

The Role of Informal, Unstructured Practice in Developing Football Expertise: The Case of Brazilian Pelada

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Abstract

The aim of this paper is to provide explanation and discussion on how unconventional socio-cultural constraints influence the development of skill and expertise of Brazilian football players. On this basis, the central question of this research is this: What are the influential environmental constraints on the development of perceptual-motor skills and expertise of Brazilian football players? The epistemological and methodological assumptions of the “contextualised skill acquisition research” (CSAR) (see Uehara et al., 2014) are used as an underpinning framework for data collection and organization of material. Drawing upon the notion of ethnographic strategies of inquiry for generating and analyzing data, we used qualitative methods such as contextual analysis, participant-observation, and open-ended interviews. At the micro-level of Brazilian society “pelada” emerges as one of the socio-cultural constraints that shapes the talent of Brazilian football players by influencing the development of their perceptual-motor expertise.

Keywords

expertise, socio-cultural, pelada, practice

Introduction

A fundamental question for many sport scientists and practitioners across the globe is this: How can skill and expertise be best developed? Here our analysis considers traditional approaches to expertise alongside contemporary theories of motor learning in order to understand better the complex interaction between association football, the learner, and the practice environment (Davids, Button, & Bennett, 2008). We specifically focus our attention on Brazil, arguably the country

with the greatest reputation for developing highly skilled football players (Bellos, 2002; Lever, 1995). We consider why Brazil historically has emerged as a talent hotspot producing so many outstanding footballers (see Ankersen, 2013). A key challenge is to identify any unique environmental, historical, and socio-cultural constraints that underpin this ongoing dynasty (Araújo et al., 2010). Alluding to the framework “contextualised skill acquisition research” (see Uehara, Button, Falcous, &

Davids, 2014), we adopt the bioecological model of human development proposed by Bronfenbrenner (2005) in order to understand how various interacting constraints shape the talents of many Brazilian footballers. In particular, we identify the customary practice activity of “pelada” (roughly defined as informal “pick-up” games) as a powerful influence upon skill and expertise development.

Over the last decade or so, the first author returned to his roots in the São Paulo region of Brazil on numerous occasions seeking to understand how and why pelada may have contributed to the development of a number of current and ex-elite footballers. Here we offer qualitative evidence resulting from observations and interviews with Brazilian players and coaches that help us to situate pelada as an enabling socio-cultural environmental constraint upon the development of football talent. Finally, we consider which scientific principles of practice are implicitly embedded within pelada and comment on how they might contribute to the emergence of a certain style of football movement common to many Brazilian players.

Methodology

Given the socio-cultural nature of the present study, data was inductively generated and analysed through the lenses of qualitative interpretative paradigm. More specifically, this paper builds on the investigation of Uehara et al. (2014) of the way in which the framework “contextualised skill acquisition research” (CSAS) is used to analyse key socio-cultural factors that affect development of expertise of perceptual-motor skills of Brazilian football players. Historical contextual analysis, participant observation, and unstructured interviews were the three methods used for data collection.

Historical Contextual Analysis

For this type of qualitative research, a contextual analysis is useful to investigate the socio-cultural context in which a phenomenon has been historically constructed. The analysis of the historical, economic, political,

sociocultural context in which acquisition of football expertise in Brazilian players occurs was significant for the present investigation. Indeed, the historical contextual analysis provided rich information to inform and guide the two other methods; that is, participant-observation and interviews. For example, the contextual analysis required us to reconstruct a number of socio-cultural and political-economic sites of articulation—that is, how these pressures and contexts interact to shape patterns—of Brazilian football.

Participant Observation

Participant observations, or sometimes observations only, were performed in São Paulo, Brazil, in 2011 and in 2017. Through my contacts as a former player in this region and as a current football agent, I gained access to a professional football club called Paulista FC, a football school affiliated with São Paulo FC, to a football pelada organized by a former professional player of mine, and to a football pelada in a favela called Vila Ana. I also took notes from children playing informal football in parks and streets of my home town Jundiaí.

The parameters around the chosen locations for data collection were based on contemporary commentaries regarding on history of Brazilian football, which shows that many successful players emerged from underprivileged suburbs around Brazil. Before they were scouted and sent to a club, they made and improvised their own playing fields, whether on the street, waste ground, or beach (see Taylor, 1998; Goldblatt, 2006).

To scrutinize the topic and generate rich and relevant evidence, I was prepared to collect data from whatever and whomever provided an opportunity, be that be from structured or non-structured settings, professional or non-professional people related to football. Fieldwork practice was limited, however, by the funding available and by accessibility in Brazil. In this sense, growing up in the city of Jundiaí, a province of São Paulo, I was privileged to gain access to football professionals and clubs in the local area that would not have occurred in other regions. I started with two key gatekeepers (i.e.,

contacts) who helped to open the door to this world by introducing me to the right people. Through a snowball sampling technique (i.e., one person indicates others) accessibility was further expanded (see Patton, 2002).

Unstructured Interviews

For the interviews, thirteen adults with different football related backgrounds were identified based upon their extensive experience of Brazilian football. Due to ethical reasons, especially in relation to the principles of protection and confidentiality, the identity of the participants has not been revealed. Instead, participants' names have been randomly listed with initials as: Mr. A, Mr. B, Mr. C, Mr. D, Mr. E, Mr. F, Mr. G, Mr. H, Mr. I, Mr. J, Mr. K, Mr. L, and Mr. M. This study was approved by the Human Ethics Committee of the participating institution, and all participants signed the consent form to participate in this study.

Analytical Procedures

Guided by the qualitative analytical steps proposed by (Creswell, 2009), the first author read and organized all raw data in order to have a general sense of the information and to reflect upon the common findings and their meanings. Interviews were transcribed, and field notes were typed. Both materials were then translated from Portuguese to English. Although the first author was mainly responsible for the translation, a Brazilian academic teacher also helped with the translation. Initial analysis of the interview transcripts promptly indicated "pelada" as one of the relevant constraints that fit the microsystemic contextual dimension of the bioecological model (see Bronfenbrenner, 1979, 2005; Uehara et al., 2014). Bear in mind that other Brazilian socio-cultural constraints such as poverty, *malandragem* (i.e., cunning, street smart), etc., have also emerged from the investigation in question. However, due to the complexity of the issue, these findings will be best presented elsewhere. On this note, we would like to clarify and re-emphasize that pelada is not the only factor but rather just one among many different socio-cultural constraints that may facilitate expertise acquisition. In other

words, there are many different paths to be a greater footballer (see Menuchi, Moro, Ambrósio, Pariente, & Araújo, 2018; Sarmento, Anguera, Pereira, & Araújo, 2018; Williams & Reilly, 2000)

Describing Pelada

Many of Brazil's best football players (e.g., Garrincha, Pelé, Zico, etc.) have reported that they played pelada frequently as youngsters (Araújo et al., 2010) and such high-profile anecdotes prompted us to probe more deeply into the unique nature of this style of practice. Pelada is a style of "pick-up football" where, regardless of the location, players organize practice games themselves (without coaches) in an informal manner (Araújo et al., 2010). In Brazil, it is a common term referring to different contexts and discourses such as amateur football and/or professional football games of low standards (Pimenta, 2009, 2013). It is also used to describe a spontaneous, unsupervised football game that may be played in the streets, schools, backyards, and wherever the players' hearts desire (Vilela, 2009). Literally, pelada is a Portuguese word that can be translated as "nude." As it pertains to football, there are several tentative explanations about its origin such as its being a referral to participants playing with bare feet and/or with no shirt. However, a more plausible explanation alludes to non-grassy, thus, bare or naked environments where pelada may take place (see Pimenta, 2009, 2013; Vilela, 2009). Here, we suggest that it signifies playing football in the naked environment.

Establishing where and when pelada began is a difficult, if not impossible, task. It is likely that informal versions of association football were practiced in 18th century England at public schools where the early roots of the sport were sown (Goldblatt, 2006). The Englishman Charles Miller is commonly credited with translocating football to Brazil in the early 19th century, and, in a class-driven society where corruption, urbanization, and slavery were rife, it seems likely that pelada emerged and flourished here as a popular pastime.

