



<http://www.diva-portal.org>

This is the published version of a paper published in *Sport Coaching Review*.

Citation for the original published paper (version of record):

Barker, D., Nyberg, G., Larsson, H. (2022)

Coaching for skill development in sport: a kinesio-cultural approach

*Sport Coaching Review*, 11(1): 23-40

<https://doi.org/10.1080/21640629.2021.1952811>

Access to the published version may require subscription.

N.B. When citing this work, cite the original published paper.

(c) 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Permanent link to this version:

<http://urn.kb.se/resolve?urn=urn:nbn:se:gih:diva-6809>



## Coaching for skill development in sport: a kinesio-cultural approach

D. Barker, G. Nyberg & H. Larsson

To cite this article: D. Barker, G. Nyberg & H. Larsson (2021): Coaching for skill development in sport: a kinesio-cultural approach, Sports Coaching Review, DOI: [10.1080/21640629.2021.1952811](https://doi.org/10.1080/21640629.2021.1952811)

To link to this article: <https://doi.org/10.1080/21640629.2021.1952811>



© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 06 Oct 2021.



Submit your article to this journal [↗](#)



Article views: 132



View related articles [↗](#)



View Crossmark data [↗](#)

# Coaching for skill development in sport: a kinesio-cultural approach

D. Barker <sup>a</sup>, G. Nyberg<sup>b</sup> and H. Larsson <sup>c</sup>

<sup>a</sup>School of Health Sciences, University of Örebro, Örebro, Sweden; <sup>b</sup>Department of Sport and Health Science, University of Dalarna, Sweden; <sup>c</sup>Department of Movement, Culture and Society, The Swedish School of Sport and Health Sciences (GIH), Stockholm, Sweden

## ABSTRACT

Skill development was traditionally seen through a positivist lens. Research was based on mind-body, individual-environment, and performer-skill dualisms, and researchers assumed that universal principles would ensure optimal development. Metaphorically, these assumptions represented a target hitting understanding of skill development. The goal was for the performer to hit the target of optimal performance as reliably as possible. Such an understanding commits researchers and practitioners to practical and methodological approaches. The aim of this paper is to reconsider skill development and think beyond a target hitting metaphor. To achieve this aim, we outline a kinesio-cultural exploration approach to skill development. This approach is based on a metaphoric understanding of skill development as familiarizing oneself with a landscape. Attaining familiarity in movement landscapes, or 'kinescapes', requires spending time in these fields, attending to critical aspects, and remaining flexible. From this perspective, skilled performers are qualitatively different to 'target hitting' performers.

## ARTICLE HISTORY

Received 28 January 2021  
Accepted 16 June 2021

## KEYWORDS

Movement; skill; capability; development; sport coaching; learning

## Introduction

Skill development has traditionally been the preserve of motor learning scholars. Until the 1970s and 1980s, motor learning scholarship was heavily influenced by the field of psychology (Fischman, 2007). Skill development was seen through a positivist lens and research was based on reductionist principles that separated mind from body, individual from environment, and skill performer from skill (e.g., Shea & Morgan, 1979; Singer, 1968). In line with the mechanistic metaphor that had dominated psychology since the seventeenth century (Withagen & Michaels, 2005), it was further assumed that if researchers could correctly identify, isolate, and manipulate certain variables – often related to feedback and practice – optimal skill

**CONTACT** D. Barker  dean.barker@oru.se  School of Health Sciences, Örebro University, Fakultetsgatan 1, SE701-82, Örebro, Sweden

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

learning could be ensured (Magill, 1977). Decontextualised knowledge of manipulation primarily gained in laboratories could then be transferred to sporting contexts as principles of motor learning (Singer, 1968).

Since the 1980s, two significant developments concerning skill learning have taken place. First, the epistemological base of the motor learning field has grown markedly as scholars have challenged traditional assumptions and built alternative explanations of skilled behaviour (see Gibson, 2014; Kelso, 1995; Sheets-Johnstone, 2011; Varela, Thompson & Rosch, 2017, for important contributions). Second, the issue of skill has caught the attention of researchers in fields outside of motor learning. Sociologists (e.g., Shilling, 2008; Wacquant, 2004), sports pedagogues (e.g., Barker, Barker-Ruchti, Rynne & Lee, 2014a; Smith, 2016), and sport coaching scholars (e.g., Bobrownicki, MacPherson, Collins & Sproule, 2019; Macnamara, Moreau & Hambrick, 2016; Porter, Wu & Partridge, 2010) have all considered skill learning from unique standpoints. Both developments have led to a diversification of theoretical and epistemological assumptions concerning skill learning.

