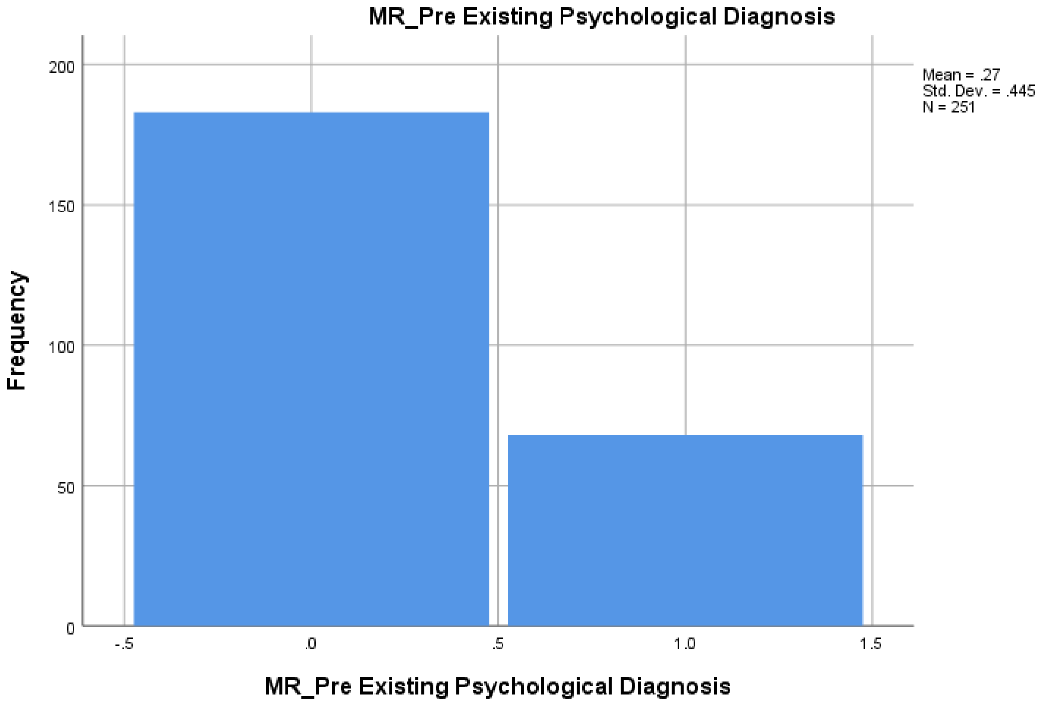

Subjective Wellbeing_Affect_Balance (SPANE-B_
Frequency
0
10
20
30
40
-20
-10
0
10
20
30
Subjective Wellbeing_Affect_Balance (SPANE-B_
Mean = 1.59
Std. Dev. = 9.015
N = 251

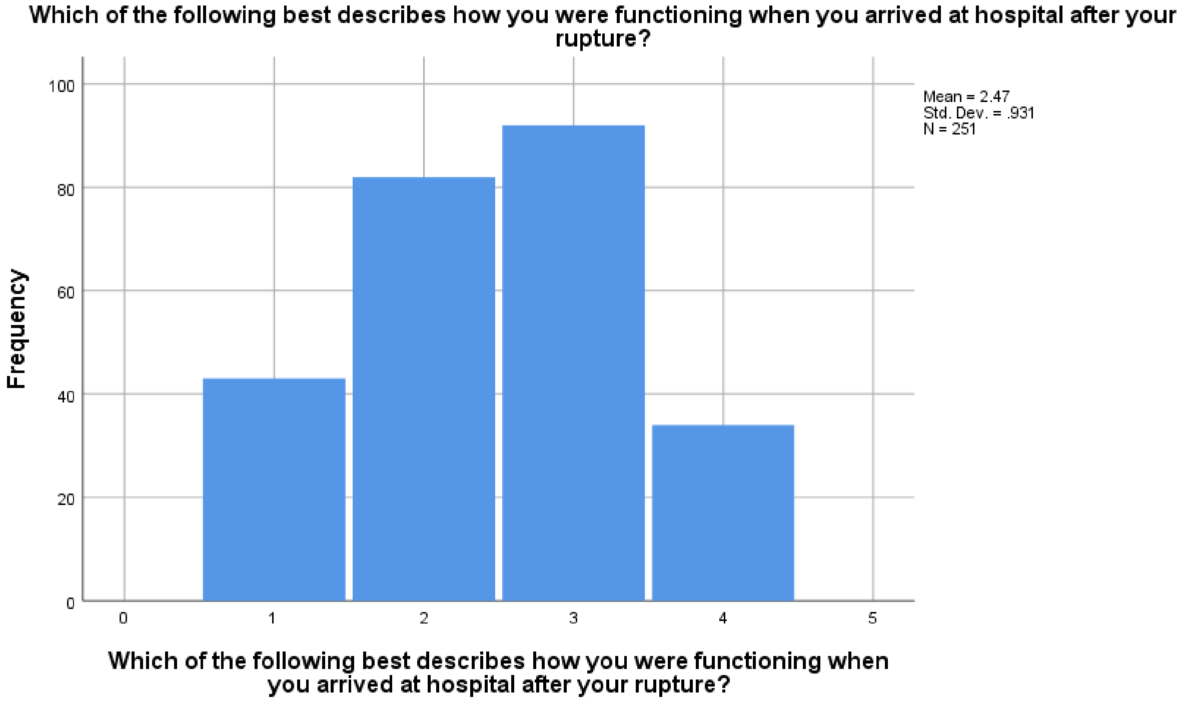

Subjective Wellbeing_Life_Satisfaction
Mean = 17.74
Std. Dev. = 7.137
N = 251
Frequency
0
5
10
15
20
0
10
20
30
40
Subjective Wellbeing_Life_Satisfaction

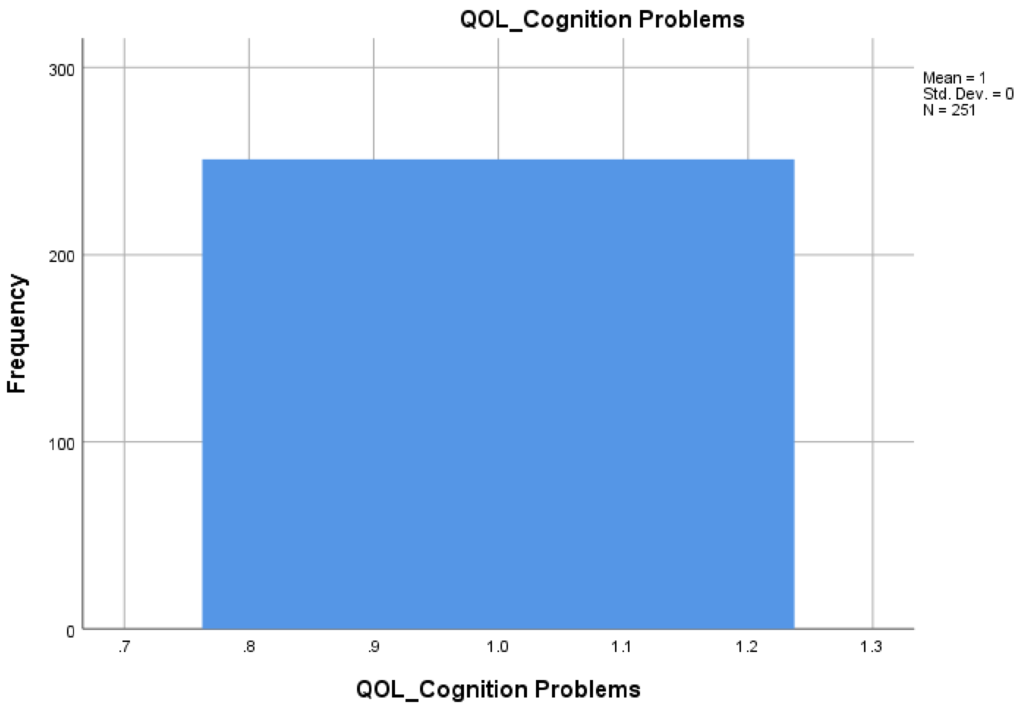

Post Traumatic Growth
Mean = 69.15
Std. Dev. = 20.277
N = 251
Frequency
0
10
20
30
0
20
40
60
80
100
120
Post Traumatic Growth

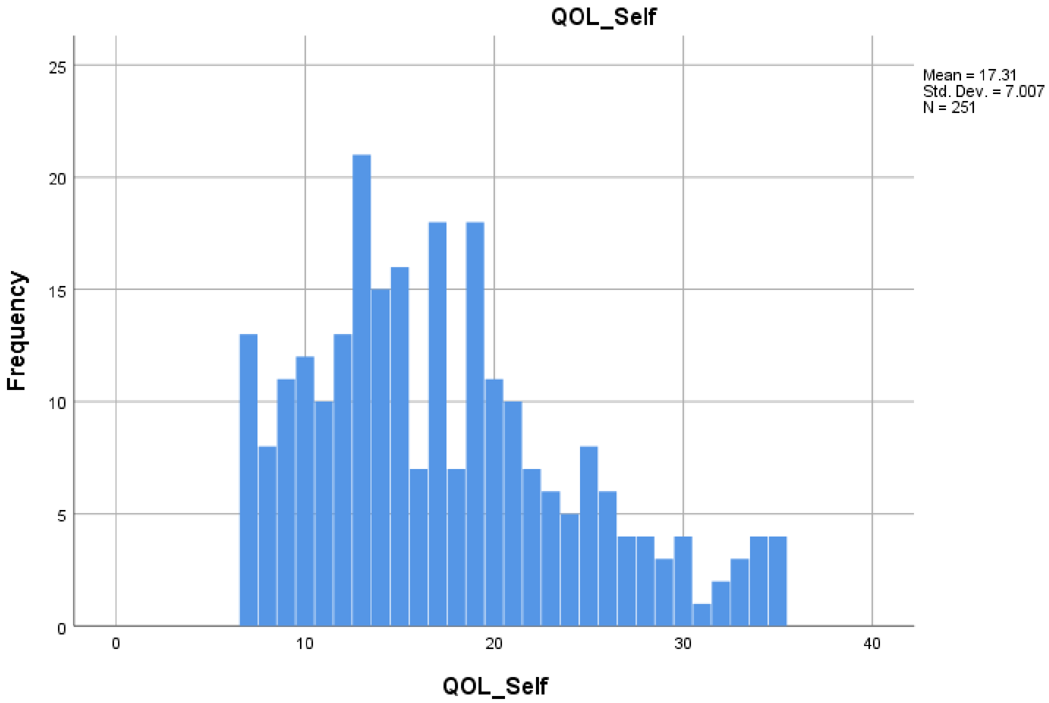

QOL_Cognition Problems
Mean = 20.39
Std. Dev. = 7.097
N = 251
Frequency
0
5
10
15
20
0
10
20
30
40
QOL_Cognition Problems

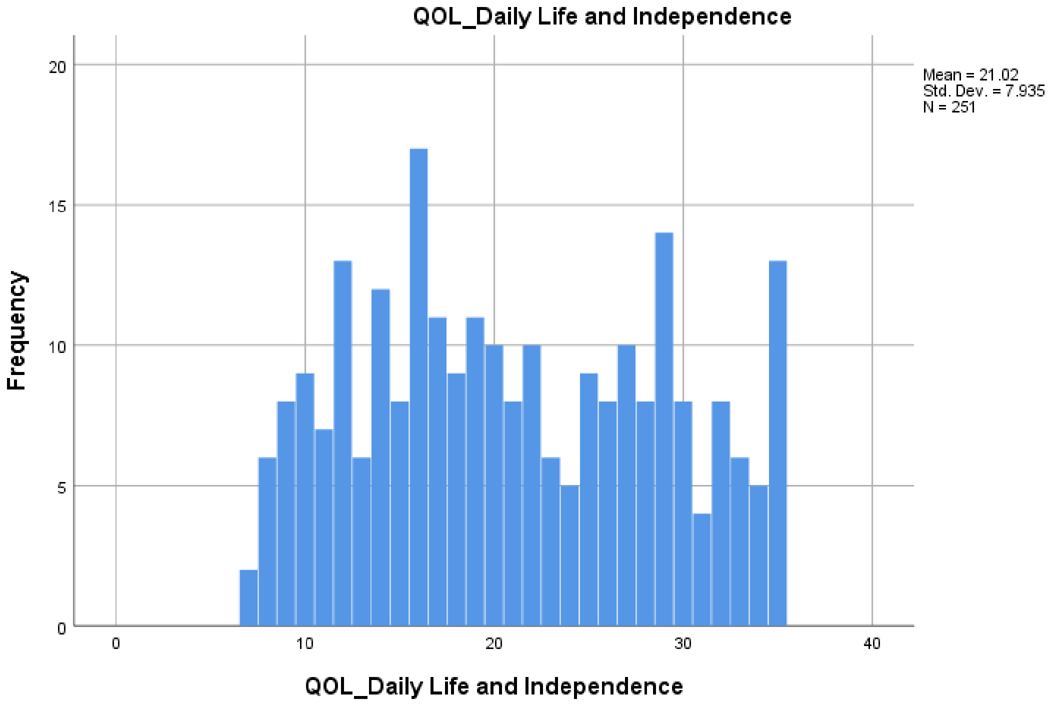

QOL_Physical problems and impairments.
Mean = 19.25
Std. Dev. = 3.668
N = 251
Frequency
0
10
20
30
40
0
5
10
15
20
25
30
QOL_Physical problems and impairments.

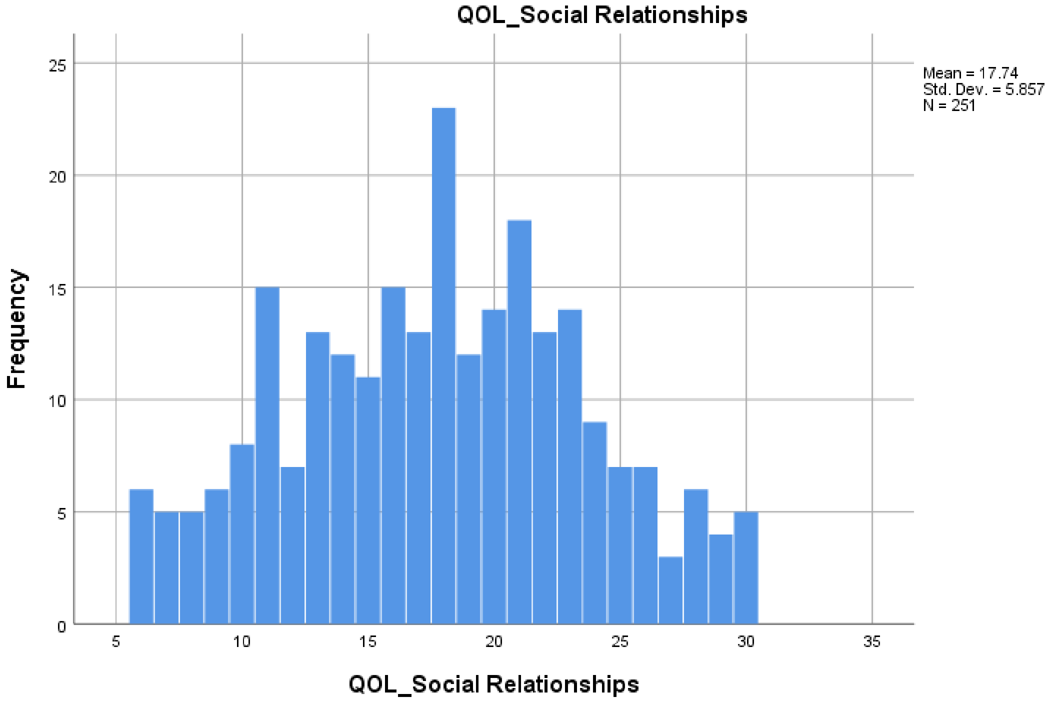

MR_Pre Existing Psychological Diagnosis
Frequency
200
150
100
50
0
-.5
.0
.5
1.0
1.5
MR_Pre Existing Psychological Diagnosis
Mean = .27
Std. Dev. = .445
N = 251

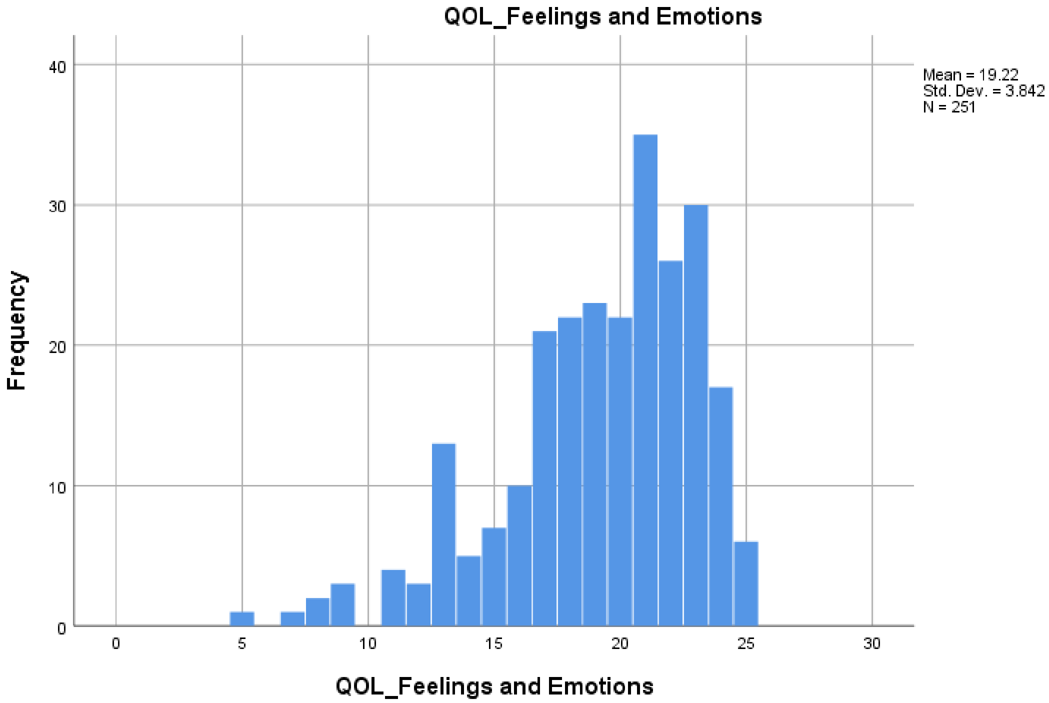

Which of the following best describes how you were functioning when you arrived at hospital after your rupture?
Frequency
100
80
60
40
20
0
0
1
2
3
4
5
Which of the following best describes how you were functioning when you arrived at hospital after your rupture?
Mean = 2.47
Std. Dev. = .931
N = 251

