Futsal task constraints promote the development of soccer passing skill: evidence and implications for talent development research and practice

Futsal task constraints promote the development of soccer passing skill: Evidence and implications for talent development research and practice

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Abstract

Both anecdotal and research evidence suggests that futsal could be a key developmental activity for soccer. Futsal task constraints (e.g., equipment and playing area) have been argued to promote the acquisition of perceptual-motor skills that positively transfer to soccer and, in turn, improve performance in soccer. However, a lack of empirical evidence in support of this argument limits current understanding.

In this commentary, we discuss three studies that provide empirical support for the benefits of practicing the passing skill with futsal task constraints to enhance performance in soccer. Practicing futsal for more than 1000 h and learning the passing skill with the futsal ball promoted the development of a higher standard of passing relative to practicing with soccer constraints. Futsal task constraints promoted players' education of attention towards information specifying affordances and functional adaptability of the passing skill.

These results should encourage national soccer federations and coaches to strongly consider the systematic introduction of futsal in the early stages of soccer development programs to promote talent development. Future research should examine the optimal balance of soccer and futsal practice, and the timing of specialisation to soccer, adopting the underpinning principles of representative learning design.

Keywords: Skill transfer, football, constraints-led approach, modified sport, modified equipment, skill acquisition

Introduction

The preferred pathway(s) for developing talent/expertise in soccer (association football) is an issue of debate that draws significant attention, given that soccer is one of the richest and highest participation sports in the world (Coutinho, Mesquita, & Fonseca, 2016; Sarmento, Anguera, Pereira, & Araújo, 2018). In this context, futsal, which is 5-a-side indoor soccer (FIFA, 2012b), could be a key developmental activity to promote soccer talent. Elements of the futsal game, such as properties of the ball and dimensions of the pitch combined with a continuous change of the learning environment and sociological factors (e.g., high value of children's play time) are argued to enhance the acquisition of perceptual-motor skills and promote positive transfer to soccer (Araújo et al., 2010; Travassos, Araujo, & Davids, 2017; Yiannaki, Carling, & Collins, 2018a). Furthermore, it has been shown how children in Brazil, one of the highest ranked countries in soccer worldwide (FIFA, 2018), play a large amount of futsal until the age of 10 (Ford et al., 2012).

While the above propositions are appealing, there is a lack of empirical evidence to fully support these views. Current evidence is generally anecdotal, i.e., statements from elite soccer players and coaches (FIFA, 2012a), stories in popular books (Coyle, 2010; Syed, 2010), and a survey has recently shown how high-level soccer coaches and players support futsal as developmental activity for soccer (Yiannaki, Carling, & Collins, 2018b). In this commentary, we present a series of empirical work that provides initial evidence for the benefits of practicing futsal to develop passing skill for soccer. We discuss the implications for talent development, and we conclude with some recommendations for future research.

Passing skill

Passing is a key skill for successful performance in soccer (Rein, Raabe, & Memmert, 2017). It is the means of interaction between teammates to build offensive sequences with the aim of creating scoring opportunities (Grund, 2012), and a team's ability to create efficient passing networks is linked to successful performance (Cotta, Mora, Merelo, & Merelo-Molina, 2013; Sarmento et al., 2017). Passing is a complex perceptual-motor skill which involves the reception of the ball and a pass towards a teammate. Spatial and temporal information about the ball and attacker-defender interactions shapes the emergence of opportunities for passing (i.e., passing affordances) during games (Travassos et al., 2012). A player's ability to adapt their perception and action to continuous changes in these relationships during a game underpins successful passing performance (Corrêa, Vilar, Davids, & Renshaw, 2014; Travassos, Araújo, Davids, Esteves, & Fernandes, 2012).

It has been argued that practicing the passing skill with futsal task constraints can promote a player's ability to functionally couple perception and action, and to adapt to the dynamic changes of informational constraints that occur in a soccer game (Travassos, et al., 2017; Yiannaki, et al., 2018a). Relative to soccer, passing in futsal is performed in a smaller area, with shorter time to act, and with a ball that is relatively easier to control. The landscape of passing affordances in futsal is highly unpredictable (Corrêa, Alegre, Freudenheim, Dos Santos, & Tani, 2012) and changes continuously due to the high-intensity movements of players (Corrêa, et al., 2014). In theory, these futsal specific constraints should encourage players to quickly channel their attention to the key information that specifies passing affordances at every moment, and to quickly adapt to sudden changes during a game relative to soccer.

The similarity of the information that guides action promotes skill transfer between tasks (Pinder, Davids, Renshaw, & Araújo, 2011; Snapp-Childs, Wilson, & Bingham, 2015), and consequently the relative similarity of information that guides the passing action in futsal and soccer should promote skill transfer. Therefore, the enhanced ability of futsal players to perform accurate passes and to quickly adapt to game scenarios should positively transfer to soccer. While the above claims are intuitive, to date, no research has examined futsal-soccer differences in passing skill and whether the skill transfers from futsal to soccer. Here, we discuss the main results and the implications of a series of three studies that examined this issue.