Despite developments, positivist assumptions to some extent still underpin skill development research (Millar, Oldham & Donovan, 2011). At times, skill development research works from the positivist-inspired assumption that practitioners should help athletes to zero in on correct performance by eliminating movement errors (Anderson, Magill, Mayo & Stell, 2020). At other times, research has taken on the instrumentalist idea that the function of coaches is to help athletes secure best performances under any conditions (see Gröpel & Mesagno, 2019). In sporting contexts, deterministic, reductionist, and instrumental assumptions cohere in a “target hitting” understanding of skilled performance, where the primary objective of practitioners is to ensure that athletes “hit” the optimal way of performing a movement as reliably as possible.

There is little doubt that a target hitting understanding of skill learning has been generative in terms of research (Hodges & Williams, 2019). At the same time, this view invites particular lines of questions and action, and potentially prevents novel approaches. The aim of this paper is to reconsider skill learning and think beyond a target hitting understanding of skill learning. To do this, we outline a kinesio-cultural explorative approach to skill learning in the second part of this paper (Barker, Nyberg & Larsson, 2020b; Nyberg, Barker & Larsson, 2020).<sup>1</sup> In the next section however, we review existing coaching literature on skill development with a view to identifying commonly investigated coaching methods and the epistemological assumptions that support research on these methods.

---

<sup>1</sup>In earlier work, we have referred to the approach as ‘embodied exploration’ (Barker et al., 2020; Nyberg et al., 2020). We have changed terminology because the former does not signal the approach’s concern with cultural factors and suggests a tighter connection with phenomenological traditions than is the case.

## Coaching methods for facilitating skill development and the epistemological assumptions that they entail

Coaching researchers have investigated a range of aspects involved in the development of sport-related skills (Abraham & Collins, 2011; Hodges & Williams, 2019; O'Connor, Larkin & Williams, 2018). In this section, we identify four general categories of coaching methods used for skill development and consider the epistemological assumptions on which the methods are based. The first category – explicit instruction – is concerned with the verbal remarks that coaches make to their athletes (Solomon, Golden, Ciapponi & Martin, 1998; Tzetzis, Votsis & Kourtessis, 2008). Common to much of this literature is the assumption that technical information, often referred to as feedback, enables athletes to improve their movement patterns and perform skills with more precision, more consistency, or both (Millar, Oldham & Donovan, 2011). This idea assigns considerable weight to the actions of coaches and positions the athlete as relatively passive. Valid coaching knowledge from a direct instruction perspective includes knowing: what an ideal skill performance looks like; why athletes' performances might diverge from the ideal; which types of information athletes require for desired changes to take place; how the timing and method of feedback delivery affects athletes' development, and in some cases; how the characteristics of tasks affect how information needs to be provided.

Other scholars have claimed that providing explicit instruction to athletes is detrimental to skill development because it results in an internal focus of attention (Carson & Collins, 2016; Gröpel & Mesagno, 2019).<sup>2</sup> This claim supports a second category of methods for facilitating skill development: implicit coaching. Implicit coaching methods involve actions such as inviting athletes to engage in secondary tasks while learning new skills (what Gabbett, Wake & Abernethy, 2011, refer to as a dual-task methodology) or giving instructions for motor tasks through analogies (Gabbett & Masters, 2011; Lam, Maxwell & Masters, 2009; Liao & Masters, 2001). Participants in Bobrownicki and colleagues' (Bobrownicki, MacPherson, Collins & Sproule, 2019) research on dart throwing, for example, were asked to move their arms "like catapults" (p. 20), while rugby league players in Gabbett and Masters (2011) investigation were asked to imagine they had a rod running through their head and spine while they were tackling opponents. An important epistemological assumption of implicit methods is that mind and body constitute two distinct entities that need to work together. Scholars suggest that by avoiding direct technical instruction, coaches can prevent athlete introspection from interfering with the performance of the

---

<sup>2</sup>The question of whether athletes should have an external, an internal, or an alternating focus of attention when developing and performing skills has led to animated scientific debate (see for example, Toner & Moran, 2015; Collins, Carson & Toner, 2016; Mattes, 2016; Wulf, 2016).

moving body (Beilock & Carr, 2001). Carson, Collins and Kearney (2018) expand on this idea when they suggest that “while it should be obvious to readers that execution outcome is a direct result of kinematic and kinetic processes, a wealth of evidence has also demonstrated the perils of maladaptive conscious processing” (p. 174). As with direct instruction, valid coaching knowledge is principally about knowing how to provide information to athletes that will help them approach an ideal performance (and “hit the target”). In the case of implicit coaching methods however, coaches must have a variety of strategies at their disposal to provide this information indirectly.