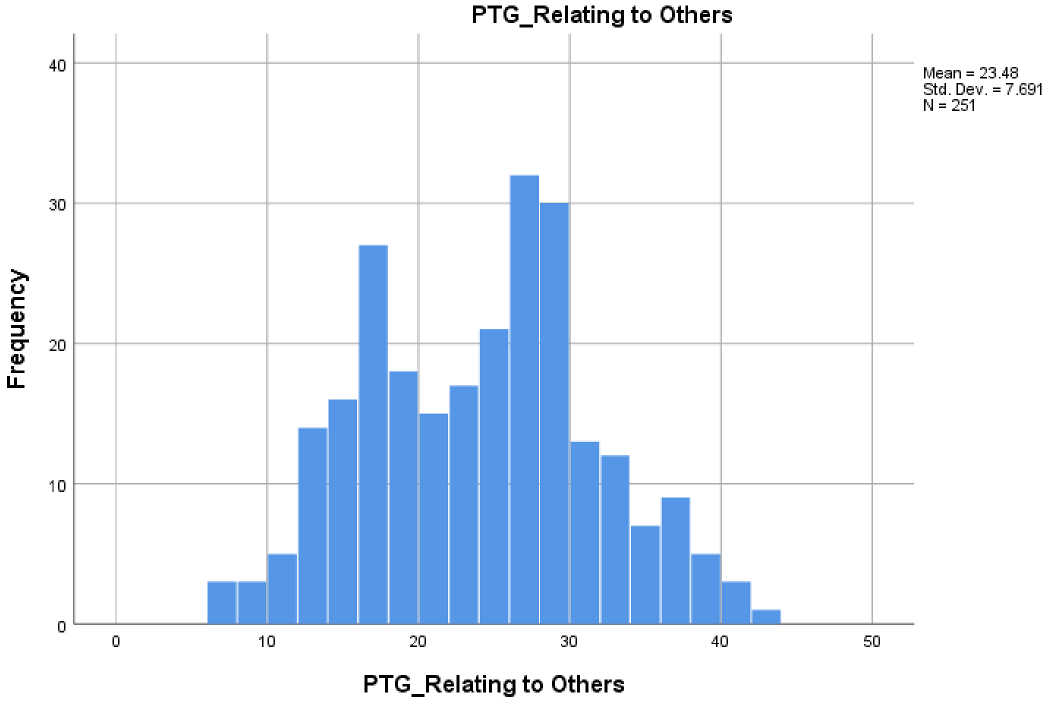

QOL_Cognition Problems
Mean = 1
Std. Dev. = 0
N = 251
Frequency
0
100
200
300
.7
.8
.9
1.0
1.1
1.2
1.3
QOL_Cognition Problems

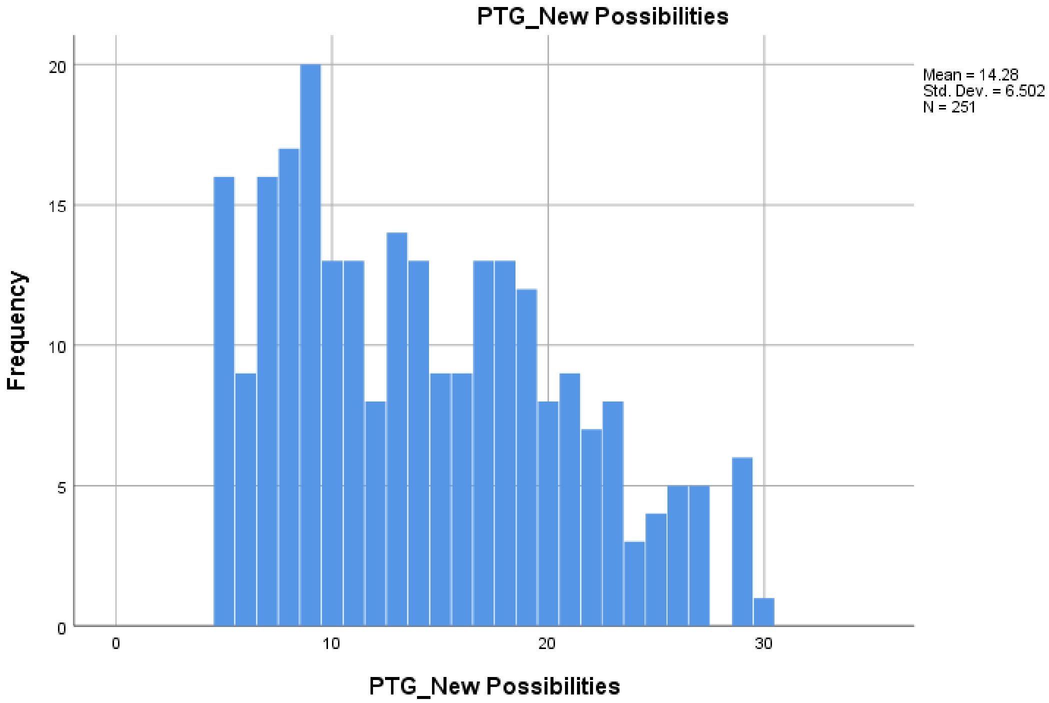

QOL_Self
Mean = 17.31
Std. Dev. = 7.007
N = 251
Frequency
0
5
10
15
20
25
0
10
20
30
40
QOL_Self

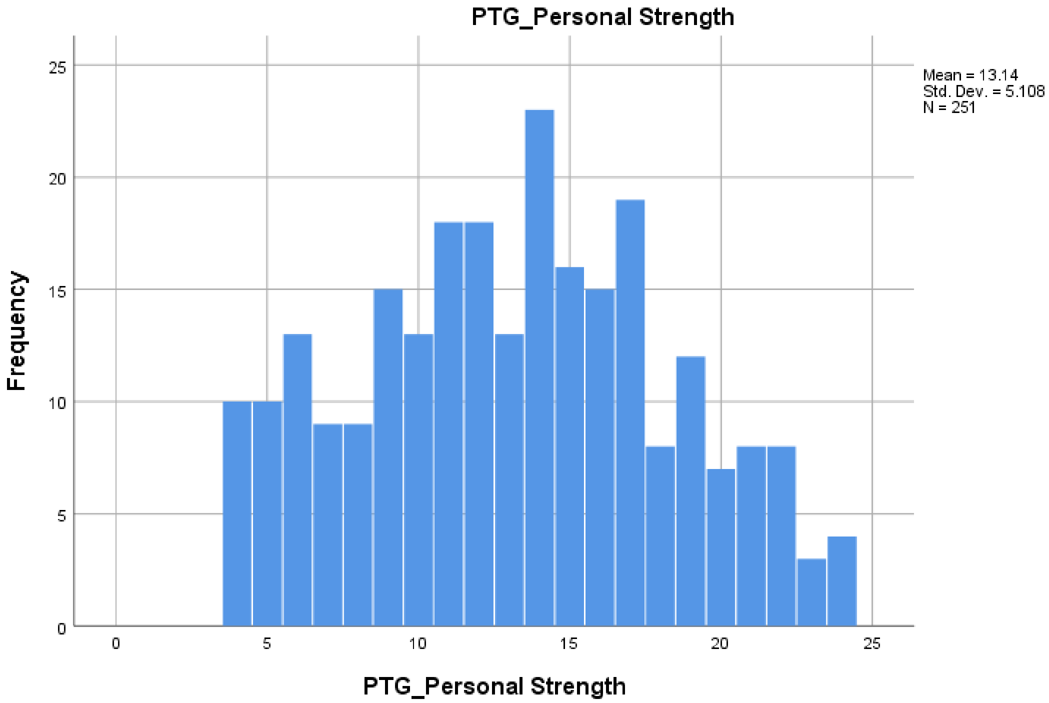

QOL_Daily Life and Independence
Mean = 21.02
Std. Dev. = 7.935
N = 251
Frequency
0
5
10
15
20
0
10
20
30
40
QOL_Daily Life and Independence

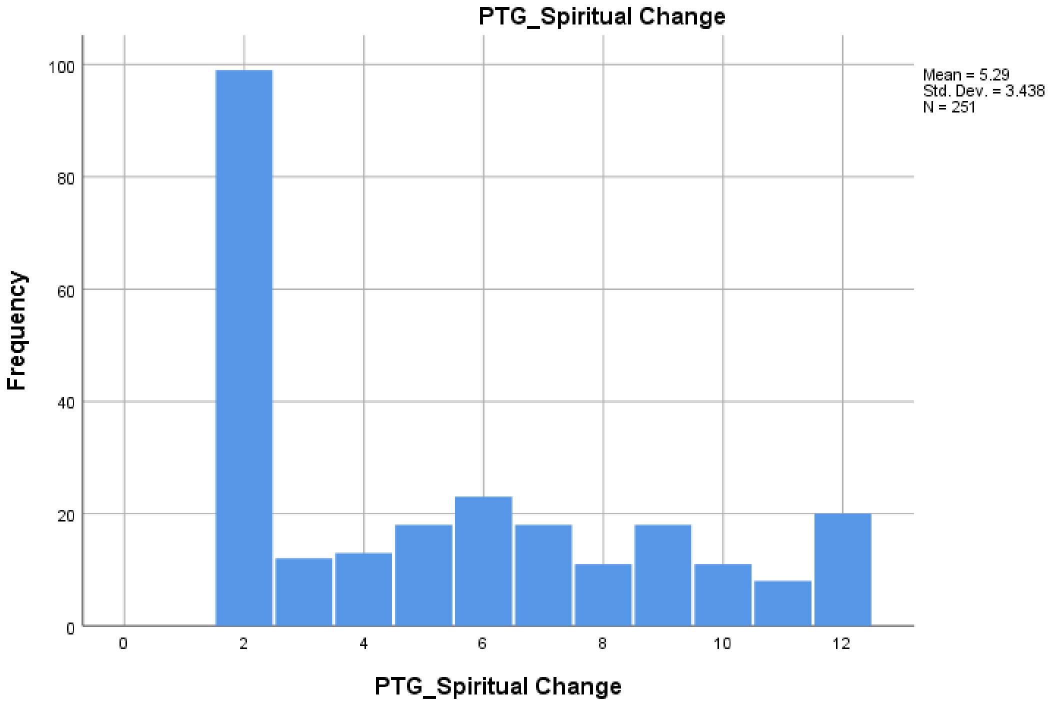

QOL_Social Relationships
Mean = 17.74
Std. Dev. = 5.857
N = 251
Frequency
0
5
10
15
20
25
5
10
15
20
25
30
35
QOL_Social Relationships

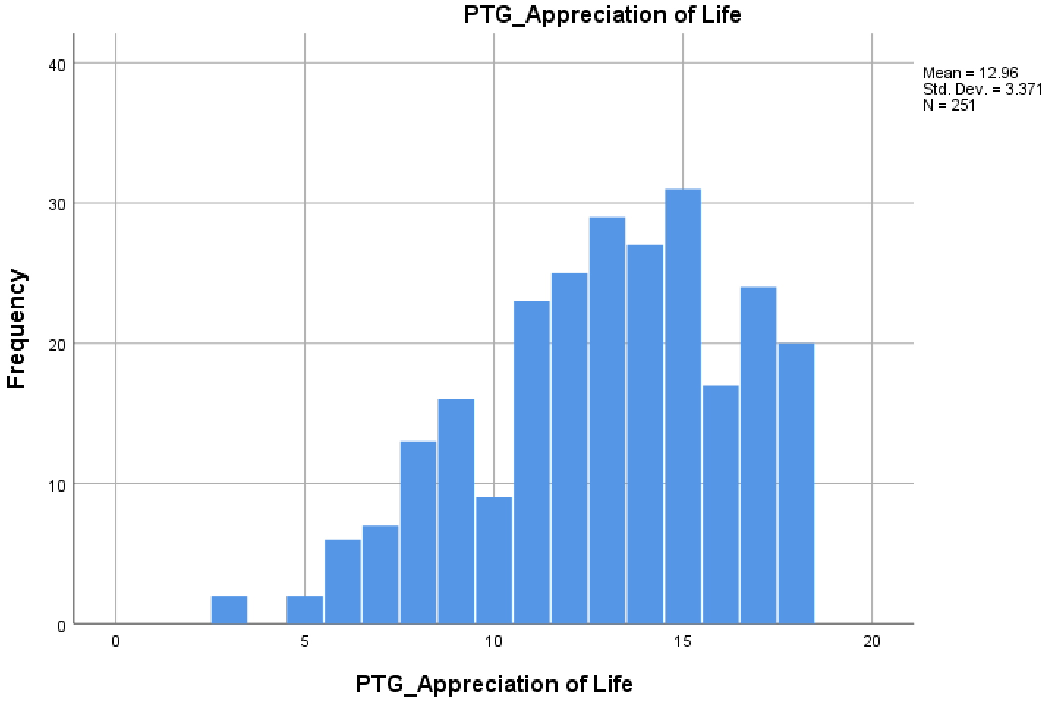

QOL_Feelings and Emotions
Frequency
40
30
20
10
0
0
5
10
15
20
25
30
QOL_Feelings and Emotions
Mean = 19.22
Std. Dev. = 3.842
N = 251

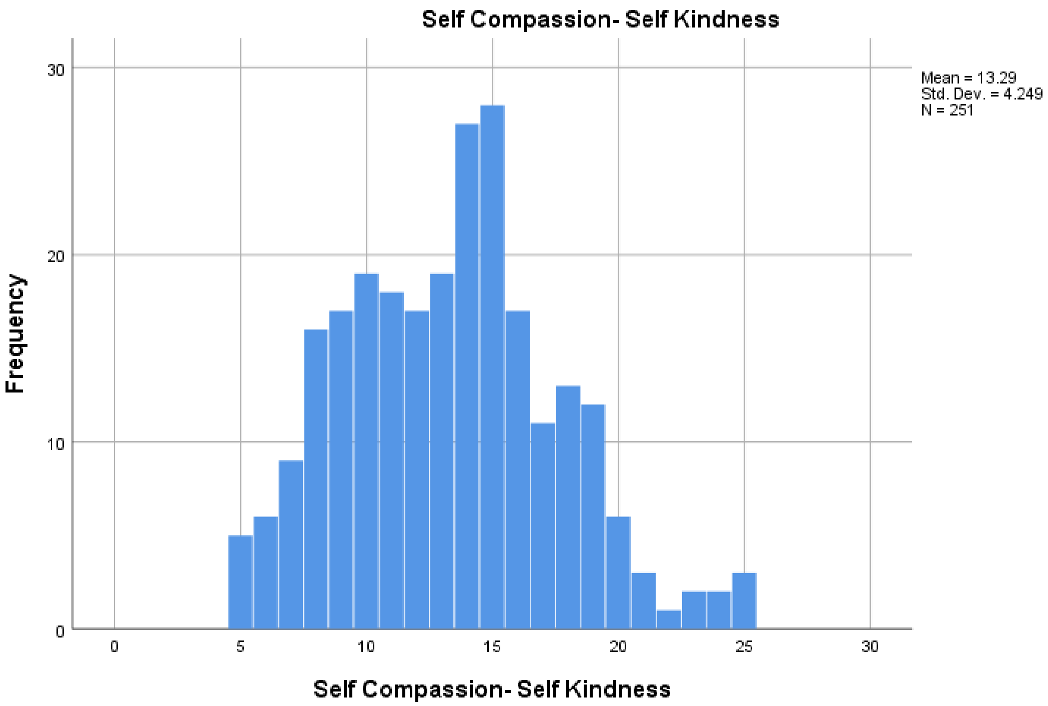

PTG_Relating to Others
Frequency
40
30
20
10
0
0
10
20
30
40
50
PTG_Relating to Others
Mean = 23.48
Std. Dev. = 7.691
N = 251


PTG_New Possibilities
Frequency
0
5
10
15
20
0
10
20
30
PTG_New Possibilities
Mean = 14.28
Std. Dev. = 6.502
N = 251

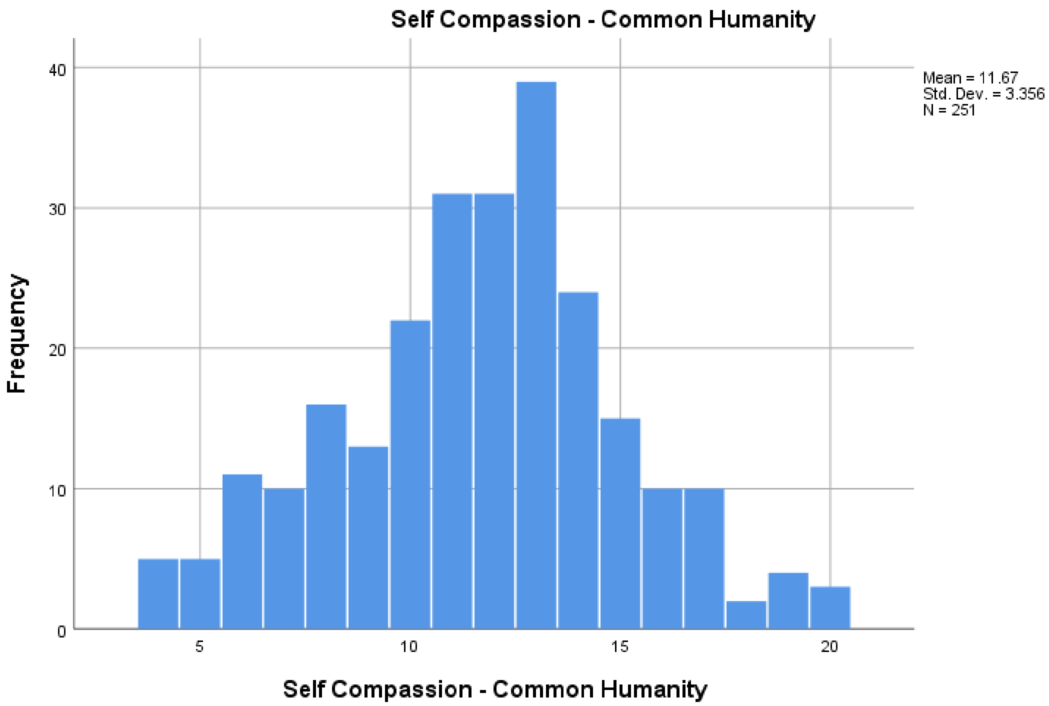

PTG_Personal Strength
Frequency
0
5
10
15
20
25
0
5
10
15
20
25
PTG_Personal Strength
Mean = 13.14
Std. Dev. = 5.108
N = 251

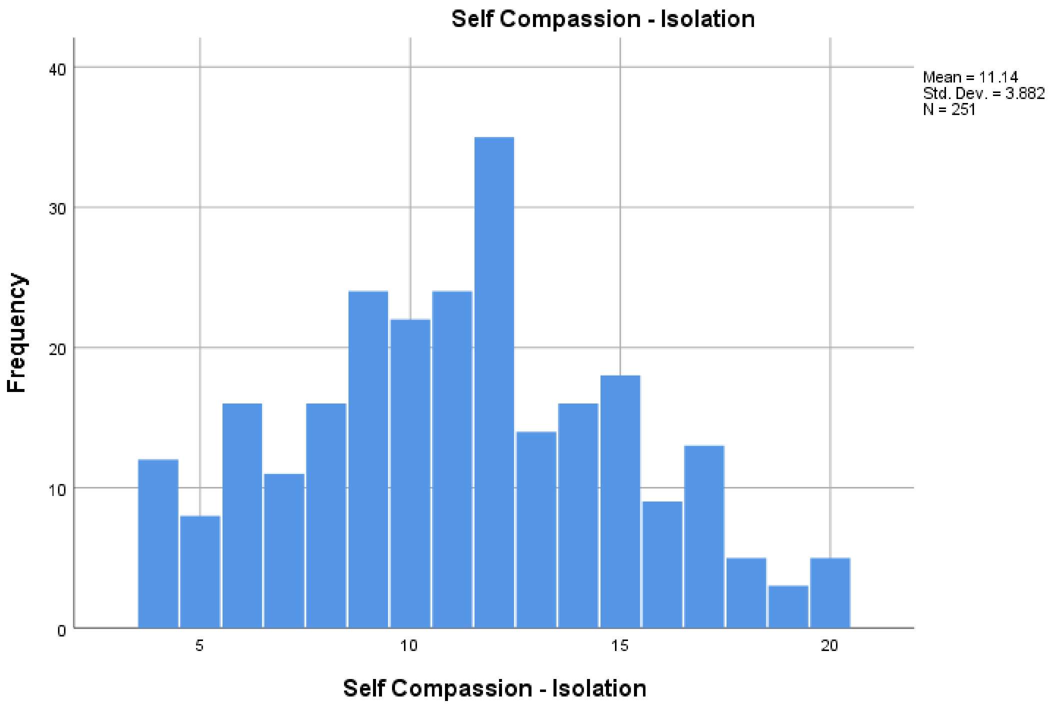

PTG_Spiritual Change
Mean = 5.29
Std. Dev. = 3.438
N = 251
Frequency
0
20
40
60
80
100
0
2
4
6
8
10
12
PTG_Spiritual Change