Pelada is usually played outdoors on irregular surfaces (e.g., streets, beaches, yards, makeshift grounds, courts, etc.) where the boundaries of the playing area are often marked or created impromptu, although it may also be played in demarcated venues such as soccer fields and futsal courts (see Figure 1). In addition, pelada is played under different rules and norms to other more formal versions of football such as futsal. For example, the number of players per team depends on the number of people present to play. Age and gender are not constraining factors, and players of all ages and both sexes typically play together.



Figure 1. Pelada in Dois Riachos (Alagoas, Brazil). This is the exact context where the six-times FIFA award winning Brazilian player Marta learned to play football. Photo: Mauro Graeff Junior.

A common way to assign players to teams in pelada is for the most respected or senior players present to select the teams, so that the skill level of each team is relatively well matched to enhance the competitive nature of the informal game. If the number of players present is deemed too high for the size of the playing area, then more than two teams are formed. As an example, if thirteen players were present to play in an area of similar dimensions to a futsal court then two teams of five and one team of three players would be initially formed. In this case, the two teams of five would play against each other first, and the team of three would have to wait, with games lasting about 10 minutes or after a first team has score two goals. The winning team continues playing until they lose, then the team of three would be able to choose two players from the losing team in the

first match. In the case of a draw after 10 minutes, the team that has been in the field for the longest keeps playing. This pattern would be repeated until changes had to be considered, such as when more people turned up to play.

In further investigation of this issue, we can then ask, “What is it about pelada that enhances skills?” The answer will become clearer as you read this article, but in a nutshell, it is about adapting to varied environmental constraints such as playing surfaces with different textures, dimensions, slants, and material composition, as well as playing with people with different skills, body types, and experience in football. As a result, many different motor competencies such as postural control, balance, proprioception, agility and adaptability in running, stopping, twisting and turning on different surfaces and areas of play are enhanced by playing pelada. Ultimately, this practice leads to the adoption of different styles to engage in the same actions, refining as a result the football skills and expertise of Brazilian players.

Developing Football Expertise from a Coaching Science Perspective

A number of different theories have been proposed in the expertise literature to explain how practice can facilitate achievement of excellence in sport (see Baker & Farrow, 2015; Davids & Baker, 2007; Farrow, Baker, & MacMahon, 2013). An initial focus has concerned the amount of practice time required to “get to the top.” For instance, Newell and Rosenbloom (1981) proposed the power law of practice as the basis for performance improvement. This much-cited model demonstrated that predictable increases in performance level are associated with extended practice periods. Subsequently, Ericsson and colleagues (e.g., Ericsson, 1996; Ericsson & Charness, 1994; Ericsson, Krampe, & Tesch-Romer, 1993; Ericsson & Williams, 2007) reinforced the idea that expertise is attainable as a function of deliberate, prolonged practice. Deliberate practice is predicated on two propositions: (1) Expert levels of performance are achieved after an extensive involvement within a domain—the putative 10-year rule; and

(2) Innate talent may influence some of the defining characteristics of expertise, but the core of expertise attainment relies on an individual's direct engagement in relevant activities (Ericsson et al., 1993; Ward, Hodges, Williams, & Starkes, 2004).

Coincidentally, the dramatic proliferation of football academies created by professional football clubs in the latter half of the 20th century may be associated with the widely held belief that young players need to be exposed to large volumes of intense practice and structured "quality" coaching in order to reach elite standards of performance. For example, the (English) Premier League's "Elite Player Performance Plan" refers to constructs such as a "performance clock" and "player chronology," and the "10,000-hour model" explicitly, in the development of young footballers (Premier League, 2011). Ward et al. (2004) confirmed that age-group academy footballers typically spend a relatively larger volume of time engaged in various types of practice than their respective sub-elite age-group players.

However, while pervasive in its influence (see best-selling books such as *Peak* (Ericsson & Pool, 2016), *Outliers* (Gladwell, 2008), and *Bounce* (Syed, 2011), the notion of accruing large volumes of practice time as the key determinant of success has been challenged by many academics. For example, Macnamara, Moreau, and Hambrick (2016) highlight that deliberate practice explains only 18% of expertise in sports and only 1% in elite level sport. Further research pointing to the flaws in the deliberate practice concept has identified the significance of "deliberate play" (e.g., Côté, Baker, & Abernethy, 2007; Côté & Hay, 2002). With deliberate play, expertise is not attained by simply accumulating a putative number of hours of practice, but by being exposed to a range of "game-like" practices (Côté et al., 2007). Deliberate play involves activities that foster adaptive skill, and the focus is on enjoyment rather than skill improvement per se.

Recognizing the futility of such polarized debates, Côté and Fraser-Thomas (2007) proposed that the process of expertise attainment is dependent on numerous factors

including the quality and quantity of coaching, playing, and practicing. Current evidence suggests that both *quantity* and *quality* of practice matter in order to excel at any activity (see Drake & Winner, 2018). However, a relevant question is what scientific evidence, if any, (see Partington & Cushion, 2013) informs football coaching practice? In fact, while many practice activities are accepted by coaches as effective, Williams and Hodges (2005) noted that many traditionally-held myths about football practice are "at odds" with research evidence. For example, many practitioners traditionally believe that "giftedness" or innate attributes are essential precursors for developing players, contradicting the deliberate practice model which suggests that an athlete's motivation to succeed or willingness to commit to intense, structured practice are more important factors than initial skill or talent (Ericsson, 2007). Also many football coaches adopt direct, prescriptive coaching strategies (i.e., frequent use of demonstrations, verbal instructions, and corrective feedback) in the belief that they must convey their knowledge of the game to learners (Partington & Cushion, 2013), however, the limitations of prescriptive coaching strategies have also been widely documented in recent times (e.g., Chow, Davids, Button, & Renshaw, 2015; Davids et al., 2008) For instance, the common coaching strategy of demonstrating techniques (e.g., idealized versions of an action) can over-constrain learners and restrict the emergence of creative and individualized performance solutions.

In response to dissatisfaction with traditional approaches, a number of "alternate" coaching approaches that differ in both philosophy and theoretical underpinnings have emerged. For example, the Teaching Games for Understanding movement in Physical Education (Bunker & Thorpe, 1982) and Game Sense in sports coaching (den Duyn, 1997) demand a problem-solving style of learning presented in the form of modified games. The coaches' role is to modify games to match the current abilities of learners and where appropriate ask questions and reinforce effective solutions as the learner

progresses. With some similarities to this approach (see Renshaw et al., 2016), the Constraints-Led Approach (CLA) has been advocated as a theoretically valid approach to coaching in sport, and similar to game sense emphasizing a more “hands-off coaching role” to encourage learners to search for and discover themselves individual-specific movement solutions.

Significantly, both pedagogical approaches place the learner at the center of the learning process (as opposed to the coach) and recognize the value of representative learning design in practice activities (Pinder, Davids, & Renshaw, 2012) that promote skill learning (for a discussion about their similarities and differences see Renshaw et al., 2016). Another popular form of practice that is harmonious in many ways with both CLA and Games Sense is Small-Sided and Conditioned Games (SSCG) (see Clemente, Wong, Martins, & Mendes, 2014; Davids, Araújo, Correia, & Vilar, 2013; Vilar, Duarte, Silva, Chow, & Davids, 2014). SSCGs are specific practice activities typically conducted in small playing areas with fewer players that nonetheless induce high intensity training demands in terms of physiological, technical, and tactical development (Davids et al., 2013; Praça, Folgado, Andrade, & Greco, 2016). As the science of coaching has developed over the last 30 years (see Baker & Farrow, 2015) contemporary approaches such as these are becoming more frequently used on football training grounds from grass roots to elite levels.