Futsal practice influences perceptual behaviour supporting passing skill

Oppici, Panchuk, Serpiello, & Farrow (2017) showed how youth futsal players and soccer players (13.5 years old on average), who practiced futsal or soccer for more than 1000 h, oriented their attention differently when performing passes during modified games (study 1). Futsal and soccer players performed 5-vs-5 plus goalkeeper games with their respective task constraints, i.e., futsal players performed a modified futsal game with a futsal ball on a wooden pitch and with an individual playing area of 36m^2/player, and soccer players performed a modified soccer game with a soccer ball on a synthetic-grass pitch with an individual playing area of 86m^2/player. These modified games have been designed to be representative of the passing skill in futsal and soccer (for a full explanation see Oppici, Panchuk, Serpiello, & Farrow, 2019). During these games, the players' orientation of attention was assessed using the scene camera of an eye tracking device. Futsal players oriented their attention towards other players' behaviour primarily during ball reception and control, while soccer players primarily oriented their attention to other players when they were not performing passes

but their team was in possession of the ball. These results do not imply that futsal or soccer players' perceptual behaviour is more desirable that the other group, but 'simply' indicate that practicing the passing skill in futsal or soccer influences how players perceive their environment.

Futsal practice promotes transfer of passing skill to soccer task constraints

Oppici, Panchuk, Serpiello, & Farrow (2018a) showed that futsal players positively transferred their passing skill to the modified soccer game (study 2). In this study, the same cohort of futsal players performed the modified soccer game following the same procedure of study 1, and their passing performance was compared to soccer players' performance. Futsal players performed more accurate passes than soccer players, which indicates positive skill transfer from futsal to soccer. Furthermore, the futsal players modified their perceptual behaviour from the futsal (in study 1) to the soccer modified game and oriented their attention towards the ball and other players at critical phases, which, combined with the superior passing performance, indicates that futsal players functionally adapted their perceptual behaviour and passing skill to the affordances that emerged in the modified soccer game.

Futsal ball usage enhances the acquisition of soccer passing skill

While the previous studies examined the effect of futsal in relatively experienced players, a third study focused on the influence of the futsal ball on the learning of soccer passing skill (Oppici, Panchuk, Serpiello, & Farrow, 2018b). The futsal ball has a lower coefficient of restitution than a soccer ball which facilitates the execution and (likely) acquisition of the kicking action (Peacock, Garofolini, Oppici, Serpiello, & Ball, 2017). Following a randomised controlled design, two groups of adult novices practiced 300 passes in response to video stimuli (i.e., 2v2, 3v3, and 4v4 soccer simulations) using

either a futsal ball (experimental group) or a soccer ball (control group). Both groups performed a pre-test and post-test using a soccer ball. The experimental group improved their passing performance – passing and decision-making accuracy – to a greater extent than the control group. Changes in gaze behaviour and attunement to key environmental information that specified passing affordances (e.g., free teammate and free space) underpinned the experimental group's superior performance.

Collectively, these three studies demonstrate how practicing futsal and learning the passing skill with the futsal ball promoted the development of higher passing and decision accuracy which positively transferred to soccer. Education of attention towards key information and adaptability of the passing skill underpinned the transfer process. It must be acknowledged that these studies did not consider how participants' skill level and potential skill level differences between the futsal and soccer groups may have influenced the results (which represent an avenue for future research). Despite this limitation, these studies empirically suggest that futsal can be a key activity to promote learning of soccer skill and development of soccer talent.

Implications for skill learning and talent development

Providing a suitable learning environment is critical to promoting talent development and expertise (Baker and Farrow, 2015; Williams and Reilly, 2000), and, based on these findings, soccer organisations are encouraged to introduce futsal in the early stages of their pathway programs to promote the development of the passing skill. National soccer federations already scale the pitch dimensions, number of players and ball size to the children's age (e.g., Italian Football Federation, 2018), and the introduction of futsal might seem superficial. However, futsal is not a scaled form of soccer, and different elements, such as ball properties, pitch surface, style of play, and contextual variability set futsal and mini-soccer apart (Corrêa, et al., 2012; Travassos, et al., 2017; Yiannaki,

et al., 2018a). The findings of the studies discussed indicate that this difference in constraints needs to be faithfully represented to optimise the development of soccer passing skill. For example, study 3 showed how the futsal ball's coefficient of restitution promoted the learning of passing skill. Practicing 300 kicks with the futsal ball was sufficient to elicit greater improvement than using the soccer ball.