PTG_Appreciation of Life
Mean = 12.96
Std. Dev. = 3.371
N = 251
Frequency
0
10
20
30
40
0
5
10
15
20
PTG_Appreciation of Life

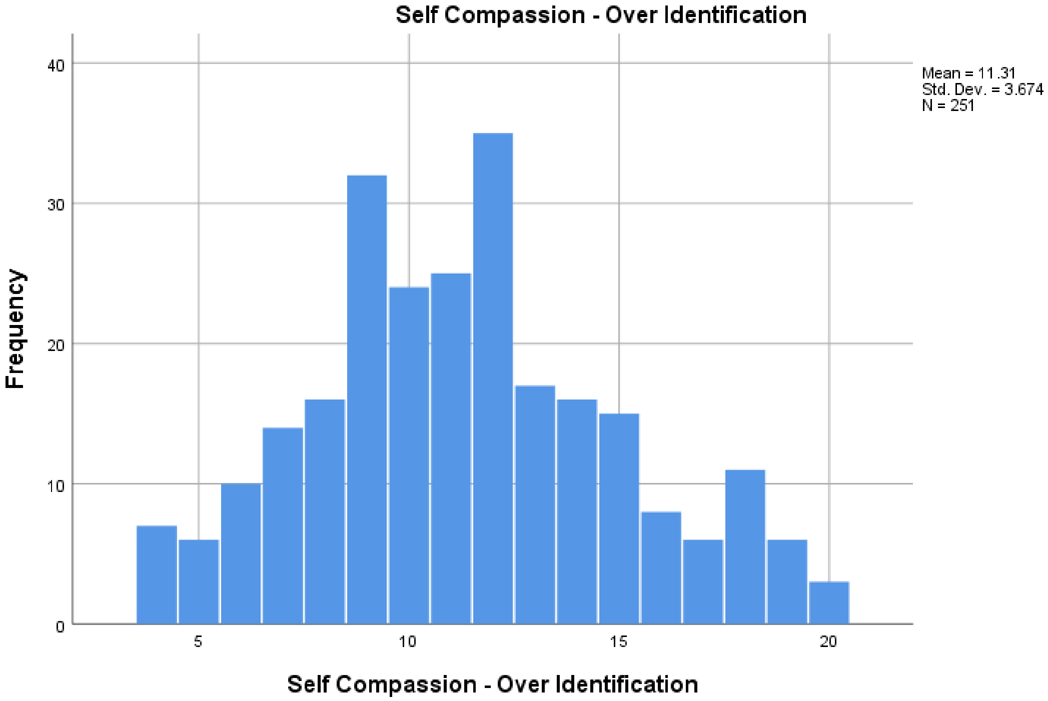

Self Compassion- Self Kindness
Frequency
30
20
10
0
0
5
10
15
20
25
30
Self Compassion- Self Kindness
Mean = 13.29
Std. Dev. = 4.249
N = 251

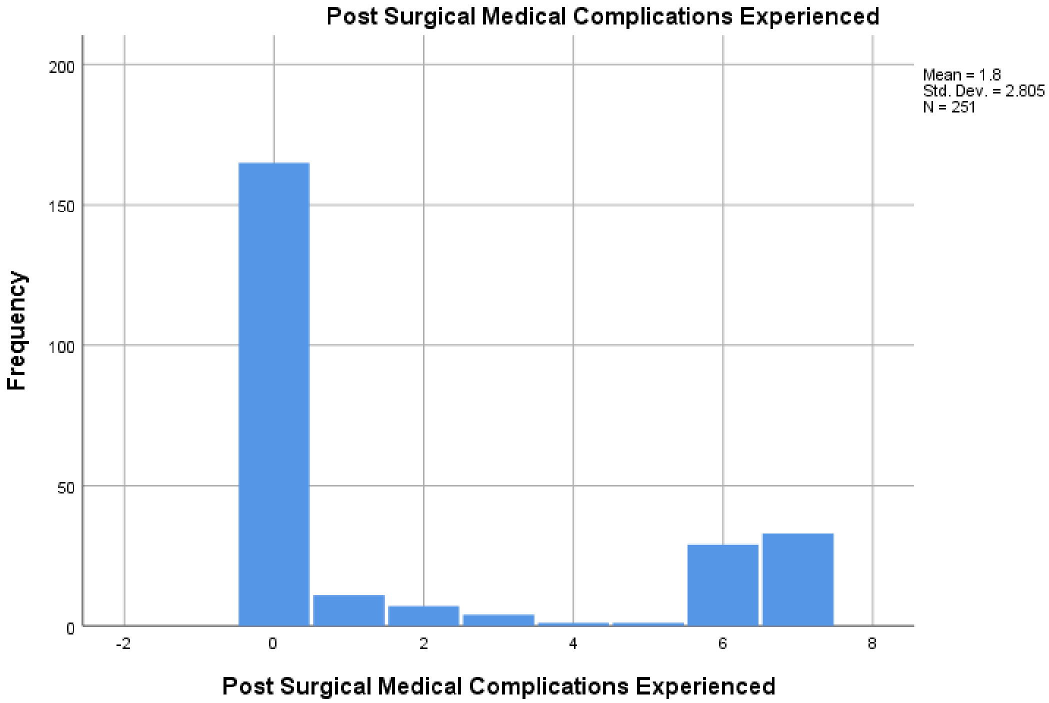

Self Compassion- Self Judgement
Frequency
30
20
10
0
0
5
10
15
20
25
30
Self Compassion- Self Judgement
Mean = 13.53
Std. Dev. = 4.298
N = 251

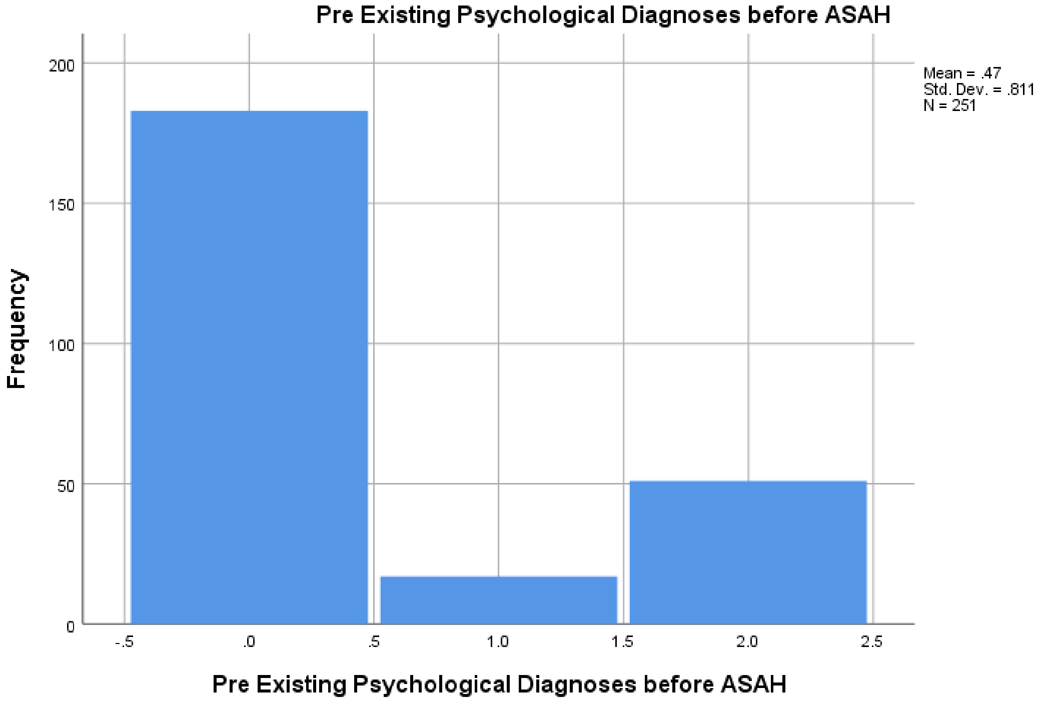

Self Compassion - Common Humanity
Frequency
40
30
20
10
0
5
10
15
20
Self Compassion - Common Humanity
Mean = 11.67
Std. Dev. = 3.356
N = 251

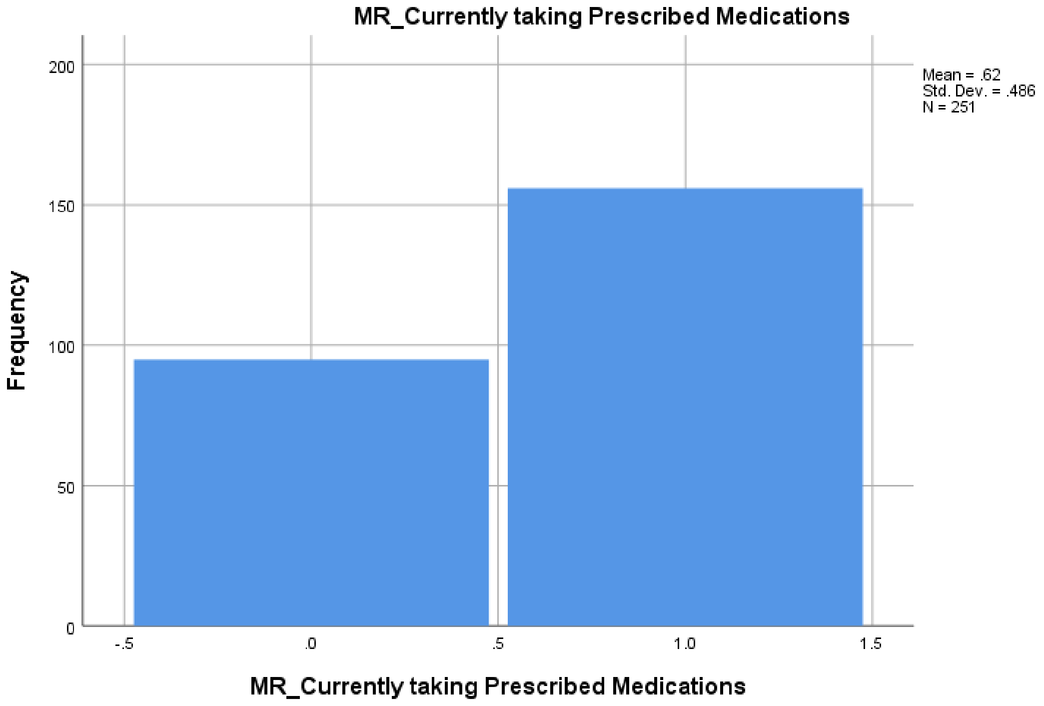

Self Compassion - Isolation
Frequency
40
30
20
10
0
5
10
15
20
Self Compassion - Isolation
Mean = 11.14
Std. Dev. = 3.882
N = 251

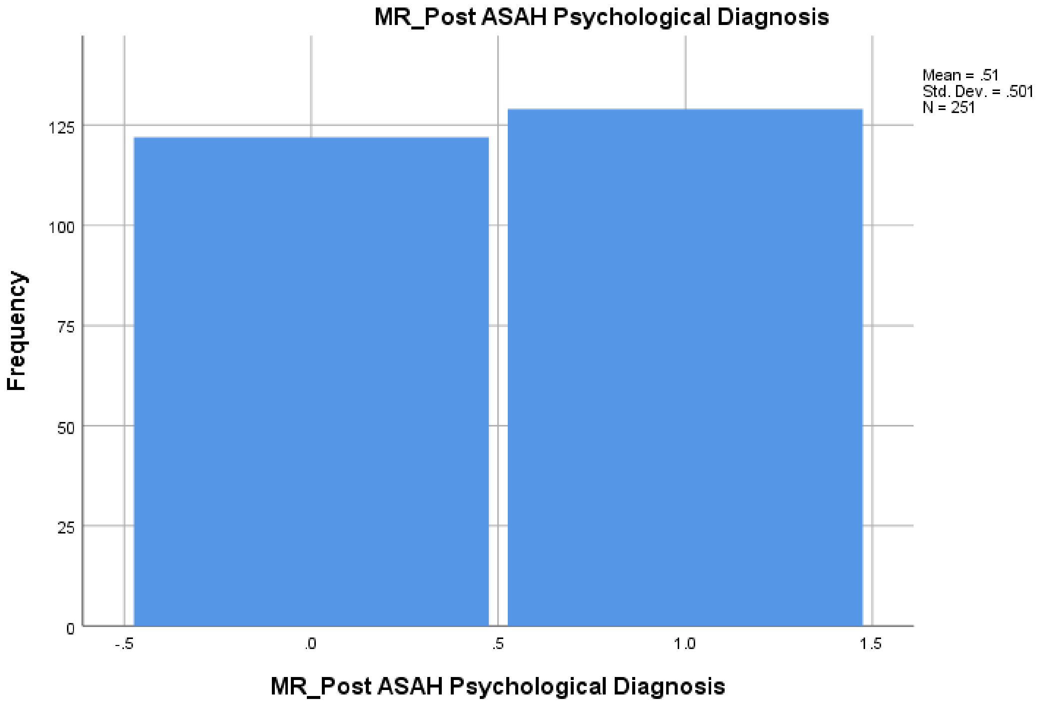

Self Compassion - Mindfulness
Mean = 12.22
Std. Dev. = 3.297
N = 251
Frequency
0
10
20
30
40
5
10
15
20
Self Compassion - Mindfulness

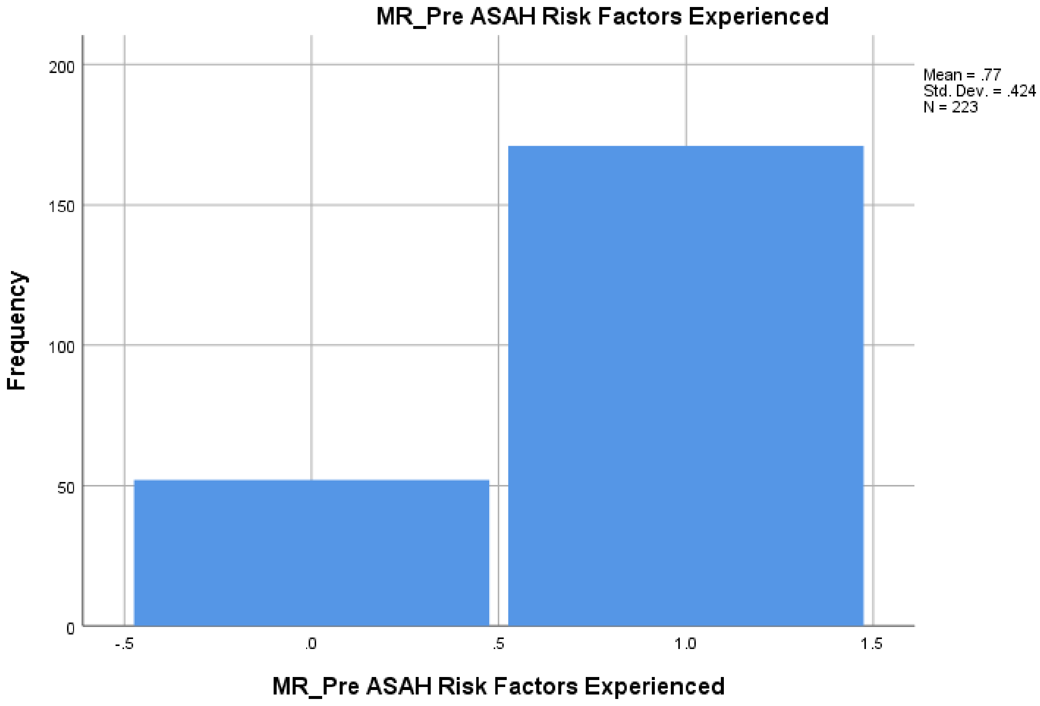

Self Compassion - Over Identification
Mean = 11.31
Std. Dev. = 3.674
N = 251
Frequency
0
10
20
30
40
5
10
15
20
Self Compassion - Over Identification

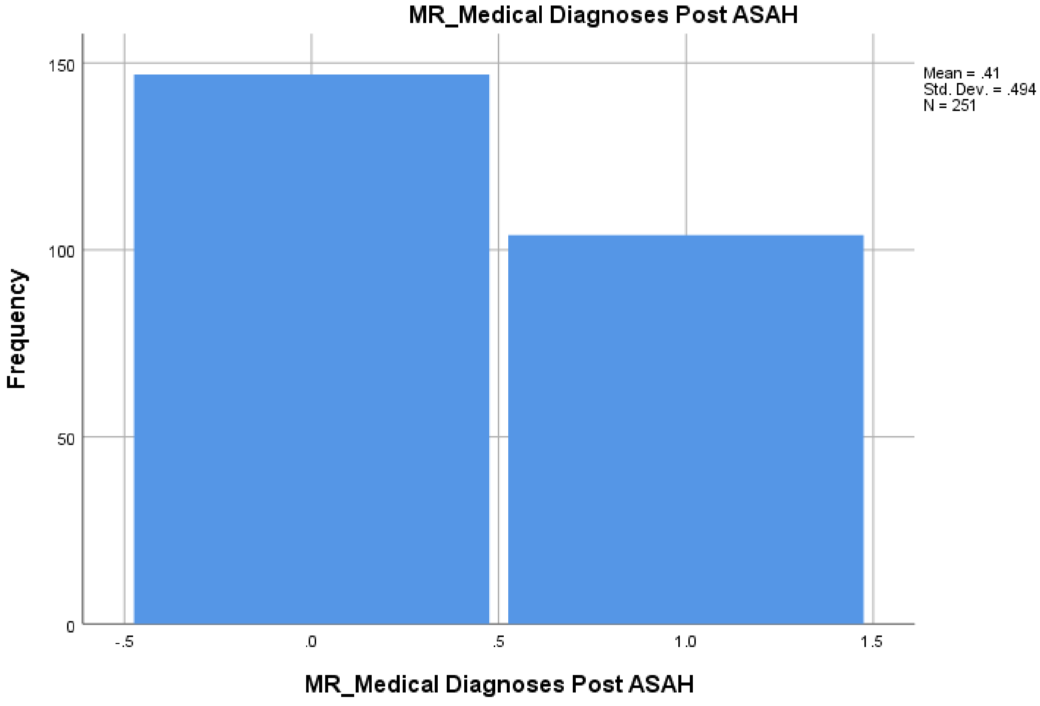

Post Surgical Medical Complications Experienced
Frequency
200
150
100
50
0
-2
0
2
4
6
8
Post Surgical Medical Complications Experienced
Mean = 1.8
Std. Dev. = 2.805
N = 251