In addition to micro-level practice variables (e.g., Davids, Gullich, Shuttleworth, & Araújo, 2017) discussed above, it is also important to note the influence of other “macro-variables” such as physical and psycho-social environment constraints on the development of football expertise (see Baker, 2003; Baker, Côté, & Abernethy, 2003; Petlichkoff, 1993). In drawing attention to this issue, an increasing number of studies have highlighted the importance of physical as well as socio-cultural environmental constraints on skill acquisition (Krebs, 2009; Uehara et al., 2014). The mechanisms as to how socio-cultural constraints act specifically to impact skill acquisition are of interest. For

example, one might question why certain nations have a consistent and outstanding record of producing talented athletes in certain sports. These countries include Australia with cricket, Canada with ice-hockey, Scandinavian countries with skiing, Jamaica with sprinting, East African states with endurance running, New Zealand with rugby union, America with basketball, and Brazil with football. Each country/region has a long and rich history associated with consistently producing elite athletes in specific sports.

Authors such as Ankersen (2013) and Larsen, Alfermann, Henriksen, and Christensen (2013) have begun to address these questions by examining key features of so called “talent hotspots” and “athletic talent development environments” respectively. However, there is still limited understanding of the underpinning contribution of socio-cultural constraints. With this in mind, our questions of interest are as follows: What are the unique, environmental (socio-cultural and historical) constraints that enable the development of specific sport expertise? Or, on an individual basis, what are the unique, environmental (socio-cultural and historical) constraints that enable the development of high calibre of perceptual-motor skills of Brazilian football players?

Under the umbrella of “ecological dynamics,” it has been argued that expertise in sports emerges from the interaction of the environment constraints with other variables, such as the task and individual constraints (Araújo et al., 2010). Bronfenbrenner (1995) proposed a model which may help to strengthen the theoretical basis of ecological dynamics. In general terms, Bronfenbrenner’s bioecological model conceives human development as a function of the interaction between nature and nurture (see Krebs, 2009); that is, between individual and environmental constraints. In this model, environmental constraints have been organized into four different systems including the microsystem, the mesosystem, the exosystem, and the macrosystem (for further details see Araújo et al., 2010; Uehara et al., 2014). Moreover, the context interacts with the person, in what Bronfenbrenner called

“proximal processes,” which vary over time (Araújo et al., 2010; Bronfenbrenner & Morris, 2006). In the rest of this article we outline a framework that aligns key concepts in ecological dynamics and the bioecological model to guide understanding of skill acquisition and sport expertise enhancement.

To elucidate this integration, we turn to Brazilian football as our research vehicle, as Brazil provides such rich and apparently pervasive environmental constraints upon footballers. Accordingly, we will first highlight the role of Bronfenbrenner’s microsystem under the context of pelada, and subsequently discuss evidence of the potential benefits of pelada from interviews with developing Brazilian footballers.

Pelada as a Microsystem that Enhances Skill and Expertise in Brazilian Football

The microsystem of Bronfenbrenner’s bioecological model of human development helps us describe a specific activity under consideration, including the relationship between the developing person and his or her roles, and interpersonal relationships with the immediate physical and social environment (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 2006), such as that of pelada. The agglomeration of many microsystems forms what Bronfenbrenner defined as the mesosystem, where a person transits from the microsystem under consideration (pelada) to another (such as family, school, clubs, and neighborhood). In a non-linear fashion, the microsystem and/or mesosystem is/are linked directly to much broader contexts of a society such as the exosystem (i.e., other microsystems that the individuals under analysis do not frequent, but that influence how people behave in the microsystem under consideration) as well as to the macrosystem such as socio-cultural mores and historical affairs. This idea could be exemplified by a local political decision taken in a regional council assembly—the exosystem—to build a supermarket on an open area where local children undertake the pelada—the microsystem. In other words, a decision made at

the exosystemic level directly influences the microsystem under consideration (pelada). This in turn affects the macrosystem of the nation under consideration (Brazil), given that pelada has been part of the culture of Brazilian society for centuries.

Indeed, many of the Brazilian footballers we interviewed revealed that their interactions with their immediate physical environment as children played an important role in their football expertise development. In fact, several players grew up in poverty and as a result reported having to draw upon whatever physical means and resources they could acquire in order to play football. For example, a lack of financial resources for many parents meant that they could not send their children to organized football clubs or academies and hence the only outlet to play football was via playing pelada in the streets. Through regular exposure to unsupervised play, some of the players also reported a wide range of outdoor play activities (such as climbing trees, swimming in lakes). Such activities reputedly encourage adaptive skills, creativity, mental and physical well-being, and ultimately the overall enhancement of body movement coordination (Louv, 2005).

Interestingly, pelada does not appear to “belong” solely to less privileged children (i.e., in the favelas where children play for fun and to escape the harsh realities of poverty). From observational analysis in São Paulo (Uehara, 2014), pelada was equally as evident among the young players who had been selected to train at football academies. In Brazil, once children reach the age of around 14 years, the best players are typically scouted and invited to play for a federated (i.e., professional) club, and academy players regularly engaged in spontaneous modified games in between and sometimes during formal practice sessions. Furthermore, the academy coaches commonly reported integrating elements of pelada into their practices. A good example is the coach of São Paulo Football Club (SPFC), Mr. A, one of the most successful youth coaches in Brazil, who brought to his coaching methodology the essence of pelada:

“The key is to bring back some elements of pelada such as fun, enjoyment, and most important to give freedom so players feel comfortable to express themselves. In doing so they can try things that they have seen or new skills that they want to invent.” (Interview, February 8, 2011)

From this view, it can be noticed that the lack of unstructured practice is limiting the development of perceptual motor skills of Brazilian players which in turn limits the ginga (i.e., body sway) way/style that Brazilians used to play. When deviating from the ginga way of playing, the Brazilian national football team struggles to achieve greater success, and this leads to criticism that the team should return to a style that is consistent with its cultural identity. For instance, many criticisms and debates alike aroused a demand in Brazil to bring back the Brazilian traditional way of playing football after the infamous defeat to Germany by 7 – 1 in the 2014 FIFA World Cup. Pelé, for instance, said, “Brazil needs individual ginga to return to their former best” (see Hirshey, 2016).

Uehara (2014) observed how Mr. A often manipulated task constraints in novel and creative ways. For instance, players improved their perception of information in training by playing in small-sided games without bibs to identify team membership, instead wearing head bands. This coaching strategy forced players to look up and scan the field when trying to pass or dribble with the ball. On occasion, Mr. A also used a rugby ball so that the unpredictable bouncing forced players to change direction faster. Resulting from his coaching strategies, many Brazilian superstars (including Kaká among others) performed at the highest level of football worldwide.

The interviewees Mr. F, Mr. E, and Mr. G also advocated the importance of bringing the essence of pelada to their coaching methodology. Mr. F (former SPFC fitness trainer) noticed that some of the youth players

who came from big cities were lacking general motor competencies (e.g., postural control, agility, balance) compared to those players who came from the countryside. So to provide some of this experience within the setting of his club he organized some unusual physical training, such as climbing fences and trees. In a similar vein, Mr. G and Mr. E have developed an online football coaching course called University of Football in which pelada is evident within their coaching philosophy. One of Mr. G’s main objectives is to “rescue” the Brazilian culture of playing football, as Uehara (2014) indicates in the discussion below:

Uehara: Do you think our Brazilian football players are still as skillful as they were before?

Mr. G: I think we are still very skilful, but with some reservations. This is because we are making two major mistakes. One is because we are losing our culture of playing with that body expression due to the lack of natural learning environments, as a result of urbanization. Second, it is because such natural learning environments have been occupied by soccer schools that are not qualified in methodological understanding of our culture. Their training is too mechanized, losing the essence of learning the game in a natural way.

Uehara: Given that this process of urbanization is irreversible and the number of soccer schools tends to grow, what can be done so that we can keep developing players with high calibre of perceptual-motor skills?

Mr. G: We need to bring back the essence of pelada, street soccer, to the training in soccer schools. But we can make it even better than playing pelada alone. We can introduce educational elements to it. This is one of the objectives of

University of Football. This is what we are proposing. (Interview, February 10, 2011)

Highlighting these macro-level issues of urbanization and soccer academies may provide some explanation as to why fewer players emerge from big cities like São Paulo than they used to. Many experienced coaches and managers that Uehara (2014) spoke with (e.g., Mr. A, Mr. B, Mr. K) confirmed that the majority of their players originate from the country rather than cities. This is in line with other team sports; e.g., Aussie cricket in which the majority of its players emerge from the countryside (Phillips, Davids, Renshaw, & Portus, 2010). Of all the interviewees who played at the top level of professional football, only two (Mr. H and Mr. A) grew up in big cities like São Paulo. However, the relevance of this data today may be questionable as it was more than forty years ago when they were still able to play a lot of pelada as they highlighted above. The four others interviewed—Mr. K and Mr. M (ex-players) and Mr. J, and Mr. L (current players)—who successfully reached professional standards of football, grew up in rural settings.