A third category of bringing about skill development centres on practice (Hopwood, Mann, Farrow & Nielsen, 2011; Macnamara, Moreau & Hambrick, 2016). Scholars have considered practice and subsequent learning in different ways (Memmert, Hagemann, Althoetmar, Geppert & Seiler, 2009; Vera, Alvarez & Medina, 2008). Some have used laboratory-based approaches. By controlling performance conditions, these researchers have concentrated on factors such as knowledge of results and knowledge of performance (Anderson, Magill, Mayo & Stell, 2020) and defined learning in terms of memory retention (Newell & Rosenbloom, 1981). Others have taken a naturalistic approach, examining the actions of expert performers over time (Ericsson, Krampe & Tesch-Römer, 1993). At the end of a sustained programme of research, Ericsson (2008, 2014, 2020) claimed that to be effective, practice must: (1) be individualised, where a coach determines appropriate goals for the athlete and provides explicit instructions on the means to achieve the goals; (2) involve tasks that have explicit performance goals and that allow the learner to “repeatedly perform the same or similar tasks” (2020, p. 163), and; (3) include individualised performance assessment which form the basis for future practice tasks.

Epistemological assumptions underpinning practising as a coaching method vary according to approach. In laboratory approaches, researchers have worked with the idea that adjustments to the amount or type of information that performers receive will affect learning. In naturalistic research, information is also crucial, but the mediating role of the coach is of specific interest. In both cases, it is assumed that developing skill requires repeating the task and processing sensory information after repetitions. Valid coaching knowledge when practising is thus relatively broad and concerns knowing: which conditions are appropriate for which individuals (Memmert, Hagemann, Althoetmar, Geppert & Seiler, 2009); which types and amounts of practice are optimal (Barker, Barker-Ruchti, Rynne & Lee, 2014a) and how assessment strategies can be used to prescribe further practice conditions (Ericsson, 2020).

A final category concerns the manipulation of athletes’ environments to facilitate skill development (see, for example, Buszard, Reid, Masters &

Farrow, 2016). This approach is informed by constraints-led theorising (Araújo & Davids, 2011; Uehara, Button, Falcous & Davids, 2016). From a constraints-led perspective, coaches should set tasks for athletes where demands are matched to athletes' capabilities (Millar, Oldham & Donovan, 2011; Renshaw et al., 2016). By providing athletes with tasks rather than instructions, coaches should engage learners physically, cognitively, and emotionally (Araújo & Davids, 2004; Renshaw et al., 2016). Key assumptions underlying a constraints-led approach are that: (1) skilled behaviour is a function of the person *and* her/his environment, and (2) performers adapt to their environments over time so that they eventually act in context-appropriate ways. From this perspective, a person does not so much gain skills as become technically adroit in certain physical environments (Araújo & Davids, 2011). In this respect, constraints-led theorising attempts to amalgamate individual and environment, and performer and task, and diverges substantially from a positivist epistemology. In terms of coaching knowledge, this method relies heavily on coaches knowing how to manipulate task and environmental conditions (for e.g. size of playing court, number of players in a given exercise) in ways that enable athletes to respond in appropriate ways.

So far, we have painted with broad brushstrokes. Notwithstanding considerable variation and some debate (Araújo & Davids, 2011; Ericsson, Krampe & Tesch-Römer, 1993), we can say that several positivist assumptions persist in existing coaching literature on skill development. Relatively often, it is assumed that: (1) skilled performance involves correct patterns of action, and (2) developing skill involves a convergent process of refining sets of actions to the point that they can be performed under a range of conditions. We can add that some sports coaching research is based on the instrumentalist idea that: (3) coaches are primarily responsible for the cultivation of athlete skill, while athletes play a passive, recipient role. Further and related, we can say that: (4) the mind and the body are often understood as two separate entities where the mind controls the body. Nonetheless, the mind is seen as unreliable, and reflection can be seen as risky and detrimental when it comes to skilled performance (note that some literature suggests that paying attention to one's bodily movements is useful for learning – see Mattes, 2016; Toner & Moran, 2015). In this paper, we endeavour to move beyond these assumptions and think differently about skill development. In the next section, we describe how we went about the process of developing our thinking.