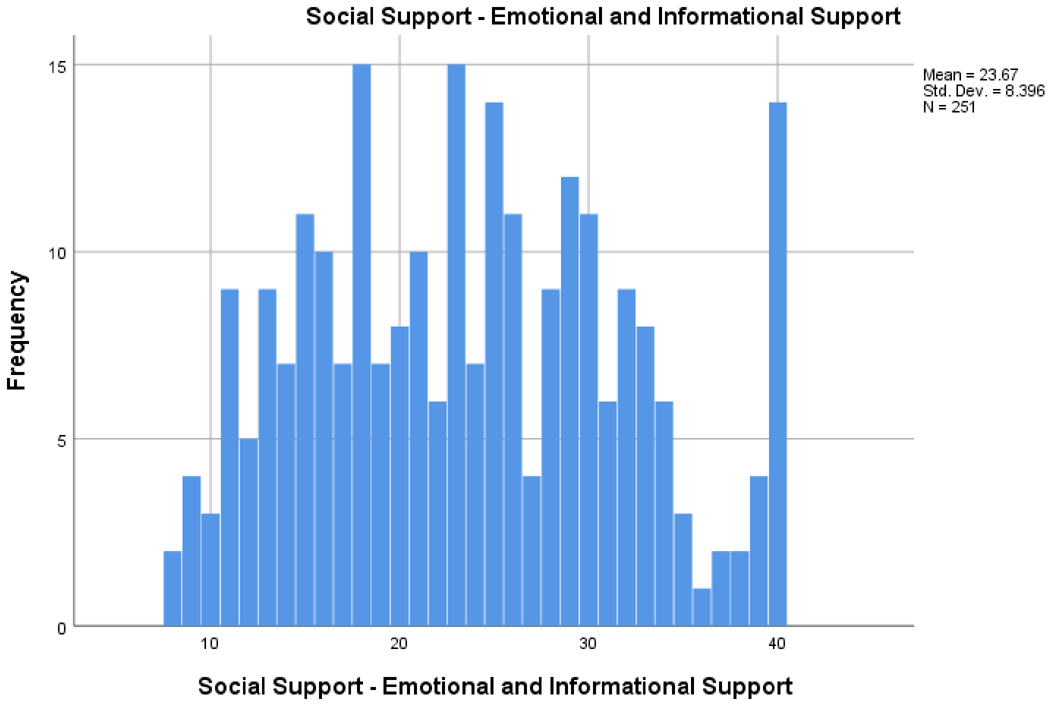

Pre Existing Psychological Diagnoses before ASAH
Frequency
200
150
100
50
0
-.5
.0
.5
1.0
1.5
2.0
2.5
Pre Existing Psychological Diagnoses before ASAH
Mean = .47
Std. Dev. = .811
N = 251

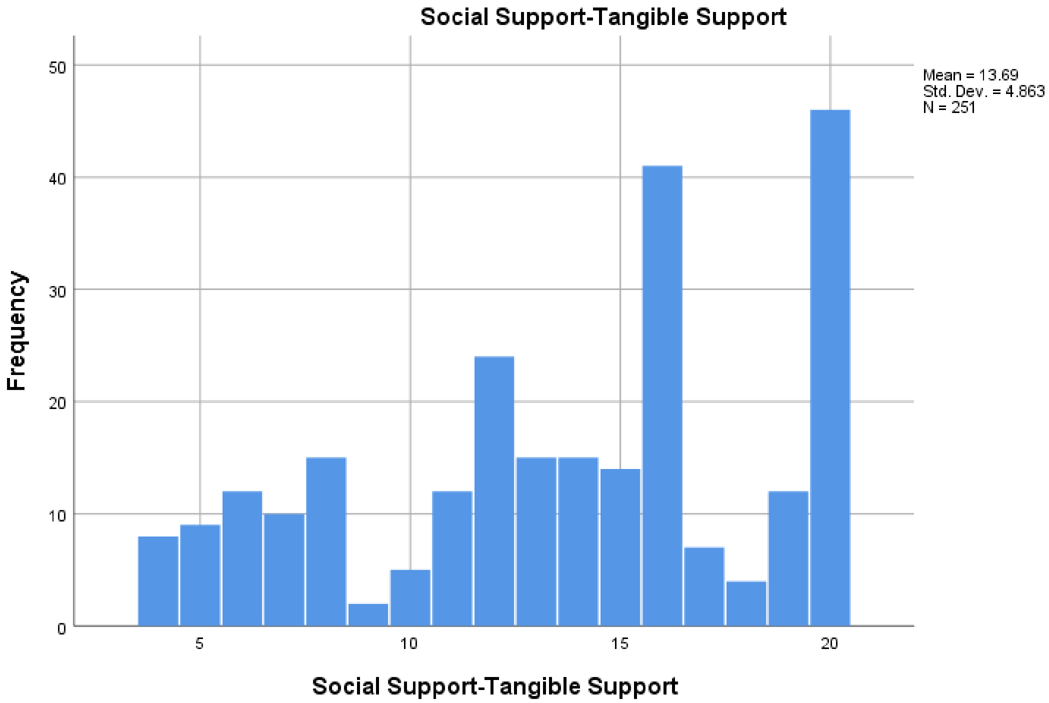

MR_Currently taking Prescribed Medications
Mean = .62
Std. Dev. = .486
N = 251
Frequency
200
150
100
50
0
-.5
.0
.5
1.0
1.5
MR_Currently taking Prescribed Medications

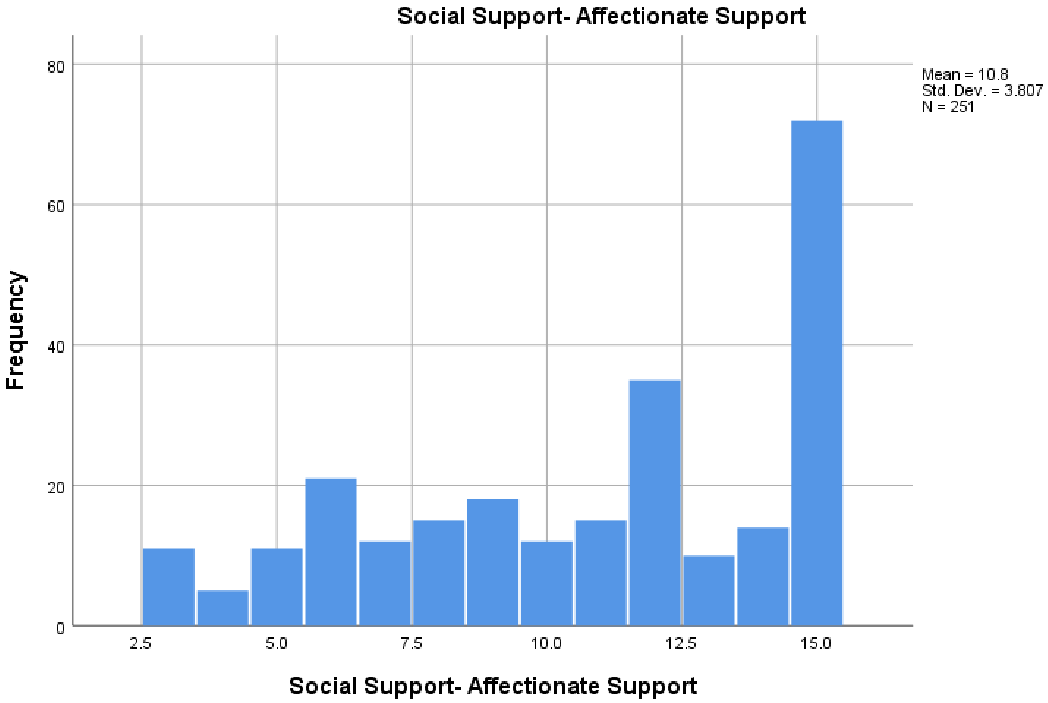

MR_Post ASAH Psychological Diagnosis
Mean = .51
Std. Dev. = .501
N = 251
Frequency
125
100
75
50
25
0
-.5
.0
.5
1.0
1.5
MR_Post ASAH Psychological Diagnosis

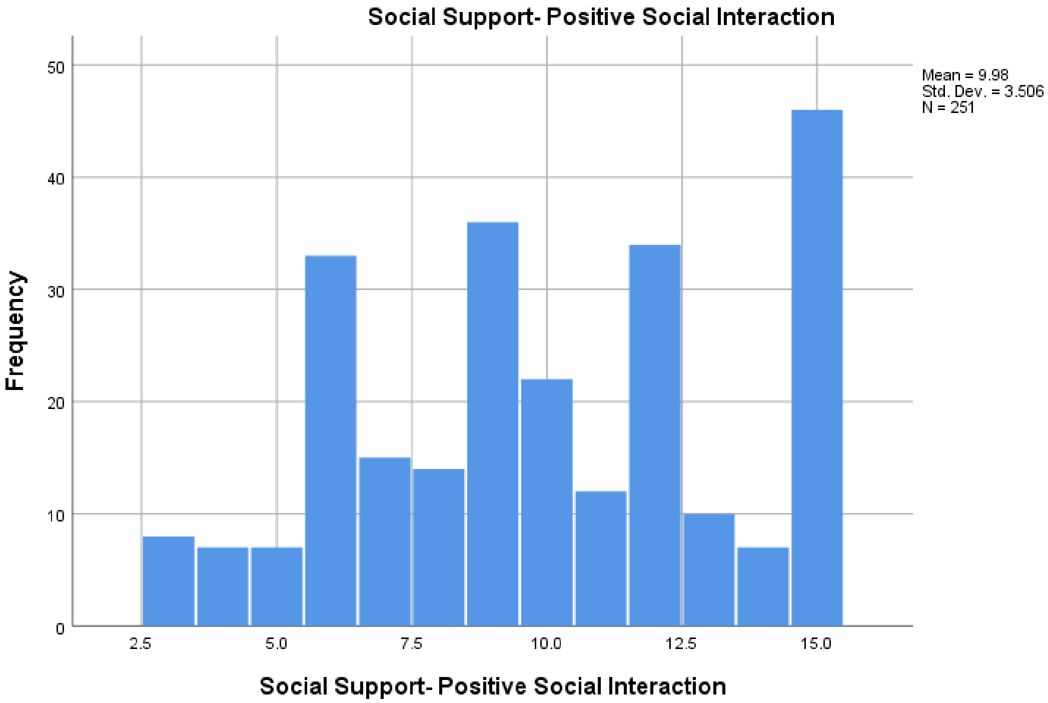

MR_Pre ASAH Risk Factors Experienced
Frequency
200
150
100
50
0
-.5
.0
.5
1.0
1.5
MR_Pre ASAH Risk Factors Experienced
Mean = .77
Std. Dev. = .424
N = 223

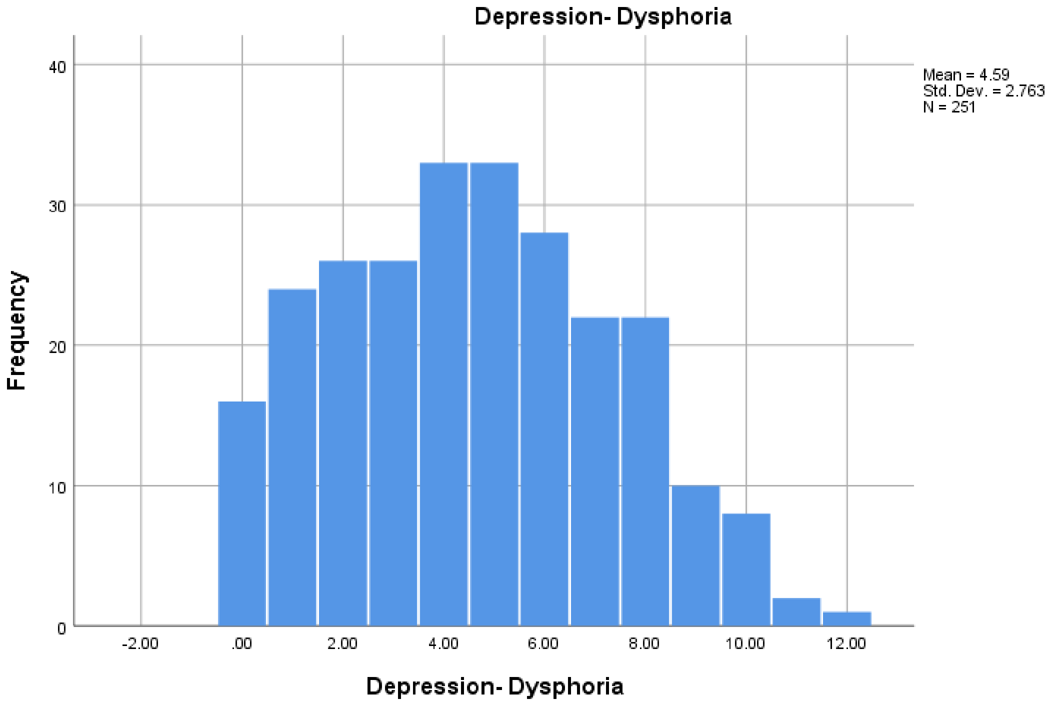

MR_Medical Diagnoses Post ASAH
Frequency
150
100
50
0
-.5
.0
.5
1.0
1.5
MR_Medical Diagnoses Post ASAH
Mean = .41
Std. Dev. = .494
N = 251

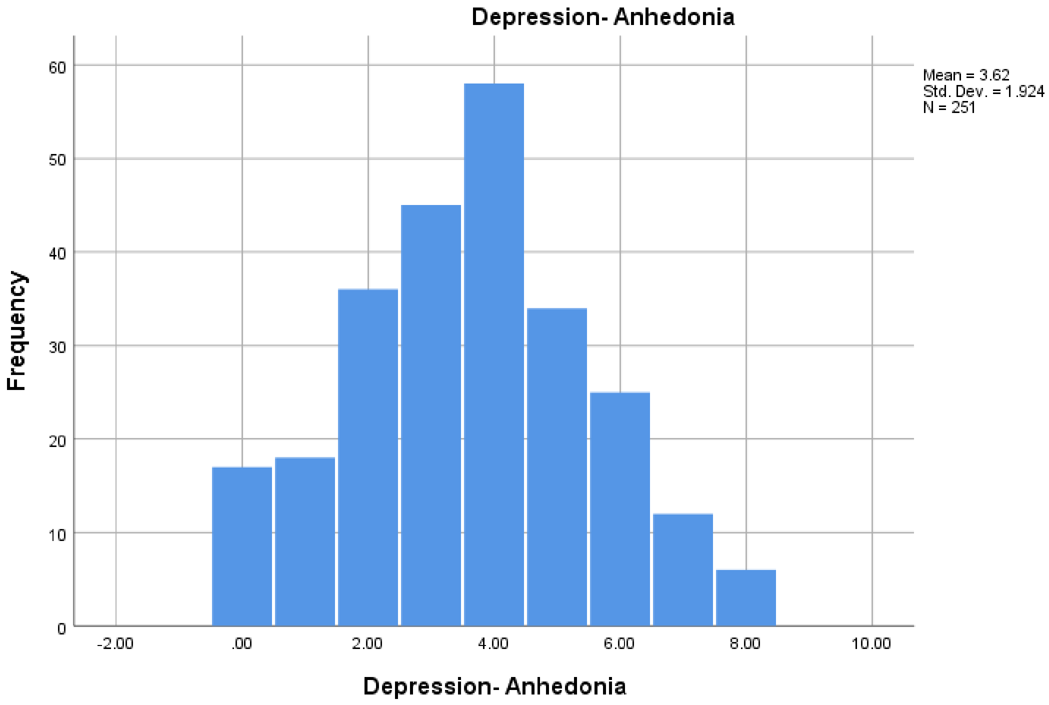

Social Support - Emotional and Informational Support
Frequency
15
10
5
0
10
20
30
40
Social Support - Emotional and Informational Support
Mean = 23.67
Std. Dev. = 8.396
N = 251

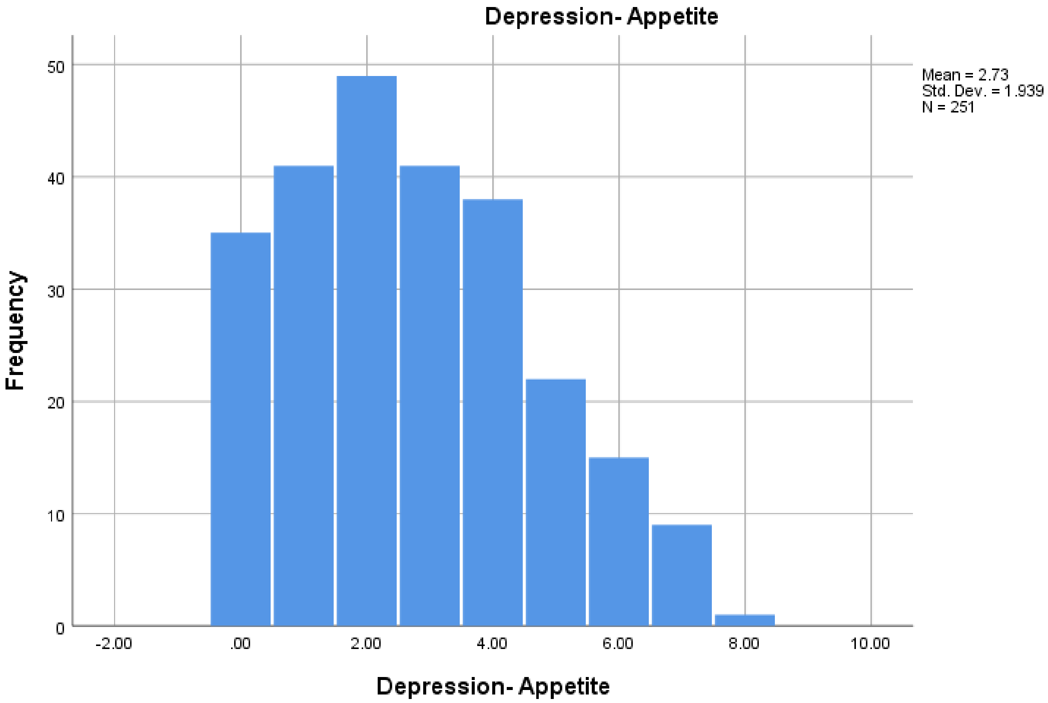

Social Support-Tangible Support
Frequency
50
40
30
20
10
0
5
10
15
20
Social Support-Tangible Support
Mean = 13.69
Std. Dev. = 4.863
N = 251