This trend is in line with recent research on “birthplace effects” indicating that individuals from the country, towns, and small cities are more likely to become professional athletes

compared to those growing up in large cities (see Bruner, Erickson, Wilson, & Coté, 2010; Carlson, 1988; Côté, Macdonald, Baker, & Abernethy, 2006; Davids & Baker, 2007; Phillips et al., 2010). Côté et al. (2006) pointed out that the optimal city size for athletic development ranges between 1,000 and 500,000 people and athletes from such communities may receive more social support and have greater amount of safe and recreational space available (see Davids & Baker, 2007). This may lead to a greater amount of practicing or playing, resulting in higher probabilities of attaining elite level of performance.

Contextualizing Pelada

In addition to high-level and talented players, Uehara interviewed several prominent football coaches for their insights into pelada’s contribution. From Uehara’s observations of Brazilian footballers and coaches, such as those recorded in Table 1, it can be seen that practice via pelada is widely regarded as a key factor underpinning skill development. For instance, interviewees commonly cited influential factors such as the following: controlling the ball with bare feet on an uneven surface using different parts of the feet, seeking space to play, thinking quickly to compensate for a lack of physical strength and in turn to avoid injuries, and so on.

Table 1. Selected quotes from managers and coaches interviewed highlighting their experience of playing pelada (list of interviewees is organized alphabetically by their initials).

Coach and Brief Biography	Key Quotes
Mr. A: Considered one of the best youth coaches in Brazil and works for São Paulo FC. He has coached many football icons such as Miller, Kaka, Oscar, Lucas to name but a few.	Where I grew up, the streets were not asphalted so we just put blocks as a mini goal and played pelada a lot.
Mr. B: Was the financial advisor of SPFC when they won two Club World Cups in Japan in 1992/93. He is now a FIFA agent working primarily in managing the careers of young players.	Many football players emerged from the countryside of São Paulo and of Brazil in general. This is because there was more space, and everything was cheaper. The streets themselves were football fields. There was no asphalt. We just placed some rocks as small goals and played with balls made of socks.
Mr. C: Widely considered one of the most successful football goalkeeper coaches in Brazil. Currently he works for Paulista Football Club.	I played a lot of street soccer. I believe that street soccer with all those levels of difficulties such as stones, mud, and so on, forces you to become more skillful in terms of controlling the ball.

Coach and Brief Biography	Key Quotes
<p>Mr. D: A former professional goalkeeper coach in Brazil, he finished his career and gained a degree in physical education. Currently he works as a personal trainer in Queenstown, New Zealand.</p>	<p>As any other Brazilian boy, I started playing on the street. I was younger and played with adults and also with my mates of my age. But age was not a problem. It was a pick-up system; that is, whoever was present and keen to play was picked up.</p>
<p>Mr. F: He is a highly experienced fitness trainer with national and international experience. Among the top clubs, he worked for the São Paulo Football Club and Paulista FC.</p>	<p>It was invaluable. We played all bare foot. This makes you kick the ball in a different way, to protect yourself. Until we learned, we lost a lot off the tips of our toes.</p>
<p>Mr. H: He was a well-known footballer in the 1980s playing for São Paulo FC. In 1978 he was in the Brazilian National squad to play in the World Cup in Argentina. Currently he is the youth coach of São Paulo FC.</p>	<p>In my childhood it was normal to play pelada bare feet. Fields with grass were hard to find. We played in the parks and used the trees as goal posts...and there we played a lot...</p>
<p>Mr. I: A historian with PUC-SP, he has a master's degree from the same institution, a Ph.D. in history from the University of São Paulo, and is a researcher at the Laboratory of Studies on Ethnicity, Racism and Discrimination at USP. He specializes in Nazism and anti-Semitism. As a professional journalist, he has worked for the newspaper O Estado de S. Paulo since 2006, after 14 years in Folha de S.Paulo. He is the author of the books <i>Football Explains Brazil</i> and <i>Nazis Among Us</i> published by Editora Contexto.</p>	<p>As I wrote in my book, the British people in Brazil played with a proper soccer ball made of leather; they had proper field with appropriate goal posts. In contrast, the underprivileged boys (socio-financial poor children) played on the streets with balls made of socks. Therefore, they had to develop skills as a necessity to avoid injury.</p>
<p>Mr. J: He is a young football player who has just turned professional. In 2011, at only 17 years of age, he was the top scorer of the Paulista FC professional team. Due to his talent, The International team from Southern Brazil contracted him. In 2012 he was selected for the U20 Brazilian National Team squad to play a tournament in Argentina.</p>	<p>As a kid I played every day on the street and on makeshift grounds. It was great fun.</p>
<p>Mr. K: One of the most successful football coaches in Brazil, the last prize he received was the award of best coach of Paulista League when he coached Guarani Football Club. However, he is well known for winning the same league in 1988 with an underdog country side team called Mogi Mirim from which emerged Rivaldo, one of the biggest football icons in Brazil.</p>	<p>I played all kinds of football when in my childhood. I played in bare feet so to control the ball was much more difficult because it hurt my feet. But I believe that all the most skillful players have a background where they played bare feet too.</p>
<p>Mr. L: He played for the youth team of Paulista and soon was contracted by the powerful Gremio FC in 2012.</p>	<p>We started on the street, in the footpath, in the sand, in the parks; all bare foot.</p>
<p>Mr. M: He was born in Brazil but became a naturalized Japanese. He started his football career at São Paulo FC in Brazil before moving to Japan where he played for different clubs such as Kashiwa Reysol, Honda, Bellmare Hiratsuka, Nagoya Grampus, FC Tokyo, and Avispa Fukuoka. He was part of the Japanese National Team in the 1998 World Cup. As a coach he started his career at Paulista FC in 2005, then went to different clubs and currently is back coaching the Paulista FC for the second time.</p>	<p>In Franca we played pelada on the streets. From the age of 6 to 18, [it] was all mixed. We know that football has 17 rules. In my street there was just one. That is, if you don't see blood there is no foul. This makes you smart to play. I knew that if I bumped into a boy of 15 years old I would get injured so I had to avoid physical contact by checking all the time my front and my back. This makes you develop the ability to think quick and seek for free space to play.</p>

Based on these insights, the underlying characteristics of pelada do not quite sit comfortably under the conceptual scope of deliberate practice, nor with deliberate play (see Araújo et al. 2010; Côté et al., 2007; Côté & Hay, 2002). Pelada is not coached or planned or supervised by adults who interfere and start to prescribe ways to perform skill. In contrast, it represents unstructured or informal play, and it is typically participated in for achievement sake alone. That said, results from Uehara's study (2014) show that the principal difference between pelada and deliberate play (or practice) is the highly intense, competitive nature of Brazilian pelada. In other words, while the idea is to play pelada for fun and intrinsic enjoyment, nobody wants to lose. In this way, competition and fun can still be the integrated focus of the engagement in Pelada. As one ex-player (Mr. M) graphically points out:

“In Franca we played pelada on the streets. From the age of 6 to 18 [it] was all mixed. We know that football has 17 rules. In my street there was just one. That is, if you don't see blood there is no foul” (Interview, February 16, 2011).

To further exemplify this issue, in a recent trip to Brazil (January 2017) a colleague of Uehara's (former Brazilian professional football player), took him to play and observe (participant observation) pelada with his mates in São Paulo. Based on the number of players available, four teams of five players were formed and the duration of each game was based on 10 minutes or when two goals have been scored. As is typical, the player's ages ranged from 15 to 60 years old. The level of skills and experience also varied from amateur, former professional, to professional players.