### **Methodological approach to developing theory**

We have been attempting to think differently about skill learning within a research project titled “Learning to move differently: Developing a non-

dualistic theory of movement learning”. The overarching objective of this project was to develop a theory of movement learning. To develop theory, we have engaged in four mutually supporting activities. First, we borrowed ideas from other fields of scholarship; namely, theoretical tenets from Ryle (1949/2009) and Michael Polanyi (1969, 2002) – described in detail in the next section. Following Whetten (1989), we utilised principles and concepts from these scholars that have seldom been used in movement learning literature (Nyberg, 2014; Nyberg & Carlgren, 2015). According to Whetten (1989), borrowing theories from outside of their respective fields enables researchers to “alter [their] metaphors and gestalts in ways that challenge the underlying rationales supporting accepted theories” (p. 493). Second, we were not content to borrow and apply novel principles; we wanted to extend them. Thomas (2007) suggests that playing with established theories is a necessary part of theorising. This involves maintaining a distance and being prepared to adapt or add to theory, possibly but not always as a result of empirical activities. Third, we have worked with metaphors. Shoemaker, Tankard and Lasorsa (2004) propose that metaphoric (or analogic) thinking is a “fundamental tool of the theory builder” (p. 166) because it allows the researcher to understand underlying principles. We have identified metaphors in current approaches to skill learning (Barker, Bergentoft & Nyberg, 2017) and built our explanation on alternative metaphors. Finally, and more traditionally, we have drawn on empirical cases of skill learning to find similarities and consistencies that can be amalgamated (George & Bennett, 2005) to form an explanation of skill learning. The cases took place within the empirical activities of the project where we worked with high school pupils learning to juggle in physical education classes, sport coaching students learning contemporary dance, and pre-service physical education teachers learning to ride unicycles. Given that the cases introduced in this paper are used as examples only, an account of the procedures used for generating data is not provided. Information about procedures can be found in Barker, Nyberg and Larsson (2020b), Barker, Nyberg and Larsson (2020a) and Nyberg, Barker and Larsson (2021).

### **Theoretical resources for re-considering skill development**

Ryle (1949/2009) and Polanyi (Polanyi, 1958/2002/1958/2002, 1969) supply the theoretical starting point for the development of new ideas about skill and skill development in this paper. Both scholars stress the situated and subjective nature of knowledge, both emphasise multiple ways of knowing, and both challenge the notion that intelligent action involves a double process of doing and thinking. Ryle (1949/2009) suggests that skill should not be seen as an act but as an embodied disposition, or complex of

dispositions. He proposes that when we watch an individual perform, we are not witnessing the performance of isolated skilful actions but the actualisation of a disposition. We might appreciate for example, the big air jump of the free skier not simply as a display of complex technical knowledge but as an embodied realisation of hard work, patience, courage, flexibility, timing, and power (Nyberg, 2015; see also Shilling, 2008; Wacquant, 2004). When we applaud the skier's "skill", we acknowledge the athlete's disposition and recognise that even with the most detailed technical instruction, the jump would prove impossible for most people.

At the same time, it is possible to appreciate the courage, balance, and persistence of a young child as she rides her bicycle unsupported for the first time. In this respect, skill as an embodied complex of dispositions can be constituted and actualised in different ways. A common element of skilful dispositions in all types of movement, however, is a sensitivity to different qualities of movement – essentially the ability to answer the question, "what happens if I". Polanyi (1958/2002) expands on this idea, suggesting that "actively muscular skills" are comparable to "testing and tasting" (p. 54) where certain aspects of moving become meaningful. He proposes that when people learn to swim for example, they feel their way forward by noting certain experiences and relationships. Polanyi (1958/2002) claims that in this respect, skill can be thought of as a kind of *connoisseurship* (see also Eisner, 1976, in relation to educational connoisseurship). Movement connoisseurs know where their bodies are in space and time, and how they will interact with the material and social environment (see Shusterman, 2009, 2011; Toner & Moran, 2015, for a perspective with similarities).

To extend the idea of connoisseurship, we want to suggest that having movement sensitivity can be likened to being familiar with a landscape. Here, we have been inspired by the work of Hirst (2010) and Carlgren (2012). Carlgren (2012, p. 124) suggests that as people learn, they gradually "learn to discern more and more nuances, understand how the different parts are interconnected as well as [develop] an ability to orient [themselves] in the landscape" (see also Wenger-Trayner, Fenton-O'Creevy, Hutchinson, Kubiak & Wenger-Trayner, 2014 for further use of the landscape metaphor in relation to learning). In this light, skilled performers can discern details and relationships (Polanyi, 1958/2002). In sport, particular ways of moving such as hurdling, throwing a disc in disc golf, or performing a cartwheel can be thought of as parts of movement landscapes, or what we will refer to as *kinescapes*. Kinescapes have their own features and principles that relate to propulsion, flight, rotation and so forth. Principles are not only mechanical but also cultural and aesthetic as they encompass traditions and expectations relating to good performance (c.f. Shusterman, 2011). A cartwheel performed in the kinescape of artistic gymnastics, for example, constitutes a qualitatively different movement experience to a cartwheel performed

during a capoeira routine. Ryle (1949/2009) and Polanyi (1958/2002) stress that it is insufficient to explain principles to a beginner for learning to take place. Principles – both mechanical and cultural – are not abstract or theoretical but need to be experienced before understanding can be embodied, a point to which we return in the next section.