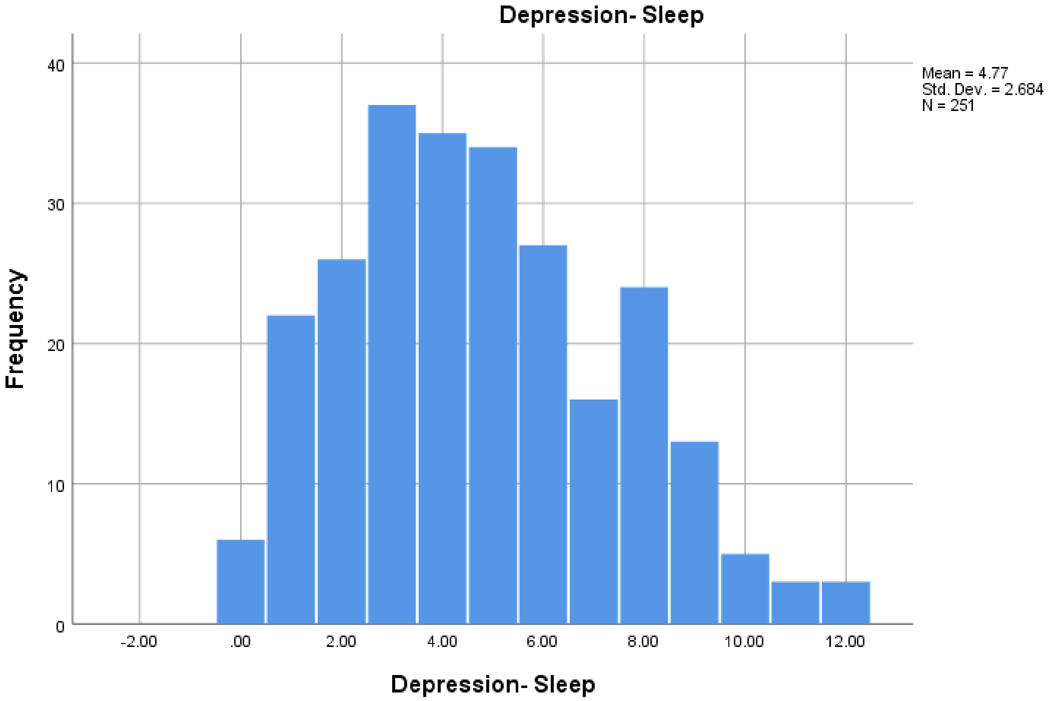

Social Support- Affectionate Support
Frequency
80
60
40
20
0
2.5
5.0
7.5
10.0
12.5
15.0
Social Support- Affectionate Support
Mean = 10.8
Std. Dev. = 3.807
N = 251

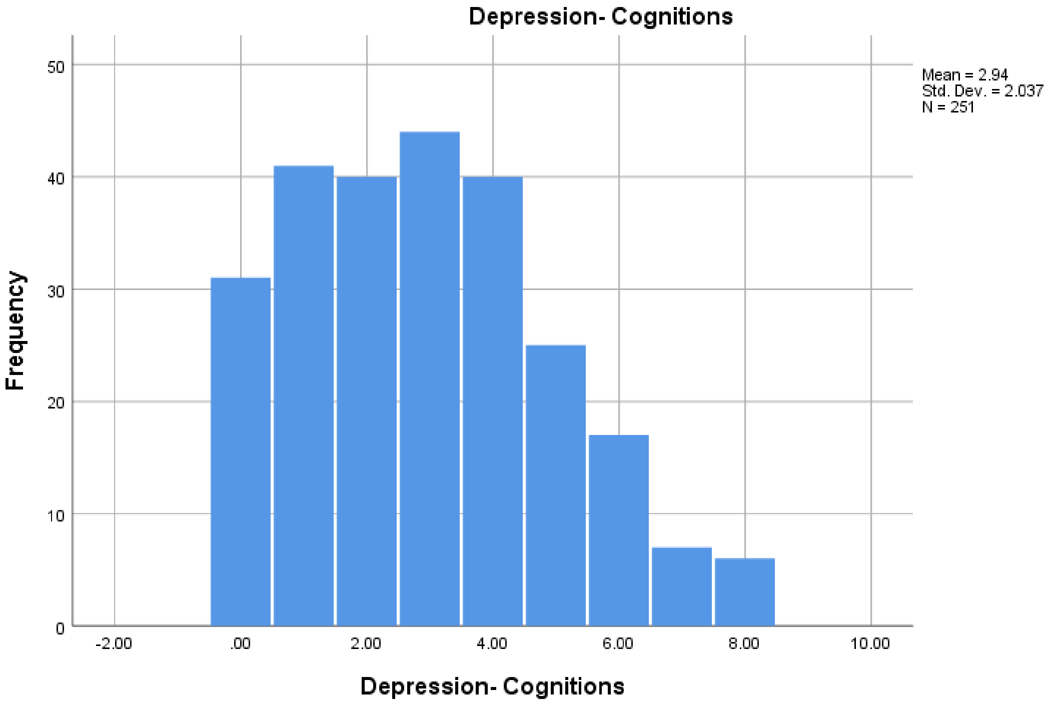

Social Support- Positive Social Interaction
Frequency
50
40
30
20
10
0
2.5
5.0
7.5
10.0
12.5
15.0
Social Support- Positive Social Interaction
Mean = 9.98
Std. Dev. = 3.506
N = 251


Depression- Dysphoria
Mean = 4.59
Std. Dev. = 2.763
N = 251
Frequency
40
30
20
10
0
-2.00
.00
2.00
4.00
6.00
8.00
10.00
12.00
Depression- Dysphoria


Depression- Anhedonia
Mean = 3.62
Std. Dev. = 1.924
N = 251
Frequency
60
50
40
30
20
10
0
-2.00
.00
2.00
4.00
6.00
8.00
10.00
Depression- Anhedonia


Depression- Appetite
Mean = 2.73
Std. Dev. = 1.939
N = 251
Frequency
50
40
30
20
10
0
-2.00
.00
2.00
4.00
6.00
8.00
10.00
Depression- Appetite


Depression- Sleep
Mean = 4.77
Std. Dev. = 2.684
N = 251
Frequency
40
30
20
10
0
-2.00
.00
2.00
4.00
6.00
8.00
10.00
12.00
Depression- Sleep


Depression- Cognitions
Mean = 2.94
Std. Dev. = 2.037
N = 251
Frequency
0
10
20
30
40
50
-2.00
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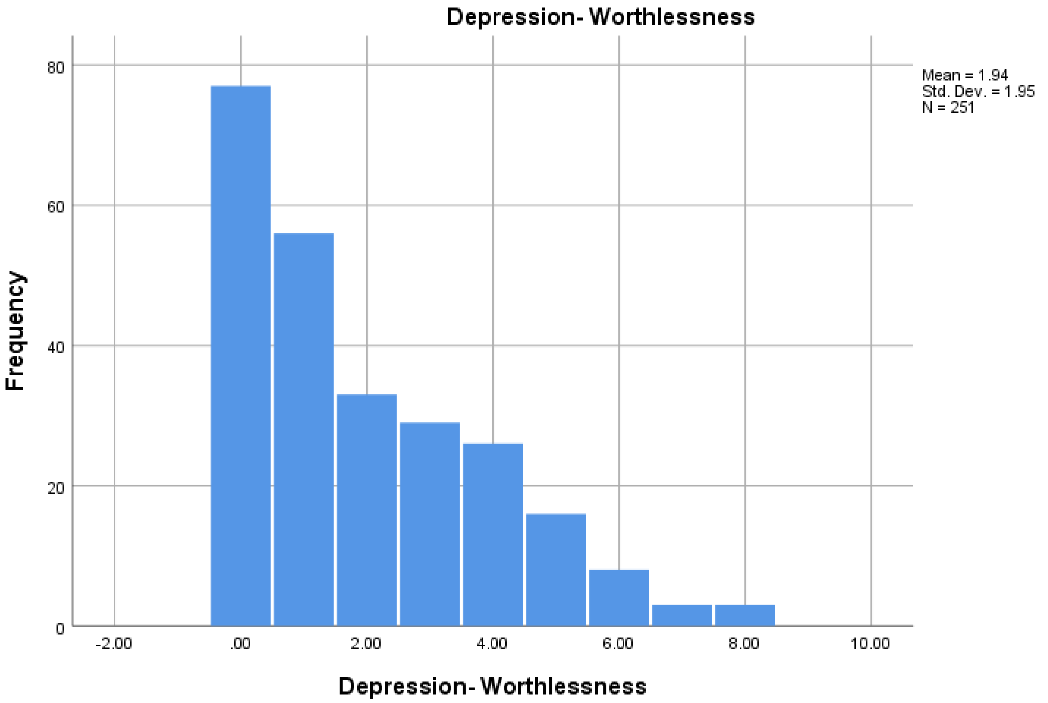
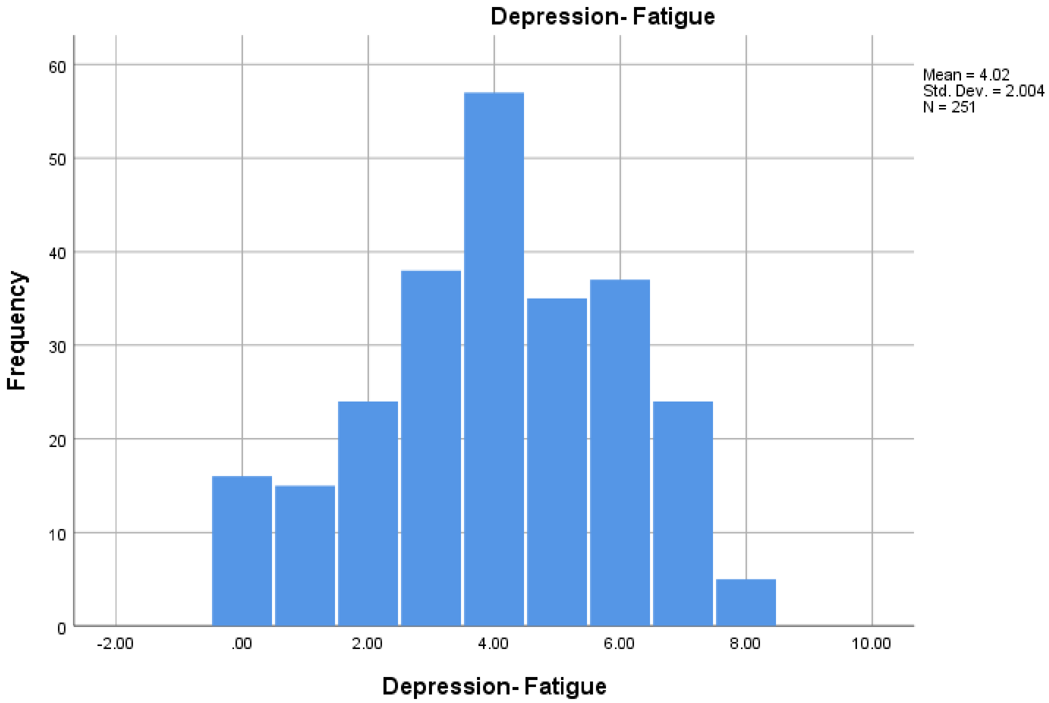
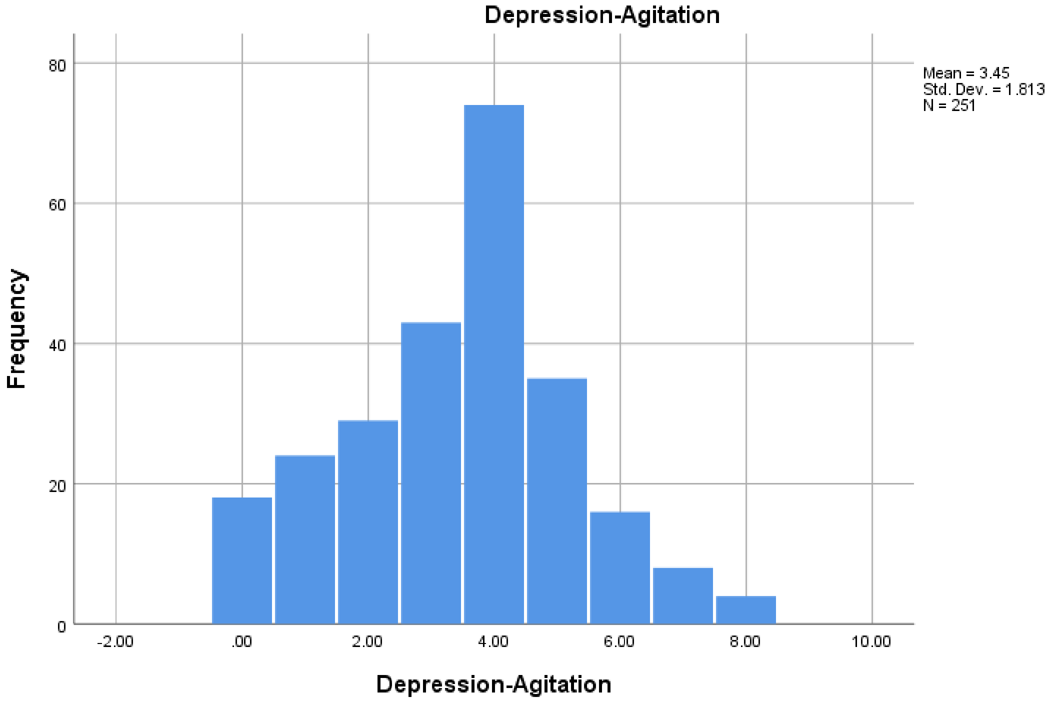
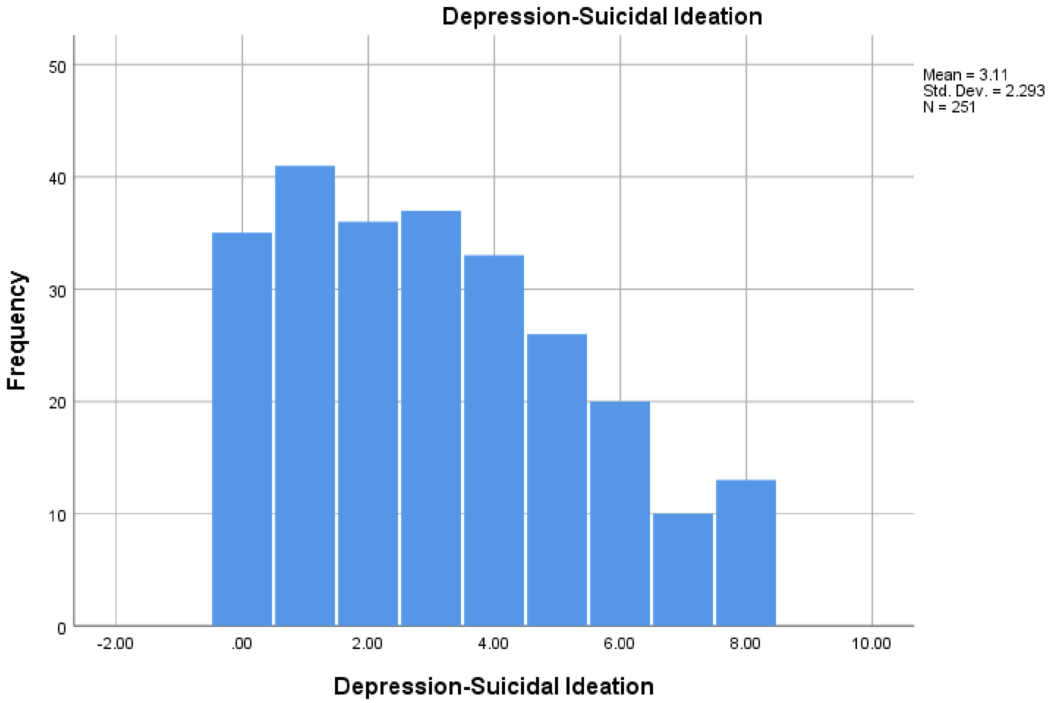
2.00
4.00
6.00
8.00
10.00
Depression- Cognitions


Depression- Worthlessness
Mean = 1.94
Std. Dev. = 1.95
N = 251
Frequency
0
20
40
60
80
-2.00
.00
2.00
4.00
6.00
8.00
10.00
Depression- Worthlessness


Depression- Fatigue
Mean = 4.02
Std. Dev. = 2.004
N = 251
Frequency
60
50
40
30
20
10
0
-2.00
.00
2.00
4.00
6.00
8.00
10.00
Depression- Fatigue


Depression-Agitation
Mean = 3.45
Std. Dev. = 1.813
N = 251
Frequency
80
60
40
20
0
-2.00
.00
2.00
4.00
6.00
8.00
10.00
Depression-Agitation


Depression-Suicidal Ideation
Mean = 3.11
Std. Dev. = 2.293
N = 251
Frequency
0
10
20
30
40
50
-2.00
.00
2.00
4.00
6.00
8.00
10.00
Depression-Suicidal Ideation

Descriptive Statistics

	Mean	Std. Deviation	N
Level of Functioning on arrival at hospital after ASAH	2.45	.932	259
Self_Compassion	2.60	.650	259
Social_Support	3.24	.997	259
Post Traumatic Growth	69.54	20.532	259
Subjective Wellbeing_Life_Satisfaction	17.75	7.213	259
Subjective Wellbeing_Affect_Balance (SPANE-B_	1.62	9.153	259
Subjective Wellbeing_Negative_Feelings	17.21	5.096	259
Subjective Wellbeing_Positive_Feelings	18.83	4.860	259
Depression	30.36	15.692	259
SWB_Flourishing	38.79	9.122	259
Post Traumatic Stress Symptom	28.87	17.240	259
Quality of Life	114.84	28.379	259

1. **Can you tell me a little bit about yourself? (Relationship Status/Children/work status (same job or different as before)**
2. **Can you tell me how your ASAH occurred?**
3. **Were you aware you had a brain aneurysm?**
4. **What kinds of thoughts did you have when you were told that you had experienced an ASAH?**
5. **Did you experience any shock? What was that like for you?**
6. **What do you remember about arriving at the hospital when you experienced your ASAH?**
7. **How did you know what was happening to you at that time?**
8. **Did you have anyone with you during this time? Who did you have with you?**
9. **What would you describe your level of functioning was on arrival at hospital, can you tell me more about this?**
10. **Can you tell me about the Tx you received for your ASAH…?**
11. **Did you experience any medical complications after your asah?**
12. **Can you tell me more about your recovery experience? Did you have to go to rehab? Was there any impact on your family?**
13. **Can you tell me more about how your mood has been since your ASAH? Did any of your treating doctors ask you about your mood after your aSAH?**
14. **Have you been dx with any psychological conditions since your asah? Who dx this? What tx have you received for your anxiety?**
15. **Have you been easily able to express your emotions since your ASAH?**
16. **What do you feel was the worst part of recovery for you after your aSAH and why?**
17. **What were the positive aspects to your recovery after you aSAH, can you tell me more about that?**

18. **In what ways has your life changed since your Asah? How have you coped with that? What has helped you adjust or accept the changes?**
19. **Can you tell me if you have experienced any periods of growth, or new possibilities or direction in life since your ASAH?**
20. **Since your ASAH would you say you have been more tough on yourself or more kind toward yourself? Have you found you need to be more kind to yourself? How have you achieved this?**

21. **Is there anything else you would like to mention that we haven't already discussed about your experiences of recovery after your aSAH?**

at my doctor when he came to visit me, and I said what are you doing here? And I don't remember that and not much else. You know the treatment which is not related to this at all I knew that I'm sure I'm getting a urinary tract infection, you know that as a woman, and I spoke to the staff and I said I need something which they totally ignored and discharged me from hospital and I ended up back in the [HOSPITAL].