The implementation of futsal may seem costly and logistically challenging for soccer clubs (building a futsal facility is indeed costly), especially for non-professional clubs (some professional clubs have the economic potential to and already are implementing futsal facilities; e.g., Barcelona football club). However, futsal can be played in any school gym and soccer clubs can build partnerships with local schools and implement futsal sessions in their gym. While the potential logistical issue of implementing a futsal program is beyond the scope of this article, the key message for soccer clubs is to find a way to introduce futsal for at least two main reasons: as the studies discussed have shown, futsal can accelerate the learning of soccer skill in novices (study 3) and promote the enhanced development of soccer skill in skilled players (study 2), and in turn contribute to the development of talent. Furthermore, while the studies discussed here did not examine this issue, futsal could prove valid in increasing variability of the learning environment and promote skill adaptability, which underpins expert performance (Seifert, Button, & Davids, 2013). Soccer play activities, whereby contextual variability is increased via a continuous and random change of rules and equipment promote the development of children's psychological, interpersonal, and soccer-specific skills, especially in the early stages of their career (Ford, Ward, Hodges, & Williams, 2009; Hornig, Aust, & Gullich, 2016; Roca, Williams, & Ford, 2012). Play activities typically occur outside of a soccer-club context, e.g., in the street and courtyard (Araújo, et al., 2010). Following the general decline of outdoor play time

(Hallal et al., 2012), children are reducing the time spent playing unstructured soccer (Güllich, Kovar, Zart, & Reimann, 2017). In this context, futsal can represent a suitable solution for soccer clubs to increase the variability of the learning environment to foster talent development.

Recommendations for future research

There is a need to investigate the optimal dose of futsal practice and the timing of a player's specialisation in soccer. Ford, et al. (2012) have shown how youth soccer players from different countries of South America and Europe played different amounts of soccer play activities (one of which is futsal) in their childhood. For example, Brazilian players played almost exclusively futsal until the age of 10, while Portuguese players balanced soccer practice and play. Considering that an optimal mix of domain-specific practice and play underpins the development of soccer talent (Ford, et al., 2009; Hornig, et al., 2016; Sieghartsleitner, Zuber, Zibung, & Conzelmann, 2018), future research should examine how to appropriately balance the volume of soccer and futsal activities, and when players should specialise in soccer. Furthermore, the empirical work reviewed here focused on the passing skill and future research should examine other soccer skills, such as kicking and defending.

This and previous commentaries have discussed the various benefits that participating in futsal could offer to soccer performance. However, it must be acknowledged that futsal may also be detrimental for some aspects of soccer. For example, there is no offside rule in futsal, and players may initially struggle when transferring their movement behaviour to soccer. Furthermore, it is known that expertise level influences how individuals transfer their skills (e.g., Orth, Davids, & Seifert, 2018) and a prolonged participation in futsal may interfere with transfer. Therefore,

204 future research should investigate the negative aspects that futsal may induce to soccer
205 performance and how these pitfalls may be prevented.
206 We recommend the principles of the representative learning design (RLD) (i.e.,
207 coupling perception and action, and sampling perceptual information from the
208 environment towards which the behaviour is generalised [i.e., game]) be used to shape
209 future research (Davids, Araújo, Hristovski, Passos, & Chow, 2012; Pinder, et al.,
210 2011). While methodologies used to date in soccer research have often lacked
211 representativeness (e.g., Serpiello, Cox, Oppici, Hopkins, & Varley, 2017; Vaeyens,
212 Lenoir, Williams, & Philippaerts, 2007), adoption of RLD would ensure stronger
213 generalisation of the results to players' behaviour in the game. Furthermore, it is
214 important that transfer is evaluated on performance achievement – the degree of success
215 when performing a task (Araújo and Davids, 2015). We evaluated transfer using passing
216 accuracy as a criterion measure to assess participants' achievement of the passing skill
217 in the experimental transfer tasks. Furthermore, performance achievement should be
218 coupled with some process measure (e.g., gaze behaviour) to evaluate how changes in a
219 participant's behaviour underpins transfer. Therefore, we recommend future research
220 use a similar criterion measure that provides information on participants' functional
221 behaviour and goal achievement in the transfer task, and use a process measure to
222 evaluate the mechanisms that promote transfer.

223 **Conclusions**

224 This commentary discussed three studies that have shown how practicing with futsal
225 task constraints (i.e., using a ball with a low coefficient of restitution, on a hard surface,
226 and with high pressure from opponents) accelerated the learning and promoted transfer
227 of passing skill to soccer. Futsal constraints encouraged players' attunement to key

information that specifies passing affordances. This empirical evidence should provide researchers and practitioners with greater impetus to continue to explore the direct value of manipulating futsal task constraints to promote the enhanced development of soccer skill. In turn, this should encourage national soccer federations to introduce the practice of futsal in the early stage of their development programs.

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