What surprised Uehara most was the level of competitiveness involved in these social games. The classic example was the case of a 20-year-old professional player who was playing pelada with the same level of determination to win as if he was playing “Copa Libertadores,” a competition in which his professional team Grêmio (one of the traditional clubs in Brazil) has been recurrently qualified to compete. Bear

in mind that the notion of the competitive nature of pelada also encompasses other aspects of Brazilian football such as flamboyance, flair, improvisation, and creativity. As such, the intrinsic motivation of players is not only based on winning, but winning with style, and to achieve that everyone competes hard. In the case of losing, the consequences are considerable: for instance, waiting for their turn to play again or being subjected to jokes and ridicule.

In summary, Brazilian pelada is a practice activity that sits somewhere on the continuum between deliberate practice and deliberate play, probably located at the unstructured end. While it is played predominantly for fun, an intense, but intrinsically focused, competitive atmosphere often unfolds. In Brazil, pelada's informal organizational style is sharply juxtaposed against the player's desire to win “at all costs.” Indeed, pelada appears to provide a fertile learning environment where children can emulate their playing heroes on the one hand, yet develop valuable “street-smart” attitudes and behaviors on the other hand. A Brazilian player typically grows up practicing pelada in all sorts of different environments such as the street, beach, grass, and gym and is highly valued by many players and coaches. In the next section we consider more closely what scientific principles of practice may support the effectiveness of pelada as a developmental activity.

Scientific Principles of Practice that Underpin Pelada

Pelada allows learners to engage in many hours of unstructured, holistic practice which enables them to acquire often unique and innovative skills, requisite mental toughness, and the physical conditioning that underpins expertise in football. For example, unstructured practice opportunities without the presence of evaluative coaches signify that players can try things and make mistakes without admonishments from coaches and parents. Learning in these fun environments can lead to a lifelong love of games (Renshaw & Chappell, 2010). Through this “romance” with the game (Bloom, 1985),

players can develop the intrinsic motivation needed to undertake the significant amounts of play and practice necessary to develop high-level performance skills (Côté, 1999; Renshaw & Chappell, 2010). Capturing these emotion-provoking conditions within practice is the essence of representative affective learning design, a general learning principle which has recently been advocated by Headrick, Renshaw, Davids, Pinder, and Araújo (2015) among others. Pelada seems to help “light the fire” in terms of children’s imaginations and motivations to improve, which is undoubtedly a crucial component in developing the resilience needed to excel (Chappell, 2004; Côté, 1999; Renshaw, Oldham, & Bawden, 2012).

In pelada, essentially no skill is ever repeated, but instead, as Sheets-Johnstone (2009) describes, “a kinetic dynamics unfolds that is at once both familiar and yet quintessentially tailored kinetically to the particular situation at hand” (p. 765). Pelada provides children with the perfect environment to ensure that variability is an intrinsic feature of skilled motor performance, providing the flexibility to adapt performance in different situations (see Araújo, Davids, & Passos, 2007). The fluid negotiation and reconstruction of rules that occurs in pelada games (Pimenta, 2009, 2013) typifies the shared responsibility of players to monitor the playing environment and regulate each other’s actions in the absence of an authoritarian or controlling figure. There is some indicative evidence in the sport expertise literature concerning athletes who have received little systematic and structured coaching during their development (Araújo et al., 2010; Phillips et al., 2010). For example, (Salmela & Moraes, 2003, 2004) identified that many talented Brazilian football players aged 16 to 17 years, tend to have received little, if any, structured coaching in programs, in contrast to a multitude of unstructured football experiences played on the streets. In a series of interviews with elite players and coaches, Garganta and Fonseca (2008) provided qualitative data on the general perception that unstructured football played on the streets had a crucial role in learning game skills for these elite players. The possibilities for

free exploration, creativity, and goal achievement under unpredictably variable performance conditions were considered essential for developing football expertise by these expert coaches and players (see Araújo et al., 2010, for other illustrative examples of street football).

We should acknowledge that, while the self-organizing tendencies of teams can be promoted through pelada, this environment may provide negative as well as positive affordances (Gibson, 1979, 1986). They could potentially foster undesirable technical/tactical and even negative social/affective outcomes for less able or undisciplined players in the complete absence of any formal coaching or adult supervision. While a fair amount of “self-policing” of behaviors is natural to pelada, it may on occasion be necessary to introduce an impartial referee or mentor. Usually this is done by a person who is waiting with his team for their turn to play. The informal nature of this intervention seeks to provide a minimal amount of intervention (just enough to foster a competitive but not unenjoyable atmosphere). Imposing too much structure and regulation upon pelada would be counterintuitive to its relaxed and improvised nature.

Moreover, in pelada the players are active designers; they are empowered to collectively design the unfolding game to enhance its challenge and the need for participants to adapt to changing constraints. In contrast, in structured practices, players are mere receptors of instructions or of a coach-led task design. This active and empowering characteristic of pelada, is a key constraint to keep, even if some structured practice is presented. Rather than simply replacing the teacher or coach, perhaps the optimal approach is to blend the essence of pelada with semi-structured practice activities, as is being recommended in contemporary teaching approaches such as the constraints-led approach (Davids et al., 2008), sport education and teaching games for understanding (Alexander & Penney, 2005). Also, engagement in learning could be facilitated by encouraging performers to actively suggest ways that a practice design might be made more challenging and beneficial.

Historically, from a motor learning perspective, the ideal conditions for practice of skills have been viewed as being specific to the conditions in which the skill/s must be reproduced (Proteau, Marteniuk, & Lévesque, 1992). In stark contrast, the range of informal conditions present in pelada appears to provide perceptual-motor expertise which is adaptable to different playing environments. Indeed, emerging evidence from the motor learning literature is recognizing the potential value of manipulated constraints for skill development (see Table 2). Changing factors such as pitch

surface, size, player density, and even the ball can each promote different kinds of adaptive behaviors as players reorganize their skills under the new constraints. An interesting challenge for players familiar with small sided games like futsal, beach soccer, and pelada is how to transfer their skills into regulation football. The large proportion of current elite football players attesting that this transfer formed part of their pathway suggests that there is considerable transfer between such football codes (see Travassos, Davids, & Araújo, 2018 for a recent discussion).

Table 2: Summary of practice principles and associated evidence base that underpins pelada

Skill acquisition principle	How principle is manifested in pelada	Supporting Literature
Unstructured practice / deliberate play	No coaches or referees; players agree on and play by their own rules; teams formed by mutual agreement.	(Pimenta, 2013) (Williams & Hodges, 2005)
Representative, affective learning design	<ul style="list-style-type: none"> Reproduces many “game-like” sub-phases (such as 1 vs.1, or 2 vs.1) with similar perceptual and motor demands to football. Pelada can be described as an “emotion-laden” practice activity (i.e., often encourages intense expressions of joy, sadness, determination, excitement, humor, etc.). 	(Pinder, Davids, Renshaw, & Araújo, 2011) (Headrick et al., 2015)
Modified task and environmental constraints	<ul style="list-style-type: none"> Small, dynamic physical spaces used to form playing area (e.g., futsal court, street, side alley, backyard) Range of irregular and adapted playing surfaces Different types of equipment used (e.g., ball, shoes, goals) 	(Button, Bennett, Davids, & Stephenson, 1999) (Buszard, Reid, Masters, & Farrow, 2016)
Contextual uncertainty	A diverse range of football skills are required in a random format (inducing high contextual interference conditions)	(Davids et al., 2013) (Ollis, Button, & Fairweather, 2005)
Variability of practice	Continuous adjustment of key movement parameters (e.g., speed, force and direction of running and kicking)	(Chow et al., 2009) (Dicks, Uehara, & Lima, 2011) (Gabbett, Kelly, & Sheppard, 2008)
Range of challenge points to suit individual learners	Players of different skill levels can compete together creating range of difficulty levels; teams matched for skill by senior players picking the sides.	(Guadagnoli & Lee, 2004)

Skill acquisition principle	How principle is manifested in pelada	Supporting Literature
Active and empowering role of players in the design of the practice		Araújo et al., 2010

Building upon the inspirations offered to us by Araújo and colleagues (2010), we suggest that characteristics of learning environments like pelada and “backyard games” (see Phillips et al., 2010) can constitute powerful tools for practitioners to enhance the acquisition of skill and learning in football through less formalized and structured environments. Araújo and colleagues suggested that key characteristics of learning design in team games should include the following: (1) not relying on formalized games and training drills all the time; (2) designing activities for fun and enjoyment; (3) creating learning environments that encourage search, discovery, and exploration in movements; (4) enhancing adaptive behaviors by creating opportunities for learners to satisfy different constraints (playing in different weather conditions, against children from different age groups, gender, number of players, etc.); (5) varying equipment and facilities for practice, varying surfaces and textures, footwear, ball types; (6) not conceptualizing an idealized target movement pattern as “the” way to perform a skill; (7) making sure that skill practice encompasses “repetition without repetition”; and (8) ensuring that practice tasks are always dynamic and never decomposed (such as in traditional practice drills). The analysis of practice principles we have presented in this section provides further evidence that each of these features are present in pelada.