Commented [JT14]: Other medical issues not treated..feeling ignored

I: It sounds like you felt ignored, how did that feel?

P: Well not good, cos it wasn't like I asked for investigations or anything like that I just needed Ural. I mean I was at home and my son took my temperature which had sky-rocketed, so going to the [HOSPITAL] so with the recent history of the brain aneurysms they had to do scans again.

Commented [JT15]: Had to go through further scans of aneurysms due to urinary tract infection…didn't feel good.

I: And when you were saying before about the clipping treatment that it was hard; can you tell me more about what part was particularly hard for you?

P: Well I mean, the staples, I had lots of staples, and I think this image of me lying in a bed with all these staples and a shaved head, it was horrible, um, you know I was in a bit of a, I mean people were wonderful. The support I had from people was wonderful. My [children] had to deal with everything, they are both living in [overseas], oh I haven't cried for ages (teary), but them being told, what had happened of course they were googling stuff and then had to get on planes for 24-hour journeys, that was the hard part. I mean I didn't know what they were going through because I was out of it, but in the aftermath, I guess I was processing a lot of that too. What they had to go through to just get here. And then I think they arrived the day the doctor said she is going downhill, we've got to move her to [HOSPITAL], so, they went through a worse time than me basically.

Commented [JT16]: Disfigurement due to scars and staples

Commented [JT17]: Wonderful support from friends and family

Commented [JT18]: Feeling sad that children had to go through worry and concern for their mother and she was not able to support them due to being unaware

Commented [JT19]: Impact on children was worse than what was happening for me because I didn't know what was happening.

I: It sounds like in some ways you were protected at the time from knowing what was going on around you.

P: Exactly.

I: You also mentioned you experienced a complication after your ruptured aneurysm in the form of vasospasm, can you tell me more about that?

P: That's what they told me, but I don't, these things were just technical jargon and I was not made aware of until they transferred me to [HOSPITAL]. I think they needed to do an angiogram with the dye and they didn't have a technician at [HOSPITAL] that could do it.

Commented [JT20]: Unaware of the severity of vasospasm complication because 'still out of it'.

I: Did you have any ongoing issues after experiencing the vasospasm?

P: Not that I am aware of, but I was on medication for it. Um, and, yep so it wasn't until, I don't have the history with me. Cos the follow ups were 6 weeks, I mean I couldn't drive for 3 months, so getting my son to have to drive me to everything.

Commented [JT21]: Medication for complication of vasospasm

Commented [JT22]: Not able to drive, child had to drive me everywhere

I: How did that feel having to rely on others to drive you everywhere?

Appendix U – Case Study – David

After his surgery David was in a high dependency ward of a major metropolitan hospital with two other patients for the first week, eventually moving to a 6- bed ward for the remainder of his four weeks stay. He remembered being visited by his family and his pastor from church during this time. On discharge he was transferred to a rehabilitation service for further intervention.

Although related to his aSAH experience and not specifically recovery, David recounted how on his arrival at work, despite experiencing loss of his peripheral vision and paralysis down one side of his body, he continue to delay seeking a medical opinion on what might have occurred to him, rather deferring to conversations with a colleague and deciding it was nothing more than a hypoglycaemic episode: *"I don't know mate. I think you just need a sugary drink I think you've over done it"* and he subsequently tried to resolve this by drinking soft drink and taking a shower. However, once in the shower David's headache returned. It was at this point that he decided to drive himself to the nearest hospital emergency department for further assessment, again seeming to play down what might be happening.

In the early stages of his recovery he remembered struggling with fatigue resulting in him being unable to consume more than ¼ of a sandwich due to the level of physical exhaustion this exerted: *"I just couldn't eat, I didn't feel hungry and wasn't awake much…I remember taking 3 bites (i.e., of a sandwich) and chewing it and thinking crap I'm tired. I slept for two hours that's ridiculous, but I didn't realise how sick I was and how bad I was until I ate that sandwich and had to sleep for two hours".*

David experienced a great deal of lower back pain during recovery due to the accumulated blood in his brain travelling down his cerebrospinal fluid and away for the site of his aSAH. *" the blood came out of the artery then went out of the brain and down my spinal cord and congealed at the base of my spine and it irritated my sciatic nerve, oh man, that was the worst the back pain was the worst".*

David spent several weeks at an independent rehabilitation facility and was conflicted about his need to attend the service. He acknowledged that physically he needed support but on comparing himself to other patients he felt they needed more support due to their limited mobility, *"I felt like a bit of a fraud, coz it was all these oldies and I could walk and these people were all on frames and wheelchairs".* Despite this he was able to recognise that he did need to relearn aspects of his functioning before he was able to be discharged home and was supported by physiotherapists to *"rewire my brain again. I sort of had to learn all that stuff again".* He recalled that *"They [physiotherapists] got me to do complex, well not complex, but you had to put your arm out and your leg out at the same time, well I couldn't do that. I would put my arm up and then my brain would tell my leg to move, so I couldn't do it".* On the whole David felt his hospital and rehabilitation experiences were generally positive.

David advised that he was unable to drink coffee or alcohol due to issues with tolerance, *"I just think it's probably the body telling it you don't need alcohol in the system coz your brain isn't too flash…when I was recovering I couldn't have a coffee and the thought of an alcoholic drink".*

David expressed frustration around his ongoing short-term memory difficulties, however identified that it was a small price to pay in the overall scheme of things. David recalled that in his early recovery phase he struggled to remember the names for everyday objects, *"There was a time where I would look at that and I wouldn't know what that was, [pointing to a plastic water bottle on the table] and I wouldn't know what it was. .. the names would go".* He had initially attempted to study a Diploma of Community services but *"I really struggled. I can't read stuff that is new and then have to write about it…I couldn't remember where it was written or if that part was in this part".* He acknowledged however, his difficulties continued to cause an impact to his family, *"I am banned from putting things away in the house".* In respect to his children and their friends David noted that his short term memory issues "*can be frustrating, coz I'll drop one of the kids home [i.e., friends of his children] and they then come back around, and I introduce myself again then they look at me like. Because I've already met them, but I don't know who they are".*

Furthermore, he recalled attempting to drive a car during recovery and struggling cognitively: "*Even 6 months later when I could drive, I remember going to T intersections sitting there for ages coz I couldn't remember if there were cars there, so it was very time consuming".*

David identified that he was not assessed for his mood during his recovery after his aSAH despite experiencing times where *"you'd sort of get a bit overwhelmed and needed to put music on and just sit down"*. This was amplified by the fact that David acknowledged he is someone who struggled to express his emotions or ask for help when needed.

He has also noticed that he struggles to manage any conflict that arises particularly between his children, noting that "*It's hard, you've got to manage that stress and being upset, so I find that I have to remove myself, I can't get engaged with that stuff"*.

In respect to recreational activities, David acknowledged that there were some activities that he previously enjoyed that he could longer engage in due to his executive functioning and cognitive difficulties: *"I can't run and listen to music [simultaneously], I just don't listen to music, I just have to listen to my breathing get worse and worse. I can't concentrate on music and keep the pace up for running, there are too many things. I also can't go on trampolines, water slides or rides at fun parks"*.

This guilt extended to existential reflections on why he was still alive. He stated that throughout recovery these feelings of guilt, were amplified by the fact he was the sole aSAH survivor on the acute ward where he was one of ten patients for his entire 3-week inpatient stay: "*The surgeon said to me before I went in [for surgery] you've got a 10% chance of dying and you've got a 10% chance of a brain disability… I wasn't happy to hear that because I thought there's probably about 10 of us sitting in hospitals around Australia so one of us isn't going to make it and one of us is coming out different…it's the odds.. I just thought that's 10%, that's bad"*. This further complicated the conflict he was experiencing around his survival.

David also acknowledged the impact some follow up medical tests had on him during recovery when he was required to attend for an angiogram, an event that left him feeling like his recovery had gone backwards: "*There was another time they put dye into an artery in my groin to my brain and did a scan of some sort and the next day I felt blab. It was like I'd gone back to recovery, so it was having those relapses which really knocked you around. Those two days were probably when I* *felt the most frustrated, but then having to then recover and seeing the improvement. You don't want to go backwards that's the worst bit".*

David identified that his relationships are generally unchanged apart from spending more time at home with his wife and children, *"I'm more patient and probably value family and stuff more".* David identified that his wife has been the main person responsible for his personal care, meal preparation and transport to appointments on his return home. David continued to feel a high level of guilt at what his wife was having to juggle at home on her own and for surviving his aSAH. In respect to his family, he continued to express feeling guilty about the argument he had engaged in with his children when leaving for work on the morning of his aSAH. He noted that if he had not of survived his aSAH, this argument would have been the last conversation he had had with his children, and this did not sit well with him.

David reported that he had previously been independent and autonomous in his work role, often travelling extensively around Australia. David advised that he had struggled to adjust back to working after his aSAH, and due to his short term memory difficulties, had to change his work to a retail position with minimal responsibility: "*Yeah, it's probably the worst job I've ever done. I couldn't find a job, and this is the one that come up, so you sort of just have to take it, I think I'd struggle if I had complex job".*

Despite ongoing feelings of guilt and questioning why he was lucky enough to still be alive, David was able to identify aspects of positive psychological growth he had experienced since his aSAH. David identified that his survival had led him to experience a greater appreciation of life. Furthermore, David was able to view his aSAH experience as an important reminder that he had been given another opportunity to reset his life priorities:

> *"I think that I've survived it that's a positive. I always say to people when I've talked about that it's been a positive experience. I hope that I don't forget it and go back to how I was. I wasn't a bad person, but it has brought me back to my values, what's important".*

In addition, David acknowledged surviving his aSAH as a timely wakeup call: *"I feel that I was given a second chance…so it's changed me a bit……. I always refer to the aneurysm as being a* *good kick up the bum. To say what's important so the lessons would be that your priorities…..That I survived that's a positive……..there is a finite time that you're here and it could finish at any time and you need to do the right thing and what's important".*

David expressed his desire to embrace new possibilities in his life, particularly in respect to future career prospects. David recognised an opportunity to utilise and expand his Christian beliefs with the view to forge a new career path:

"I've gone and done some study, so I've done a Diploma of Theology and Ministry…I just finished that last year… I enjoyed that…. I'm hoping that I get into chaplaincy or wellbeing, maybe in schools as a chaplain".

David was able to contextualise his experience with his Christian beliefs as a reminder that it was with God's intervention that he had survived:

"It's important for me to make sure that I've aligned my life with his plan and do good and be a positive aspect….I genuinely believe that there was a God who saved me when I felt what I felt and then the moment I finished saying that it all just came back. So, I am very appreciative of that. I don't know why out of 4 billion people on this Earth that's happened and I'm sure there was a lot of people that died of ruptured aneurysms that day, so why me, I don't know".

David expressed that his desire to increase altruistic pursuits and giving back to others as a result of his aSAH. He stated that he intended to travel overseas in coming months to provide pastoral services to less fortunate: "*I'm taking my daughter to the U.S.A. to work for a church helping the homeless. I would say to just show some care to people who are doing it tough. It's funny you can just see people and their eyes you see hurt and others …and it's just giving a damn".*

He also acknowledged that his biggest fear after his aSAH was also connected with his faith and beliefs:

"*I guess it comes back to your faith and your belief and doing what you're supposed to do..me as a Christian, I was worried that my next conversation was going to be with God and he wasn't going to be very happy with me because, I'm not one of these people who thinking God condemns people, he is a loving being you know, I think he would be disappointed. I suppose my life is looking after the family but also making sure I'm aligning my life in God's plan for me….you so you go to church and do whatever but you're not patient at home you get a bit grumpy at home, you've got to not be a* *hypocrite, it's important to me to make sure that I've aligned my life with his [God] plan and do good and be a positive aspect".*

David provided final reflections around his approach to life, again drawing on his Christian beliefs, which had left him with a level of contentedness around his mortality given what his aSAH experience has taught him:

"It's easy to say I'm going to live forever and if you are standing there and you don't know where your next breath is, this is going to happen very quickly and you are actually mortal, I would like to think that the next time something happens, at least I'm going to be happy about leaving this Earth, at least I've done the right thing…there's a bible verse…you've fought the good fight now come and rest"

David expressed frustration at some aspects of his social relationships, most notably with some of his congregation at Church, *"There was a mate who came and saw me in high dependency ward, our pastor, I really like him, he is a very good guy who is very real, but there were a few people we had at our home group, where you go and do bible study, they didn't even come and visit. I got really jacked off bout that as the thing I didn't like the most, they didn't ring my wife to see how she was going".*

David expressed self-critical views of himself particularly connected with the way in which he had not been living according to God's plans: *" I probably could have done better at home at the time, and a bit of a hypocrite. So, you go to church and do whatever but you're not patient at home you can get a bit grumpy at home, you've got to not be a hypocrite"*

Appendix V- Case Study – Amanda

Amanda was able to recount a sense of overwhelming gratefulness for their doctor saving their life. Often this was only able to be appreciated and recognised at the first follow up appointment, *"I remember walking into him [neurosurgeon] and having this overwhelming sense of emotion, wanting to burst into tears and throw my arms around him[neurosurgeon] and thank him for saving my life"* .

Amanda expressed her frustration at her treating physician's lack of follow up after her second aSAH, which may have prevented her developing a further aneurysm. Furthermore, she also noted a change in demeanour in her physician which she detailed as follows, *"This was after the first one, and he [neurosurgeon] was so tough, long gone was his bedside manner and he literally said to me, this was 2 years after the rupture, he said to me, they said there was a genetic cause, I think they should have recalled all of us, I was 26yrs, they discovered there was a genetic disposition he said to me the chances of this happening to you again are the same as anyone else walking down the street. And I remember walking down the street with my tail between my legs that I had gone in there being proactive trying to do everything to stay healthy, and I do remember being really cross about that, why didn't they recall us. Not that I would have sued anyone, but seriously they could have completely prevented my second one. But you know intelligent medical profession discovering this, and they have a whole catalogue of people they have told it is never going to happen again and they did nothing. Um, so I remember being cross about that".*

Amanda recalled "*I remember being very emotional and they were telling me when they take the lid off, so mine were both craniotomies, so I have 2 clipped, mirror sides, same location opposite sides [of the brain]..so I have this big bore hole, that's the first one".*

The toll of medical monitoring was also something that Amanda experienced, often linked to previous surgical treatments and the implications for future symptom observations: "*My problem is because I have an old clip they can only do an angiography every 2 yrs. Then they moved to 3 yrs. Then they said it can go 5 yrs. But my last one I had a bad reaction, they couldn't find a vein, so they* *did it without pain killers and it was fine until they started squirting a whole lot of dye through my brain. They had to stop it halfway through because my blood pressure went through the roof. I could tell something had gone wrong, because about 13 people came running into the room".*

Amanda recalled the negative impact of her aSAH on her father which was concerning for her given his usual stoicism: *"Watching the effects on my dad, he is a pretty stoic farmer, but he was going through a lot as well and he collapsed when they told him that I had to go into emergency brain surgery, he actually fainted, they said to him that she could lose her speech and he said but she's fluent in Italian, that's what she works with".* Amanda also recalled seeing her father in such a vulnerable state, she became more protective of him.

In addition, after her second aSAH Amanda has found her focus has become more about her family, notably her children and being proactive in protecting them from future aSAH risk,

"They worry about me, probably not so much now. I keep saying to them I'm good at staying alive. Interestingly my eldest daughter keeps asking me if she should get checked, and I asked the doctor, and he said don't' worry when they are going through their studies. But do make sure they have life insurance in place first because if they find something they won't' get it after that".

Amanda recalled experiencing the psychological impact of her two aSAH very differently. After her first aSAH, Amanda recognised a need to stay strong and achieved this by reflecting on what she had experienced and survived, being recharged by the love and support from those around her to spur her on, *"I mean it had been a pretty amazing thing that had happened to me and I probably enjoyed if I'm really honest too .....no one knew what the hell it was that I had been through, and it was ...a bit of a novelty, so I had experienced my moment in the sun. .... I didn't go into a dismal state of anxiety on the contrary I found a real zest.... I've really got to do something with my life. I'm very much a glass half full person, I think I always was, but I think I am much more so now".*

However, her psychological health was more negatively impacted after her second aSAH. Amanda recognized the impact on her mental health after her second aSAH appeared to have a more profound impact on her psychological functioning: *"So that was full on (crying again- sorry). I was mentally unwell, I looked at myself in the mirror and I looked completely different. It really scared me. I knew that I couldn't really look after the children properly, so I had my sister involved and my ex-husband was great (crying)".*

Amanda described the differences between her two aSAH, notably in the areas of surgical treatment and recovery. She was able to differentiate the level of pain experienced between the two aSAH*: "They told me temporal, and I've got pictures, so that was the first one [dent in head] I have this big bore hole that's the first one and then here is the second one. The differences in recovery between the two was remarkable. The first one was very painful, the second not so painful, and I've got a third one in there now as well".*

Further she added that her recovery was a very different experience after her second aSAH: "*Medicine advances in medicine today, the difference was phenomenal between the two. They put me in to a coma for 3 days after my second one and it made a huge difference to my recovery".*

Amanda articulated her desire to continue living despite experiencing multiple aSAH and continuing to live with a further unruptured brain aneurysm as a strong motivation: "*I feel responsible and I am very very aware that I have this 3rd one and I want to live a long time, so I am very good at keeping up with my check-ups..because of my first clip I can't have as many MRI check- ups".*

Amanda expressed her desire to use her experience in order to raise awareness and knowledge of the condition: *"I would really like to do something to really raise awareness of brain aneurysms, I look at the numbers of 1 in 50 people experience a brain aneurysm and I know people after me who have died of a brain aneurysm….I've got a lovely husband, 2 wonderful children and a great ex-husband. I feel lucky, I do want to do something with it one day… I really feel I should be doing something, should I be walking from here to Sydney to raise money for aneurysm research"*

Amanda reported the need to be more discerning with her friendship group resulting in a need to disconnect from those people who were not supportive or empathetic to what she was going through after her aSAH/s:

> *"I remember clearly making a decision because some of my friends, clearly didn't' understand the enormity of what had just actually happened and um I remember being able to decide very early on and it really amazed me some of the people who came out the woodwork….I remember making decisions about those who just didn't get it……I didn't fall out with anyone, I just let them go"*

Amanda was able to view her vulnerability I the wider context of her aSAH experience: *"It was just really confronting, I'd never seen anything like that, I'd never been in hospital before and I felt vulnerable, and I realised how lucky I was and I think reality had set in and I had realised that I had come close to dying…I just remember how lucky I was an d I just thought good God, how lucky am I, luck has so been on my side that I should still be here and be fine"*.

Appendix W - Case Study – Cameron

Although Cameron was oblivious to what was happening to her during her initial treatment for her aSAH it was later on when she discovered what her sons had gone through whilst she was in a coma, that she realised the impact this may have had on them: *"My sons had to deal with everything, they are both living in Europe, (became teary), but them being told, what had happened of course, they were googling tuff and then had to get on planes for 24 hour journeys, that was the hard part, I meant I didn't know what they were going through because I was out of it, but in the aftermath, I guess I was processing a lot of that too".*

Cameron felt well supported by friends during her recovery after her aSAH: *"People cared, I think that was it, you know at that time I was very much into Facebook and it allowed me to keep in touch with people and take photos and post them of all the flowers so that was nice".*

On discharge from hospital, despite raising concerns with nurses about urinary symptoms she was having she ended up having to attend a different hospital emergency department where she was diagnosed with a urinary tract infection, *"You know as a woman, I spoke to the staff and I said I need something which they totally ignored and they discharged me from hospital and I ended up back in a hospital".* Cameron identified feeling ignored and further frustrated when in her opinion all she needed was Ural, and given her recent aSAH she was subjected to further investigations to rule out a possible issue with her recent neurosurgery, *" I was at home and my temperature had skyrocketed so with the recent history of the brain aneurysms they had to do scans again".*

Cameron expressed frustration at being discharged home with only her son to support her, "*What they did with me they took me down a corridor of the hospital to assess if I needed to go to rehab, and they asked me to walk and because I could do a few steps they said oh you're fine, you know even if they don't have enough rehab beds, they could send a nurse around to home, a bit like* *when you have a baby to check on you, because that was nice and you felt supported and it was comforting".*

Cameron has sought a number of clinical opinions since her aSAH in respect to how often her unruptured and treated brain aneurysms should be conducted, whether exercise was safe to engage in and other issues, "*My scans are yearly, but I have kind of brought it forwards, that's the stress I have, because they are monitoring the unruptured one to see if its growing, its more about that , the follow up for the other one that's been treated isn't' as bad, they don't need to do that as much anymore".*

Cameron recalled her feelings about her physical disfigurement post-surgery: " *I remember waking up with the shaved head and the big scar all that was a bit hard to deal with".* For Cameron, the impact of the large metallic staples post-surgery left her feeling shock at how she looked, *"Well I mean, the staples, I had lots of staples, and I think this image of me lying in a bed with all these staples and a shaved head, it was horrible, um, you know I was in a bit of a shock"* .

Cameron recalled noticing issues with her sense of smell whilst on a holiday overseas with friends. She had commenced to them that after eating asparagus she had not noticed any changed in the smell of her urine. She had thought that there may be a change in the asparagus grown in Europe where they were, *"I realised I can't smell anything, I've seen neurosurgeons and specialist and asked if it will come back and they have said unlikely".*

Cameron struggled to return to exercise after her aSAH due to not knowing whether it may have a negative impact on her health. This led to a juggling of fears around the unknown cause of their aneurysm with her desire to maintain good health by returning to exercise that she previously loved to participate in. This was heightened by the fact that her aSAH had been experienced whilst exercising, *"I'm nervous, I was exercising when it happened, nervous to the point, that's why I've probably changed to this second surgeon, he's a swimmer, and cos I would say to the original one, can I get my heart rate up and blood pressure up, and he would say, yes that's alright, wouldn't that make me more susceptible. And I've been and had a stress test and had my blood pressure checked* *when your exercising but I'm still not…so I haven't gone back to swimming as much, I would swim a lot more regularly sometimes run, but I haven't gone back to that".*

Cameron experienced ongoing fatigue during the recovery period after her aSAH. She reported an ongoing need to adapt their daily activities in order to manage their fatigue as follows: *"Oh, yes, I had to sleep, I still think I experience fatigue, if someone had told me 4 years ago that I spend a lot of time watching daytime television, I would have told them they were mad. But that is how I spend my days now, that's me now, you know I work in front of television with my feet up, that's changed. I might not have to do it, but it would never have occurred to me, every day I used to sleep, have a rest in the afternoon".*

Cameron reported struggling with emotions at times during her recovery: *"I am a lot more emotional at times, even now, others will ask how's your health and its quite intense, but that's changed a lot I am more emotional and probably a lot angrier".*

Cameron struggled to determine if she might be experience anxiety or depression: "*I have been reading up on it because sometimes I get confused about what is anxiety, what is depression and other things".*

Cameron also acknowledged that she had increasingly been drinking more alcohol than usual as a form of coping: *"I do tend to drink alcohol too much, not every day but when I drink I do drink too much because I think that is the only thing that is going to help…I'm certainly not a rolling around drunk but when I do drink I probably drink too much, or when things get like that I will think, have a drink it solves it".*

As Cameron is self-employed and working from home, she reported that she was able to manage to return to work with a few small changes around pacing to manage her energy levels throughout the day: *"My office is downstairs and I live upstairs, even now I will sit on the couch and do work remotely, 90% of the stuff is on computer so its technically full time. I could work 24 hours per day but in half an hour bits".*

Cameron identified the slow progress she experienced during her rehabilitation as another factor that added to her level of frustration. This was compounded by looking for information to better understand the recovery process and expectations, *“[I] guess it’s the frustration because you can’t do anything for yourself.....I remember when I first walked 3 steps..... being able to take the dog for a walk and being reliant on people I suppose…it’s a long recovery in a way, that’s the other reason I was… ferociously trying to find information, that’s when I found the American brain aneurysm foundation then I got onto the Australian one”.*

Cameron regarded connecting with others who had experiences an aSAH as vital in her early recovery. Cameron reached out for support via social media, namely Facebook, as a place to meet other aSAH survivors (i.e., with whom she met and organised the Camino trail walk). Cameron also felt supported by being able to keep in touch with friends and family who were able to remind her that, *“People cared, I think that was it, you know at that time I was very much into Facebook and it allowed me to keep in touch with people and take photos and post them of all the flowers, so that was nice”.*

She was inspired to set up a Facebook group and raise awareness: *“I just thought something has got to be done, so I set up a Facebook group and organised an awareness walk”.*

Cameron decided in order to keep motivated during recovery she would set some goals involving a form of reward or sense of achievement. The setting of these small goals assisted her in moving from struggling with the adjustment of being a person who was physically active and fit to being more sedentary person: *“Because I was still lying on the couch and not able to walk….I was going to walk the Camino trail in Spain. Then I sent messages to friends, I had 17 people agree to join me, I needed a focus”.*

Cameron was able to place her own aSAH experience in a wider context particularly when connecting with others who have experienced a life threatening experience: *“Well it’s just understanding what others have gone through, I have a client, a friend, his doctors think he may have prostate cancer, but it’s like people tend to gravitate towards you if you have had some sort of life* *threatening thing ..so for me friendships have got stronger we would never have talked about medical issues before, but now we can joke about it, but it brings you closer"*.

Cameron expressed frustration at those parts of her life she had not been able to return to, particularly her exercise: "*I think about it, it is something that is a big part of my life and I think that's what I am still struggling with. Because I can't [exercise] like I used to and I'm not doing it enough also procrastinating about putting things together because I am not part of that thing anymore"*.

Appendix X - Case Study – Elizabeth

Elizabeth expressed frustration at the lack of information provided to her from her doctors in respect to what she should expect during the recovery phase:

"The worst part of recovery was not having someone to say okay this is what's happened for you to get past this we need you to do, that, that, that, and that. That's not available….yeah, there was a lack of information.

Elizabeth queried her neurosurgeon about her struggle to adjust to her ongoing impairments and was advised that their role was not to worry about her ongoing functionality but rather to keep her alive: *"I talked to my surgeon about it and he said look were trained to save your life not to give you back your life. I understand, I get it, well they are doing their bit and doing the best they can but there is a big gap between saving your life and helping you come back to function as you feel you should and that was difficult to find information…there is a big gap between saving your life and helping you come back to function as you feel you should".*

Despite these negative experiences she found her physiotherapist to be a valued source of support: *" Like going to the physio like I did, they were brilliant with me, they've charted my progress and encouraged me every step, I have only started to get a bit of a level of physical fitness back, I'm definitely fitter and getting more confidence back in myself as far as my strength goes and being able to do things. I can vacuum through the house without having to sit down 2 or 3 times between, so to start improving and being able to get through the day without having to shave a sleep, that was a huge achievement"*

Elizabeth's physiotherapists paced her sessions at a rate that was best for her which she experienced as being safe and confidence building: *"My physio was brilliant they were so patient, they would do one small exercise then they'd take my blood pressure , they'd take it 10 times in an hour to see what was going on , then heart rate, watching to make sure I was okay, I felt protected with everything that I attempted with them, that was really cool and gave me confidence to try a bit harder and do a bit more".*

Elizabeth recounted struggling with surgical monitoring to follow up on her aSAH and also unruptured aneurysms: "*Every 12 months I've been going in and having either an MRI or MRA, he didn't want to do any more angiograms because he said we've been really lucky with those so far. The last one I didn't have any anaesthetic for it, and I said I would not be awake for another one, I wouldn't let them do that again It was absolutely terrifying. I had some sort of reaction to the dye and I was stroking out a bit, I had total left side paralysis, my pupils were dilating at different rates, I came good after a few hours".*

Elizabeth was advised that if she had not been as physically fit as she was her outcome may have been different, despite this: "*It was hard to wash myself, but at that stage I didn't understand, I don't think it bothered me that much, because it wasn't clear to me at all".*

Elizabeth remembers having to learn fine motor skills over a period of 12 months, "*they had me trying to tie my shoelaces and getting dressed. I couldn't do my bra up, things like that".*

Elizabeth experienced ongoing pain, particularly in respect to headaches, neck pain and in her joints necessitating in her having to seek support: " *I was on pain meds for the first year and a bit, I was on Endone and Pandeine forte, taking 4 Endone a day and 8 Panadeine forte a day and I was a mess with that. The pain in my joints, muscles, and neck and headaches was a nightmare, but I've weaned off those, I haven't had any pain meds for 3 or 4 years . I go to acupuncture every fortnight and it keeps that side of things under control".*

Fatigue continues to be a problem, although has improved more recently: *"occasionally fatigue continues to be a problem, I have got further through the day than what I used to, for quite a while there between 2pm and 3pm I just had to stop, now I'm managing to go to about 4pm".*

Elizabeth recalled struggling with basic memory tasks requiring her husband to assist at times: "*So trying to remember things I read all the time, all my husband had to do was move my bookmark in the book all the time, because II wouldn't know what part of the book I had read…I can't hold details so much".*

Emotionally Elizabeth recalled struggling to adjust from a life that was lived to the full to one where all of that had been removed: *"My life was full of joy, like I found pleasure I found everything I did, I enjoyed working I enjoyed the people that I work with, I enjoyed going to the gym, my walks with the dog.. I always had that lightness in my heart, so that's gone, it's just gone.. I just feel that my emotions are muted. I don't feel those huge surges of emotion that I used to have. It's sad, it's a piece that's missing, I just think well maybe it will come back".*

Elizabeth expressed feeling a lack of emotional support particularly from her family who were unable to maintain their patience with the slow machinations of her recovery. She described having to justify and balanced the lack of understanding in respect to her ongoing impairments and difficulties by family and friends, *"In the early days the family didn't' understand how hard it was to do the simplest things. Our house is a little bit split level, but its only 4 stairs and it's such a struggle to get up the stairs. But now, it's more [of a struggle] once I get tired, I've got nothing and like I might say to my husband can you get up and do this for me and he'll say what's wrong with you, you haven't got a broken arm or broken leg. I don't think they understand the fatigue side of things. I think most people don't, they don't' understand, like you lose all your instinctive movement. You've got to think about every tiny step to make yourself do it. I know there are times I've been trying to take the lid off a jar. I know my hand has got to go around it, I know I have got to squeeze it, but getting the strength to undo it…it doesn't always connect. It's hard, those steps are hard to explain to people. And how tired that makes you".*

During the rehabilitation phase Elizabeth described experiencing a great deal of frustration, particularly when despite working hard with allied health therapists she came to the realisation that impairments she had sustained were likely permanent *"That's hard, because… I've always been results driven as a person, that's my way of life. I worked hard and enjoyed the people I worked with. So that's been a big, a very big change for me. It was hard, it was hard to hear. You start to doubt…have you done the right thing? What have I done? Could I have done better than the way I've done it. Then I sit back and say, 'nah, don't' go down that track'….I couldn't have done any* *differently than I have done anyway, but …. It's hard to accept that the damage is permanent, coz I still think no I can get around this, there's a way to get around this".*

Despite this, Elizabeth was very motivated to gain back her cognitive functioning after her aSAH and recalled her occupational therapist praising her for her commitment but also encouraging her to embrace a more balanced approach: "*A little while ago she said to me what you've done is amazing you've done really well, you've come along way, you are totally focused on your rehabilitation that you've got to stop doing that you've got to just enjoy life and choose what you'd like to do not just because there is rehab value in that activity"*

Elizabeth had been unaware that she was living with depression and it was only sometime after her aSAH that a psychologist in the community completed an assessment, *"The neuropsychologist that I saw….was extremely concerned because they give you a questionnaire and when she read what I had written she said you have severe depression, this is no good, we've got to work on this. You know I went to her for quite some months, but then the other side of that like we were working on the acceptance of what had happened to me and that sort of thing…the trouble I had with that was that I know what she wants to hear and it's easy to tell her… what it showed me is that I haven't really accepted it".*

Elizabeth acknowledged that her family were impacted by watching her go through both her aSAH and the rehabilitation process: *"It was really hard, because I was always the doer and the one that everyone went to if they ever needed help, so for me to be so incredibly ill and that level of danger, it was really hard on them".*

Elizabeth reported obtaining valuable peer support from social media in the form of Facebook via aSAH specific groups. These groups were found to be a form of valuable non-judgemental support: *"I've got a couple of support groups on Facebook that I'm part of for quite some years…. it was great to find them, because they are people who truly understand what you're saying and why you're saying it. There's no judgement. I said to one of them one day. " you've got to walk a fine line* *between determination and desperation, and you do need to be kind to yourself. I say that to people all the time, but I don't find it easy in my heart to do it for myself"*.

Elizabeth acknowledged that her emotional numbness was attributed to the fact that she had been advised that her aSAH was significant in size being a grade 5 SAH from which most people do not survive or are severely disabled. She had been advised that she also had a further 2 known brain aneurysms located on her internal carotid artery, which she described as being *'bubbled'* with aneurysms that due to their locations were untreatable*: "Well I've still got 2 aneurysms that have not been treated, the artery that ruptured before is bubbled with aneurysm, and I had to have a stent placed in 2015 and there's still one deeper in the brain and the other is on the carotid, but it's not actually in the brain case…I saw another surgeon to discuss fixing the one that is deeper in the brain, but to do that they need to do a craniotomy but um, I can't face a craniotomy"*.

Elizabeth engaged in creative arts in order to further build on her fine motor skills. She also gained some confidence and enjoyment as well, *"I started to do stained glass classes again for the rehab value. I couldn't draw to start with. I used to enjoy drawing and sketching and found initially I struggled with that. But now I tried a bit more and that's starting to come back a bit. That was learning a new skill the glass cutting and having to plan, draw the picture, plan what glasses go in it and doing the structure of it, and having the patience to grind it down and shape it, that sort of thing. That's been a very positive thing for me"*.

Appendix Y - Case Study – Gaye

Gaye experienced difficulties returning to previously enjoyed pursuits, several participants highlighted the impact of disfigurement because of her surgical intervention. She reported a strong desire to avoid looking at herself due to the impact of her surgery, *"I don't know all I know now is I've got lumps and bumps all over my head and I have two holes. I go to the hairdressers and whenever there is something washing my hair, I have to say to them in case they wonder about all the lumps and bumps……No, well I didn't look. No, my head was covered a lot of the time and I just, when I did go into the bathroom I didn't' look, coz I felt so ugly and awful, cause they had cracked open my head, it was bits shaven and I couldn't even stand to look at myself".*

For Gaye, sources of dissatisfaction connected her negative experiences with medical practitioners were varied. She described the lack of information provided around her diagnosis or prognosis as a main source of concern, *"Family, it was family, um, actually I didn't get a lot of information out of the doctors. Yeah, I wasn't getting much at all. Even after I came out of rehab, I've had nothing since. I feel really let down by the medical profession, it's like I've just been swept under the rug and just you know forgotten about…No, I have had to push early last year I actually pushed to get an MRI, or something done because I was getting headaches. Yeah, I've just really had to push for anything".*

Gaye also expressed feeling let down during the outpatient phase, particularly around the process of attending for outpatient follow ups, *"I guess just how let down I feel with the medical profession. I had to go to see a doctor at the brain injury unit, but he was just wasting my time. Like, I had to go every 3 months, um, they'd make the appointment, so they send you a letter, so I had to take time off work. It could be an 11 o'clock appointment or something in the middle of the day so you get there at 10:30am or quarter to eleven and every time you'd be there for an hour waiting, and like he didn't really care. At that time, he would only show up half an hour after your supposed to be in there. The last couple of times I just ended up walking out. I never stayed I walked out twice".*

Gaye recounted the emotional impact on her children, in the short and long term, after being told multiple times that she may not make it through in addition to their feelings of guilt and ongoing worries for her well-being, *"They gave me a pretty good chance of dying, so 5 times they [kids] had to come and say goodbye to me. So, each time I went in for an operation and then when I was in a coma, they told my kids that they weren't expecting me to survive…but if she does, she will more than likely have to be in a nursing home…….my son blamed himself, he caused a lot of stress in my life a week before the ASAH. I had to bail him out of jail and so he sort of blamed himself and was asking the doctors can stress cause this….he was quite emotional about it".*

Gaye was well supported by family, friends, and work colleagues in the aftermath of her aSAH, who came together to provide support financially and emotionally, *"The first week out [of hospital] was the night of the fundraiser and I was able to go. That was an amazing night, I was in awe of what they did, there was over 200 people turn up and they raised about $50,000 dollars. It was just amazing. That was my work colleagues that organised that. But people were there, it went everywhere, it was in the local papers. The amount of people who turned up. There were people from my childhood, from my old workplaces, the people who turned up".*

Conversely, Gaye also described feeling misunderstood and unheard by some family members for her ongoing impairments, leading her to feel unsupported and misunderstood, *"I hated it, I just kept doing what they wanted, just being, just agree to disagree. It has been tough; I find it hard with my daughter. She doesn't quite understand how I'm feeling. She feels lucky that I'm still here. That I should feel lucky, I shouldn't be feeling so bad. I should be happy and not down and out. I've got a second chance. But no one really knows how I feel".*

Gaye experienced considerable fatigue during her recovery and described needing naps to refresh her energy each day, *"I do get very tired, yeah, I get really fatigued quite quickly….Oh, I just push through and when I get home I just sort of lay on the lounge and have a bit of a nap and then an early night. I'm always to bed early".*

Gaye reported her experience of being diagnosed with depression and/or anxiety and how it felt to struggle forward with life without letting family or friends know how she truly felt, *"When I* *did see the psychologist and did their tests … I had high range of depression and anxiety….I know I had bad depression. way he explained it too is because I've had a brain injury everything I have is magnified…..I'm making an effort to go out with friends, but I feel like a fake person, coz I'm going out with a happy face, but inside I'm just crying".*

Gaye identified struggling to express self-compassionate views towards herself in deference tending to be more critical and finding that these feelings have been difficult to shift, *" [I] think I'm tougher on myself… I hate the way I look and feel at the moment. I'm just hating everything about me now….when I look in the mirror. I hate what I see".*

Gaye acknowledged that she was lucky to have survived and viewed it as a new opportunity to focus on her life and loved ones: *"I've got a second chance at life and I don't' want to waste it….. I do appreciate life a bit more and that's why I get so down and out about its coz I want it to be better. I want it to be the way it should be. I've got a second chance, I don't 'want to waste it, I don't want to feel like this".*

Gaye reported changes in spiritual aspects of her life including re-engaging with previous religious devotion or commencing such a devotion because of their aSAH, *"Yeah, it's a new thing. I don't know I do believe he [God] helped me through it and my dad's up there too. You know I often pray to God and then talk to my dad".*

Appendix Z - Case Study – Maree

Maree recounted that her physician had not provided her with any information about her surgical treatment, *"I don't know the exact number; they didn't tell me. I kind of asked, but I don't know how many coils, I just know that post MRI's that they are very happy with the coils and they 've not found any other aneurysms and I basically now just have an MRI yearly now… I don't know, they haven't told me. I asked them how big my aneurysm was, and they pretty well said because it ruptured, we can't really tell, you would think they would have some idea".*

Maree was able to identify that her aSAH had taken a toll on her family members. She identified that distress for some family members continues to be an ongoing struggle. Maree's family members continue to have concerns around her wellbeing and maintaining a sense of being on guard for a further recurrence:

"I think they thought I was going to die. The doctors weren't giving them good news, they weren't saying she's going to pull through this. They told them she has a 10% chance of survival and lots of rehab and never being back to normal. They were quite scared and even in the beginning when I returned to work, this was once I was driving again so 6 months down the track, I was on a late shift and hadn't gotten home on time and they were panicking. They were out driving around looking for me thinking I might be in a ditch. So yeah, I think it had a bigger psychological effect on them than me. Having to go to ICU every day for the week and then high dependency and seeing me with tubes and drains and lines coming out of my neck and everywhere. So, it was harder on them than me".