Thus far, evidence from the present analysis suggests that learning in football (and all sorts of other games and sports) can be enhanced in informal learning environments under key socio-cultural constraints that can influence the development of players. In Brazilian football, the impoverished environmental conditions usually present in pelada that would appear seemingly aversive to learning to play football, may in fact be harnessed in a positive way to

facilitate adaptability, resilience, and skill acquisition under peer pressure rather than coach pressure and intrinsic enjoyment. The range of informal situations in which Brazilian players develop their talent appears to provide perceptual-motor expertise which is adaptable, innovative and effective if the global reputation of Brazilian footballers can be used as a gauge. This line of focus is supported by previous studies which provided evidence on the importance of the environment influencing talent development (see Bloom, 1985). The benefits of this type of unstructured form of play and practice can be based on skill acquisition principles such as representative learning design and adaptive variability of practice (see Davids et al., 2008). From a psychological point of view, pelada also prioritizes playing purely for the “love of the game” (intrinsic motivation) which invokes passion, pleasure, and prolonged participation to play the game in a specific way.

Concluding Comments

In this article, our contention is that informal and unstructured practice activities, such as pelada, have considerable potential to develop skill acquisition in sport. Based on Bronfenbrenner’s model, pelada can be seen as a microsystem. However, pelada is influenced and influences many other microsystems creating unique meso-, exo-, and macrosystems that makes it a specific vehicle for learning football. As such, pelada at a microsystemic level offers numerous learning opportunities across a range of skill levels. It is perhaps fair to argue that in Brazil, at least, pelada has become so interwoven within the socio-cultural fabric that it is not possible to isolate it and fully explain its value. In the same way, in other countries around the world, popular leisure activities like “backyard” ice hockey in Canada, “jumpers for goalposts” in England, “beach

cricket” in Australia, and pétanque in France have come to influence the “form of life” (see Rietveld & Kiverstein, 2014) much more than being just enjoyable pastimes.

The physical environments in which pelada takes place in Brazilian society seem central to its success as a vehicle for accelerating learning in football. Like many other contemporary recreational activities (i.e., skateboarding,

parkour, free-running) pelada can be practiced in many types of environments and is not constrained to performance on a flat, grassy patch in the same way that association football tends to be. Even urban environments can present opportunities to play, which is perhaps of significance in many densely occupied countries with restricted access to open “green” spaces (see Figure 2).

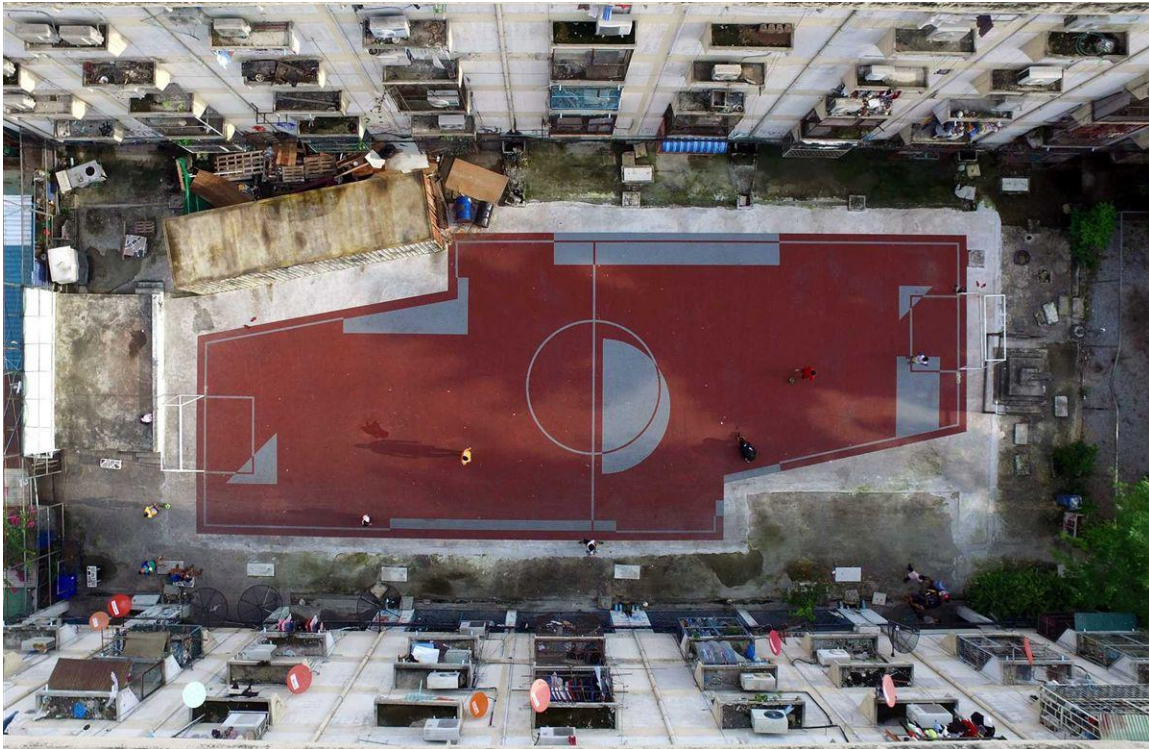


Figure 2. A pelada-inspired court in Thailand. Source: <http://www.bbc.com/mundo/deportes-37895983>

Additionally, participation in pelada (regardless of age, gender, and skill differences) is facilitated due to the fact that pelada emerges without formal structure or the need for specialized equipment. This means that practically anyone (even those differing in age and gender) is able to participate. In this article, we have argued that perhaps some of the “special” characteristics enjoyed by Brazilian pelada include a fierce degree of competitiveness, which is perhaps unique to Brazilian society, the expectation of playing with flair, and an arena in which everyone who plays does so on equal terms. Whether these characteristics play a significant role in the success and global reputation that Brazil has

developed as a football superpower needs further investigation.

While it is apparent that there exist different versions of informal “pick-up” games played globally, in Brazil, where Uehara (first author) grew up, an interesting observation refers to the demonstrable competitiveness when pelada emerges in informal playing contexts. In other countries with forms of “pick-up” games, in stark contrast to Uehara’s experiences of pelada in Brazil, there was a less noticeable effort of players to compete and win these “street” games. It seems the Brazilian version of pelada is rarely just a “fun game between friends.” More typically they are highly competitive games that no one likes to lose. Perhaps because

no monetary prize or trophy awaits the winning team, Brazilian players like to “showboat” their individual skills and try to tease or even humiliate their opposition as well as score “beautiful” goals. Under this scenario, an intense competitive environment is naturally created, with an underlying intrinsic rationale to enjoy the intensity of the informal playing experience. Although this element of pelada can surface at times in other countries’ manifestations of pelada, it is possible that the Brazilians have embraced it to their benefit more so than other nations. Further analysis of pelada reproduced in different countries is required to confirm this contention.

Authors’ Declarations

The authors declare that there are no personal or financial conflicts of interest regarding the research in this article.

The authors declare that they conducted the research reported in this article in accordance with the [Ethical Principles](#) of the Journal of Expertise.

The authors declare that they are not able to make the dataset publicly available but are able to provide it upon request.