Maree experienced fatigue at varying levels over a short-period of time subsequent to her aSAH, and notably the increase in fatigue once discharged home and attempting to increase daily activity:

"All I really experienced was fatigue, for probably the first 6 months, really bad fatigue and when I get tired, still now when I get tired I might sound a little bit drunk, I start to slur my speech, can't find words occasionally and the only other thing is being a bit more sensitive to sunlight and noise. But aside from those things pretty good……So, and I didn't even realise the fatigue until I got home. So, when I was in hospital in HDU for a few days with headaches after I'd woken up and then they settled, when I left hospital, I didn't realise how fatigued I was. Coz when I was in hospital, I wasn't doing anything; your meals are brought to you. But when you get home, I should have probably been doing things like walking people to the door of the ward or going to the canteen….When I got home, I would say 10/10 . Like when I tried to make the bed, I would then have

to have a rest. Then I would try to do things for an hour and then I would have to rest again……. You look 100% and I say well no I'm not 100% I still get fatigued and I can't overdo it. I still need rest".

Maree also described her fatigue as being difficult to articulate to others, with a requirement for her to pace her activity creating ongoing frustration for her family members, and leaving her feeling unsupported, *"Yeah, no that can get frustrating, like I'm so tired and they'd say let's go and do something and I'd say I'd rather stay home and have a nap. It's always frustrating when they don't understand but it's different now because my fatigue levels are much better there are times when I can't keep my eyes open and my husband would come home and say what have you done all day and I would say, rested. And I shouldn't have to explain that. They look at you and they say you're recovered. You look 100% and I say well no I'm not 100% I still get fatigued and I can't overdo it. I still need rest".*

On her return to work, Maree continued to experience fatigue, this resulted in her needing to reduce work requirements and shifts in order to manage, *"Sometimes when I was really fatigued……at work the colleagues always looked out for me, they will always come and go are you okay. Also, with my shifts, as a nurse you might get 7 shifts in a row but now I do get a bit of favouritism with the rosters, I don't get a bad run of shifts or getting fatigued they will give me the lighter load. I tell them you don't have to do that I'll take my share. But someone younger without past medical issues will take the shifts for me. So, no they do look out for me and will ask if I need a hand, its good team nursing. So yes, I do feel that they look out for me".*

Maree identified that her change and future thinking detailing a re-prioritising of life and financial goals as a result of her survival: *"Probably the only thing with my mood is I don't take things for granted so much anymore. The behavioural change, like before it was my husband and myself getting everything paid off and get ready for retirement and save our money, but now it's like you know what, retirement isn't guaranteed. Don't put things till later. So yeah that's a change like before I would have put responsibility first, like you don't think…. I didn't think I was going to arrest from an aneurysm. So, I'm a [medical professional] and I know people get sick and things happen all the time. But now you realise that you plan for your future, but that future is not actually* *guaranteed….Pretty much the changes have been more in not delaying things. So, I guess it's about not delaying things, the reality check. If I hadn't had the ASAH………. we would still be working our butts off to build for the future. So, I guess it's now more about living for the day. That was our thing we will keep working hard for the next 10 years and retire early and travel Australia. But I am not guaranteed 10 yrs., no one is, and it will all be over before you get to do anything".*

Maree's aSAH had led her to reflect on her own spiritual leanings as a result of her aSAH*, "I'm not religious or spiritual, but I like to believe in reincarnation, it's a whole cycle of actually to be arrested and almost gone and I have nothing. People will say they saw lights or there was something and I could see myself. And for me there was nothing, no dreams and it was like when you are born you have nothing, and this was the same".*

Appendix AA: Table 19: PTG and Self-compassion Cross-case Synthesis

Table 19 Cross case synthesis of Post-traumatic growth and Self-compassion experienced

PARTICIPANT	SC	PTG
DAVID	***Self-judgement:*** *I probably could have done better at home at the time, and a bit of a hypocrite. So, you got to church and do whatever but your e not patient at home you can get a bit grumpy at home, you've got to not be a hypocrite*	***Greater appreciation for Life:*** *I feel that I was given a second chance, so it's changed me a bit and I always refer to the aneurysm as being a good kick up the bum. To say what's important so the lesson should be that your priorities. That I survived that's a positive. There is a finite time that you're here and it could finish at any time and you need to do the right thing and what's important.*
AMANDA	***Common humanity:*** *It was just really confronting, I'd never seen anything like that, I'd never been in hospital before and I felt vulnerable, and I realised how lucky I was and I think reality had set in and I had realised that I had come close to dying…I just remember how lucky I was and I just thought good God, how lucky am I, luck has so been on my side that I should still be here and be fine*	***New Possibilities:*** *I would really like to do something to really raise awareness of brain aneurysms, I look at the numbers of 1 in 50 people experience a brain aneurysm and I know people after me who have died of a brain aneurysm….I've got a lovely husband, 2 wonderful children and a great ex-husband. I feel lucky, I do want to do something with it one day… I really feel I should be doing something, should I be walking from here to Sydney to raise money for aneurysm research*
CAMERON	***Self-judgement:*** *I think about it, it is something that is a big part of my life and I think that's what I am still struggling with. Because I can't [exercise] like I used to and I'm not doing it enough also procrastinating about putting things together because I am not part of that thing anymore".*	***Relating to Others:*** *Well it's just understanding what others have gone through, I have a friend, his doctors think he may have prostate cancer, but it's like people tend to gravitate towards you if you have had some sort of life threatening thing ..so for me friendships have got stronger we would never have talked about medical issues before, but now we can joke about it, but it brings you closer".*
ELIZABETH		***New possibilities:*** *I started to do stained glass classes again for the rehab value. I couldn't draw to start with. I used to enjoy drawing and sketching and found initially I struggled with that. But I tried a bit more and that's starting to come back a bit. That was learning a new skill the glass cutting and having to plan, draw the picture, plan what glasses go in it and doing the structure of it, and having the patience to grind it down and shape it, that sort of thing. That's been a very positive thing for me*
GAYE	***Self-judgement:*** *[I] think I'm tougher on myself… I hate the way I look and feel at the moment. I'm just hating everything about me now….when I look in the mirror. I hate what I see*	***Greater appreciation for Life:*** *I've got a second chance at life and I don't' want to waste it. I want to be respected the way I respect other people…… I do appreciate life a bit more and that's why I get so down and out about its coz I want it to be better. I want it to be the way it should be. I've got a second chance, I don't 'want to waste it, I don't want to feel like this*
MAREE		***Greater appreciation for Life:*** *I don't take things for granted so much anymore. Like before it was my husband and myself getting everything paid off and get ready for retirement and save our money, but now it's like you know what, retirement isn't guaranteed. Don't put things till later. So yeah that's a change like before I would have put responsibility first, I didn't think I was going to arrest from an aneurysm. So, I'm a medical professional and I know people get sick and things happen all the time. But now you realise that you plan for your future, but that future is not actually guaranteed….Pretty much the changes have been more in not delaying things.*

Appendix BB: Table 20: Comparative Case Study Synthesis – Main Themes

Table 20 Cross case synthesis of main themes

PARTICIPANT	***MEDICAL PROFESSIONALS***	***PHYSICAL/PAIN/FATIGUE***	***PSYCH & EMOTIONAL***	***FAMILY & FRIENDS***	***SURGICAL TREATMENTS***	***WORK***
DAVID		*The blood came out of the artery then went out of the brain and down my spinal cord and congealed at the base of my spine and it irritated my sciatic nerve, oh man, that was the worst the back pain was the worst.*	*There was a time where I would look at that and I wouldn't know what that was [pointing to a plastic water bottle on the table] and I wouldn't know what it was... the names would go*	*I think the issue is, I didn't really suffer much, and it didn't really worry me, I think I felt sorry for my wife…. she got the call she was picking the kids up and was told 'you better get yourself to the [hospital] your husband is here he has a brain aneurysm and she was beside herself. She dropped the kids off to the neighbour but did not want to tell the kids what had happened coz she had visions of me lying in bed.*		*It's probably the worst job I've ever done. I couldn't find a job, and this is the one that come up, so you sort of just have to take it, I think I'd struggle if I had complex job*
AMANDA	*I remember walking into him [neurosurgeon] and having this overwhelming sense of emotion, wanting to burst into tears and throw my arms around him[neurosurgeon] and thank him for saving my life*		*I was mentally unwell, I looked at myself in the mirror and I looked completely different. It really scared me. I knew that I couldn't really look after the children properly, so I had my sister involved and my ex-*	*Watching the effects on my dad, he is pretty stoic, but he was going through a lot as well and he collapsed when they told him that I had to go into emergency brain surgery, he actually fainted*	*I remember being very emotional and they were telling me when they take the lid off, so mine were both craniotomies, so I have 2 clipped, mirror sides, same location opposite sides [of the brain]..so I*	

			husband was great (crying)		*have this big bore hole, that's the first one".*	
CAMERON	*They took me down a corridor of the hospital to assess if I needed to go to rehab, and they asked me to walk and because I could do a few steps they said oh you're fine, you know even if they don't have enough rehab beds, they could send a nurse around to home, a bit like when you have a baby to check on you, because that was nice and you felt supported and it was comforting*	*I had to sleep, I still think I experience fatigue, if someone had told me 4 years ago that I spend a lot of time watching daytime television, I would have told them they were mad. But that is how I spend my days now, that's me now, you know I work in front of television with my feet up, that's changed.*	*I am a lot more emotional at times, even now, others will ask how's your health and its quite intense, but that's changed a lot I am more emotional and probably a lot angrier*	*My sons had to deal with everything, they are both living in Europe, (became teary), but them being told, what had happened of course, they were googling tuff and then had to get on planes for 24 hour journeys, that was the hard part, I meant I didn't know what they were going through because I was out of it, but in the aftermath*	*I remember waking up with the shaved head and the big scar all that was a bit hard to deal with, l I mean, the staples, I had lots of staples, and I think this image of me lying in a bed with all these staples and a shaved head, it was horrible, um, you know I was in a bit of a shock" .*	*My office is downstairs, and I live upstairs, even now I will sit on the couch and do work remotely, 90% of the stuff is on computer so its technically full time. I could work 24 hours per day but in half an hour bits".*
ELIZABETH	*The worst part of recovery was not having someone to say okay this is what's happened for you to get past this we need you to do, that, that, that, and that. That's not available… there was a lack of information. I talked to my surgeon about it and he said look were trained to save your life not to give you back your life. I understand, I get it. Well, they are doing their bit and doing the best they can. But there is a big gap between saving*	*They had me trying to tie my shoelaces and getting dressed. I couldn't do my bra up, things like that".*	*My life was full of joy, like I found pleasure I found everything I did, I enjoyed working I enjoyed the people that I work with, I enjoyed going to the gym, my walks with the dog.. I always had that lightness in my heart, so that's gone, it's just gone*	*It was really hard, because I was always the doer and the one that everyone went to if they ever needed help, so for me to be so incredibly ill and that level of danger, it was really hard on them*	*I talked to my surgeon about it and he said look were trained to save your life not to give you back your life. I understand, I get it, well they are doing their bit and doing the best they can but there is a big gap between saving your life and helping you come back to function*	

	your life and helping you come back to function as you feel you should. Um, and that was difficult to find information.				*as you feel you should and that was difficult to find information”.*	
GAYE	*Family, it was family, , actually I didn’t get a lot of information out of the doctors. I wasn’t getting much at all. Even after I came out of rehab, I’ve had nothing since. I feel really let down by the medical profession, it’s like I’ve just been swept under the rug and just you know forgotten about I have had to push early last year I actually pushed to get an MRI, or something done because I was getting headaches. I’ve just really had to push for anything*	*I do get very tired, I get really fatigued quite quickly…, I just push through and when I get home I just sort of lay on the lounge and have a bit of a nap and then an early night. I’m always to bed early*	*When I did see the psychologist and did their tests … I had high range of depression and anxiety….I know I had bad depression. The way he explained it too is because I’ve had a brain injury everything I have is magnified…..I’m making an effort to go out with friends, but I feel like a fake person, coz I’m going out with a happy face, but inside I’m just crying*	*So each time I went in for an operation [5 times] and then when I was in a coma they told my kids that they weren’t expecting me to survive, and if she [Gaye] does she will more than likely have to be in a nursing home*	*All I know now is I’ve got lumps and bumps all over my head and I have two holes. I go to the hairdressers and whenever there is something washing my hair, I have to say to them in case they wonder about all the lumps and bumps……I didn’t look, my head was covered a lot of the time and when I did go into the bathroom I didn’t’ look, coz I felt so ugly and awful, cause they had cracked open my head, it was bits shaven and I couldn’t even stand to look at myself*	
MAREE	*I don’t know the exact number; they didn’t tell me. I kind of asked, but I don’t know how many coils, I just*	*All I really experienced was fatigue, for probably the first 6 months, really bad fatigue and when I get tired, still now when I get*		*I think they thought I was going to die. The doctors weren’t giving them*		*Sometimes when I was really fatigued…… at work the colleagues always*

	know that post MRI's they are very happy with the coils and they've not found any other aneurysms and I basically now just have an MRI yearly now… I don't know, they haven't told me. I asked them how big my aneurysm was, and they pretty well said because it ruptured, we can't really tell, you would think they would have some idea	*tired I might sound a little bit drunk, I start to slur my speech, can't find words occasionally and the only other thing is being a bit more sensitive to sunlight and noise. I didn't even realise the fatigue until I got home. So, when I was in hospital in HDU for a few days with headaches after I'd woken up and then they settled, when I left hospital, I didn't realise how fatigued I was. Coz when I was in hospital, I wasn't doing anything; your meals are brought to you. But when you get home, I would say 10/10 . Like when I tried to make the bed, I would then have to have a rest. Then I would try to do things for an hour and then I would have to rest again……. You look 100% and I say well no I'm not 100% I still get fatigued and I can't overdo it. I still need rest*		*good news, they weren't saying she's going to pull through this. They told them she has a 10% chance of survival and lots of rehab and never being back to normal. They were quite scared and even in the beginning when I returned to work, this was once I was driving again so 6 months down the track, I was on a late shift and hadn't gotten home on time and they were panicking. They were out driving around looking for me thinking I might be in a ditch. So yeah, I think it had a bigger psychological effect on them than me. Having to go to ICU every day for the week and then high dependency and seeing me with tubes and drains and lines coming out of my neck and everywhere.*		*looked out for me, they will always come and go are you okay. Also, with my shifts, as a nurse you might get 7 shifts in a row but now I do get a bit of favouritism with the rosters, I don't get a bad run of shifts or getting fatigued they will give me the lighter load. I tell them you don't have to do that I'll take my share. But someone younger without past medical issues will take the shifts for me. So, no they do look out for me and will ask if I need a hand, its good team nursing. So yes, I do feel that they look out for me*

				So, it was harder on them than me		

Note: PSYCH=Psychological

Appendix CC: Table 21: Comparative Case Study Synthesis – Sub-themes

Table 3 Cross case synthesis of sub-themes

PARTICIPANT	SOCIAL MEDIA	HELP SEEKING DELAYS	LIVING WITH UNRUPTURED ANEURYSMS	MULTIPLE ANEURYSMS
DAVID		On arrival at work one of his work colleagues noticed he looked unwell and suggested they search Google to determine what might have happened to him. They both decided he may have experienced hypoglycaemia, *"I don't know mate. I think you just need a sugary drink I think you've over done it"* and he tried to resolve this by drinking soft drink and taking a shower.		
AMANDA			*I feel responsible and I am very very aware that I have this 3rd one and I want to live a long time, so I am very good at keeping up with my check-ups..because of my first clip I can't have as many MRI check- ups*	*They told me temporal, so that was the first one [dent in head] I have this big bore hole that's the first one and then here is the second one. The differences in recovery between the two was remarkable. The first one was very painful, the second not so painful, and I've got a third one in there now as well. The recovery was better; I remember coming to straight after surgery and feeling overwhelming sense of relief that I was alive*
CAMERON	*I just thought something has got to be done, so I set up a Facebook group and organised an awareness walk*			
ELIZABETH	*I've got a couple of support groups on Facebook that I'm part of for quite some years…. it was great to find them, because they are people who truly understand what you're saying and why you're saying it. There's no judgement. I said to one of them one day you've got to walk a fine line between determination and desperation, and you do need to be kind to yourself. I say that to people all the time, but I don't find it in my heart to do it for myself*		*Well I've still got 2 aneurysms that have not been treated, the artery that ruptured before is bubbled with aneurysm, and I had to have a stent placed in 2015 and there's still one deeper in the brain and the other is on the carotid, but it's not actually in the brain case…I saw another surgeon to discuss fixing the one that is deeper in the brain, but to do that they need to do a craniotomy but, I can't face a craniotomy*	
GAYE				

MAREE				

Appendix DD: Table 22: Triangulation of Case Study / Quantitative Data

Triangulation of data for participants across both studies

Table 4Triangulation of responses from participants

	David	**Amanda**	**Cameron**
PTSS	Consistent	Consistent	Not consistent
Self-Compassion	Consistent	Consistent	Consistent
Social Support	Consistent	Consistent	Consistent
Post-traumatic Growth	Partially Consistent	Partially Consistent	Partially Consistent
Depression	Consistent	Partially Consistent	Partially Consistent
SWB-Life Satisfaction	Consistent	Consistent	Consistent
SWB-Flourishing	Consistent	Consistent	Consistent
SWB- Affect Balance	Consistent	Consistent	Consistent
HRQoL	Consistent	Consistent	Consistent

Note: Consistent = Responses in both studies the same, Partially Consistent = Part of the response is the same in addition to further responses in qualitative study.