References

- Alexander, K., & Penney, D. (2005). Teaching under the influence: feeding games for understanding into the sport education development-refinement cycle. *Physical Education and Sport Pedagogy*, 10(3), 287-301.
- Ankersen, R. (2013). *The gold mine effect: Crack the secrets of high performance*. UK: Icon.
- Araújo, D., Davids, K., & Passos, P. (2007). Ecological validity, representative design, and correspondence between experimental task constraints and behavioral setting: comment on Rogers, Kadar, and Costall (2005). *Ecological Psychology*, 19(1), 69-78.
- Araújo, D., Fonseca, C., Davids, K., Garganta, J., Volossovitch, A., Brandao, R., & Krebs, R. (2010). The role of ecological constraints on expertise development. *Talent Development & Excellence*, 2(2), 165-179.
- Baker, J. (2003). Early specialization in youth sport: A requirement for adult expertise? *High Ability Studies*, 14, 85-94.
- Baker, J., Côté, J., & Abernethy, B. (2003). Learning from the experts: Practice activities of expert decision makers in sport. *Research Quarterly For Exercise And Sport*, 74(3), 342-347. doi:10.1080/02701367.2003.10609101
- Baker, J., & Farrow, D. (2015). *The Routledge handbook of sport expertise*. London: Routledge.
- Bellos, A. (2002). *Futebol: The Brazilian way of life*. London: Bloomsbury Publishing.
- Bloom, B. S. (1985). *Developing talent in young people*. New York: Ballantine.
- Bronfenbrenner, U. 1979. *The Ecology of Human Development*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U. (1995). Developmental ecology through space and time: A future perspective. In P. Moen, G. H. Elder, & K. Luscher (Eds.), *Examining lives in context: Perspectives on the ecology of human development*. Washington, DC: American Psychological Association.
- Bronfenbrenner, U. (2005). Bioecological theory of human development. In U. Bronfenbrenner (Ed.), *Making human being human: Bioecological perspectives on human development* (pp. 3-15). Thousand Oaks, CA: Sage Publication, Inc.
- Bronfenbrenner, U., & Morris, P. (2006). The bioecological model of human development. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (6 ed., pp. 793-828). New York: John Wiley.
- Bruner, M. W., Erickson, K., Wilson, B., & Cote, J. (2010). An appraisal of athlete development models through citation network analysis. *Psychology of Sport and Exercise*, 11(2), 133-139.
- Bunker, D., & Thorpe, R. (1982). A model for the teaching of games in the secondary school. *Bulletin of Physical Education*, 10, 9-16.
- Buszard, T., Reid, M., Masters, R., & Farrow, D. (2016). Scaling the equipment and play area in children’s sport to improve motor skill acquisition: A systematic review. *Sports Medicine*. doi:10.1007/s40279-015-0452-2
- Button, C., Bennett, S. J., Davids, K., & Stephenson, J. M. (1999, 9-12 September). *The effects of practicing with a small, heavy soccer ball on the development of soccer related skills*. Paper presented at the British Association of Sports and Exercise Sciences Annual Conference, Leeds Metropolitan University, UK, 9-12 September.

- Carlson, R. C. (1988). The socialization of elite tennis players in Sweden: An analysis of the players' backgrounds and development. *Sociology of Sport Journal*, 5, 241 - 256.
- Chappell, G. (2004). *Cricket: The making of champions*. Melbourne: Lothian Books.
- Chow, J.-Y., Davids, K., Button, C., & Renshaw, I. (2015). *Nonlinear pedagogy in skill acquisition : An introduction*. Abingdon: Routledge.
- Chow, J.-Y., Davids, K., Button, C., Renshaw, I., Shuttleworth, R., & Uehara, L. (2009). Nonlinear Pedagogy: Implications for teaching games for understanding (TGfU). In T. Hopper, J. Butler, & B. Storey (Eds.).
- Clemente, F. M., Wong, D. P., Martins, F. M. L., & Mendes, R. S. (2014). Acute effects of the number of players and scoring method on physiological, physical, and technical performance in small-sided soccer games. *Research in Sports Medicine*, 22(4), 380-397.
- Côté, J. (1999). The influence of the family in the development of talent in sports. *The Sports Psychologist*, 13.
- Côté, J., Baker, J., & Abernethy, B. (2007). Practice and play in the development of sport expertise. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of sport psychology* (3 ed.). New Jersey: John Wiley & Sons, Inc.
- Côté, J., & Fraser-Thomas, J. (2007). Youth involvement in sport In P. R. E. Crocker (Ed.), *Introduction to sport psychology: A Canadian perspective* (pp. 266-294). Toronto Pearson Prentice Hall.
- Côté, J., & Hay, J. G. (2002). Children's involvement in sport: A developmental perspective. In J.M.Silva & D. Stevens (Eds.), *Psychological foundations of sport* (2nd ed.). Boston, MA: Merrill.
- Côté, J., Macdonald, D. J., Baker, J., & Abernethy, B. (2006). When "where" is more important than "when": Birthplace and birthdate effects on the achievement of sporting expertise. *Journal of Sports Sciences*, 24(10), 1065-1073. doi:10.1080/02640410500432490
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3 ed.). Thousand Oaks: Sage Publications.
- Davids, K., Araújo, D., Correia, V., & Vilar, L. (2013). How small-sided and conditioned games enhance acquisition of movement and decision-making skills. *Exercise and Sport Sciences Reviews (ESSR)*, 41(3), 154-161.
- Davids, K., & Baker, J. (2007). Genes, environment and sport performance - why the nature-nurture dualism is no longer relevant. *Sports Medicine*, 37(11), 961-980.
- Davids, K., Button, C., & Bennett, S. (2008). *Dynamics of skill acquisition: A constraints-led approach*. Champaign, IL: Human Kinetics.
- Davids, K., Gullich, A., Shuttleworth, R., & Araújo, D. (2017). Understanding environmental and task constraints on talent development: Analysis of micro-structure of practice and macro-structure of development histories. In J. Baker, S. Cobley, J. Schorer, & N. Wattie (Eds.), *Routledge handbook of talent identification and development in sport* (pp. 192-206). Abingdon: Routledge.
- den Duyn, N. (1997). *Game sense: Developing thinking players*. Canberra, Australia: Australian Sports Commission.
- Dicks, M., Uehara, L., & Lima, C. (2011). Deception, individual differences and penalty kicks: Implications for goalkeeping in association football. *International Journal of Sports Science and Coaching (IJSSC), especial issue*.
- Drake, J., & Winner, E. (2018). Why deliberate practice is not enough: Evidence from talent in drawing. . In D. Z. Zambrick, G. Campitelli, & B. N. Macnamara (Eds.), *The science of expertise* (pp. 101-128). New York: Routledge.
- Ericsson, K. A. (1996). *The road to excellence: The acquisition of expert performance in the arts and sciences, sports and games*. Mahwah, NJ: Erlbaum.
- Ericsson, K. A., & Charness, N. (1994). Expert performance: Its structure and acquisition. *American Psychologist*, 49, 725-747.
- Ericsson, K. A., Krampe, R. T., & Tesch-Romer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100(3), 363-406.
- Ericsson, K. A., & Pool, R. (2016). *Peak: Secrets from the new science of expertise*. Boston: Houghton Mifflin Harcourt.
- Ericsson, K. A., & Williams, A. M. (2007). Capturing naturally occurring superior performance in the laboratory: Translational research on expert performance. *Journal of Experimental Psychology: Applied*, 13(3), 115-123.
- Farrow, D., Baker, J., & MacMahon, C. (Eds.). (2013). *Developing sport expertise: Researchers and coaches put theory into practice* (2nd ed.). Oxon: Routledge.
- Gabbett, T., Kelly, J., & Sheppard, J. (2008). Speed, change of direction speed, and reactive agility of rugby league players. *J Strength Cond Res*, 22(1), 174-181. doi:10.1519/JSC.0b013e31815ef700

- Garganta, J., & Fonseca, H. (2008). *Futebol de Rua, um Beco com Saída. Jogo espontâneo e prática deliberada [Football on the street, an alley with escape. Spontaneous game and deliberate practice]*. Lisboa: Visão e Contextos.
- Gibson, J. J. (1979). *An ecological approach to visual perception*. Boston: Houghton Mifflin.
- Gibson, J. J. (1986). *The ecological approach to visual perception*. Hillsdale, NJ.: Lawrence Erlbaum Associates.
- Gladwell, M. (2008). *Outliers: The story of success*: Little, Brown and Company.
- Goldblatt, D. (2006). *The ball is round: A global history of football*. London: Penguin.
- Guadagnoli, M., & Lee, T. D. (2004). Challenge point: A framework for conceptualizing the effects of various practice conditions in motor learning. *Journal of Motor Behavior*, *36*, 212-224.
- Headrick, J., Renshaw, I., Davids, K., Pinder, R. A., & Araújo, D. (2015). The dynamics of expertise acquisition in sport: The role of affective learning design. *Psychology of Sport and Exercise*, *16*(1), 83-90.
- Hirshey, D. (2016). Pele says Brazil need individual *ginga* to return to their former best. Retrieved from <http://www.espnfc.com.au/brazil/story/2868330/pele-says-brazil-need-individual-%3Ci%3Eginga%3Ci%3E-to-return-to-their-former-best>
- Krebs, R. J. (2009). Bronfenbrenner's bioecological theory of human development and the process of development of sports talent. *International Journal of Sport Psychology*, *40*(1), 108-135.
- Larsen, C. H., Alfermann, D., Henriksen, K., & Christensen, M. K. (2013). Successful talent development in soccer: The characteristics of the environment. *Sport, Exercise, and Performance Psychology*, *2*(3), 190-206.
- Lever, J. (1995). *Soccer madness: Brazil's passion for the world's most popular sport*. Long Grove, Illinois: Waveland Press.
- Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder*. USA: Algonquin Books of Chapel Hill.
- Macnamara, B. N., Moreau, D., & Hambrick, D. Z. (2016). The relationship between deliberate practice and performance in sports: A meta analysis. *Perspectives on Psychological Science*, *11*(3), 333-350. doi:10.1177/1745691616635591
- Menuchi, M. R. T. P., Moro, A. R. P., Ambrósio, P. E., Pariente, C. A. B., & Araújo, D. (2018). Effects of spatiotemporal constraints and age on the interactions of soccer players when competing for ball possession. *Journal of Sports Science and Medicine*, *17*, 379-391.
- Newell, A., & Rosenbloom, P. S. (1981). Mechanisms of skill acquisition and the law of practice. In J. R. Anderson (Ed.), *Cognitive skills and their acquisition* (pp. 1-55). Hillsdale, NJ: Erlbaum.
- Ollis, S., Button, C., & Fairweather, M. (2005). The influence of professional expertise and task complexity upon the potency of the contextual interference effect. *Acta Psychologica*, *118*, 229-244.
- Partington, M., & Cushion, C. (2013). An investigation of the practice activities and coaching behaviors of professional top-level youth soccer coaches *Scand J Med Sci Sports*, *23*(3), 374-382. doi:10.1111/j.1600-0838.2011.01383.x
- Petlichkoff, L. M. (1993). Coaching children: Understanding the motivational process. *Sport Science Review*, *2*, 49-61.
- Phillips, E., Davids, K., Renshaw, I., & Portus, M. (2010). The development of fast bowling experts in Australian cricket. *Talent Development and Excellence*, 137-148.
- Pimenta, R. D. (2009). *Desvendando o jogo: Futebol amador e pelada na cidade e no sertão [Unlocking the game: Amateur and pelada soccer in city and in rural areas]*. (Doctoral thesis), Universidade Federal de Pernambuco, Brazil.
- Pimenta, R. D. (2013). O jogo no sertão: Conhecendo o futebol amador na zona rural [Soccer in the "sertão": Exploring amateur soccer in rural areas]. *Espaço Plural*, *XIV*(29), 90-113.
- Pinder, R. A., Davids, K., & Renshaw, I. (2012). Metastability and emergent performance of dynamic interceptive actions. *Journal of Science and Medicine in Sport*, *15*(5), 437-443.
- Pinder, R. A., Davids, K., Renshaw, I., & Araújo, D. (2011). Representative learning design and functionality of research and practice in sport. *Journal of Sport & Exercise Psychology*, *33*(1), 146-155.
- Praça, G. M., Folgado, H., Andrade, A. G. P., & Greco, P. J. (2016). Influence of additional players on collective tactical behavior in small-sided soccer games. *Rev Bras Cineantropom Desempenho Hum*, *18*(1), 62-71.
- Proteau, L., Marteniuk, R. G., & Lévesque, L. (1992). A Sensorimotor Basis for Motor Learning: Evidence Indicating Specificity of Practice. *The Quarterly Journal of Experimental Psychology*, *44A*, 557-575.
- Renshaw, I., Araújo, D., Button, C., Chow, J.-Y., Davids, K., & Moy, B. (2016). Why the constraints-led approach is not teaching games

- for understanding: A clarification. *Physical Education and Sport Pedagogy*, 21(5), 459-480.
- Renshaw, I., & Chappell, G. (2010). A constraints-led approach to talent development in cricket. In L. Kidman & B. J. Lombardo (Eds.), *Athlete-centred coaching : Developing decision makers* (pp. 151-172). UK: IPC Print Resources.
- Renshaw, I., Oldham, A. R. H., & Bawden, M. (2012). Nonlinear pedagogy underpins intrinsic motivation in sports coaching. *The Open Sports Sciences Journal*, 5(1), 88-89.
doi:10.2174/1875399X01205010088
- Rietveld, E., & Kiverstein, J. (2014). A rich landscape of affordances. *Ecological Psychology*, 26(4), 325-352.
- Salmela, J. H., & Moraes, L. C. (2003). Development of expertise: The role of coaching, families, and cultural contexts. In J. L. Starkes & K. A. Ericsson (Eds.), *Expert performance in sports: Advances in research on sport expertise* (pp. 275-293). Champaign, IL: Human Kinetics.
- Salmela, J. H., & Moraes, L. C. (2004). Coaching, families, and learning in Brazilian youth football players. *Insight: The FA Coaches Association Journal* 2, 36-37.
- Sarmiento, H., Anguera, M. T., Pereira, A., & Araújo, D. (2018). Talent identification and development in male football: A systematic review. *Sports Medicine*, 48(4), 907-931.
- Sheets-Johnstone, M. (2009). *The corporeal turn: An interdisciplinary reader*. UK: Imprint Academic.
- Syed, M. (2011). *Bounce: The myth of talent and power of practice*. London, UK: Harper Collins Publishers.
- Travassos, B., Davids, K., & Araújo, D. (2018). Is futsal a donor of sport for football?: Exploiting complementarity for early diversification in talent development. *Science and Medicine in Football*, 2(1), 66-70.
- Uehara, L., Button, C., Falcous, M., & Davids, K. (2014). Contextualized skill acquisition research: A new framework to study the development of sport expertise. *Physical Education & Sport Pedagogy*. doi:10.1080/17408989.2014.924495
- Vilar, L., Duarte, R., Silva, P., Chow, J.-Y., & Davids, K. (2014). The influence of pitch dimensions on performance during small-sided and conditioned soccer games. *Journal of Sports Sciences*, 32(19), 1751-1759.
- Vilela, C. (2009). *Futebol sem fronteiras: Retratos da bola ao redor do mundo [Football without borders: Ball's picture around the world]*. Brazil: Panda Books.
- Ward, P., Hodges, N. J., Williams, A. M., & Starkes, J. L. (2004). Deliberate practice and expert performance: Defining the path to excellence. In A. M. Williams & N. J. Hodges (Eds.), *Skill acquisition in sport: Research, theory and practice* (pp. 231-258). London, UK: Routledge.
- Williams, A. M., & Hodges, N. J. (2005). Practice, instruction and skill acquisition in soccer: challenging tradition. *Journal of Sports Sciences*, 23(6), 637-650.
- Williams, A. M., & Reilly, T. (2000). Talent identification and development in soccer. *Journal of Sports Sciences*, 18(9), 657-667.

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