Before addressing how skilful dispositions and movement connoisseurship in kinescapes can be developed in sports, two points are worth understanding. First, a heightened appreciation of different movement qualities is not necessarily reflected in an increased ability to verbalise one's understanding. Polanyi (1969, 1958/2002) emphasises that much of what one appreciates is tacit. Individuals know what to do and may well demonstrate appropriate or skilled actions, but they may be hard pressed to explain what they did or how they did it. Polanyi (1958/2002) refers to this phenomenon as “unspecifiability” (p. 53). Second, while connoisseurship is connected to what is noticed, Polanyi (1958/2002) suggests that becoming a connoisseur is not simply a matter of noticing “more and more”. Rather, he contends that as people become more skilled, different aspects shift into the foreground of their experience. Polanyi (1958/2002) refers to foregrounds and backgrounds of attention as focal and subsidiary awareness. A beginning freestyle swimmer might for instance, focus on breathing every fourth stroke while breathing every fourth stroke. An intermediate swimmer might focus on breathing in the trough of the wave caused by the head while breathing in that trough *and* maintaining a breathing rhythm. In the first case, the breathing rhythm is in the swimmer's focal awareness whereas in the second, the breathing rhythm is in the swimmer's subsidiary awareness. Especially important is that swimming and thinking are not two separate actions; they happen together. From this perspective, it makes little sense to talk of cognitive interference (Beilock & Carr, 2001; Gabbett, Wake & Abernethy, 2011) since acting could never take place in the absence of thinking.

### **A kinesio-cultural approach to coaching for skill development**

If skill is thought of as dispositional and as connoisseurship within a kinescape, how might the development of sport skills be done differently? Below, we outline two kinesio-cultural explorative pursuits in which individuals might engage to develop skilful dispositions.

#### ***Helping athletes to become movement connoisseurs***

For athletes to develop a sensitivity to the ways that they move, they need opportunities to experience qualities and principles of kinescapes. Sensitivity can be enhanced in fields of movement both by moving and by

watching others move. By inhabiting, or “dwelling” (Polanyi, 1958/2002, p. 173) in kinescapes, individuals can become adept at experiencing aspects that are “critical” (Nyberg & Carlgren, 2015, p. 612) for moving in certain ways. Skilled swimmers often develop a familiarity with their bodies in water for example, such that they know what will happen if they cup their hands slightly, they know how to get more propulsion from their kick, they may even know how to adjust their style to different water temperatures (McNarry, Allen-Collinson & Evans, 2021). This kind of awareness does not develop automatically, and connoisseurship is the result of reflective, or *intelligent* practising (Ryle, 1949/2009, see below).

Coaches may draw athletes’ attention to qualities of movement by encouraging athletes to experiment with different movement tasks or equipment and posing questions that involve comparison and contrast. In one phase of our research with sports coaching students who were learning to dance, we provided only textual inspiration for moving. We then asked the students to observe each other and compare their movement responses. In another activity, we invited the students to express certain moods through their movements and discuss in small groups how mood in movement related to music, the movements of partners, and the presence of an audience, for example. Our intention was to stimulate the individuals’ judgements (see Ryle, 1949/2009) while encouraging an appreciation of the qualities of particular situations, as opposed to solidifying their capacities to move in particular ways (Eisner, 1976). In less aesthetic sports, athletes may well settle on particular ways of moving. From a kinesio-cultural perspective this is unproblematic if athletes have considered alternatives and can answer the question “what happens if I . . .”. In this sense, movement connoisseurs are skilful in a different manner to target hitters: they know more “around” ways of moving and can adjust their movements for different purposes.

Part of becoming a movement connoisseur is seeing each movement as qualitatively different from other similar movements. It is through discerning differences that Ryle (1949/2009) proposes that every experience contains potential lessons that can be used to improve subsequent experiences. In this light, the distinction between training and performing becomes blurred and knowledgeable experts are always still learning (see Collins, Carson & Toner, 2016; Wulf, 2016, for discussions of this issue). Continual possibilities for improvement are, however, dependent on individuals’ capacities for recognising qualities and principles in movement. Without sensitivity, different ways of moving will be experienced as more or less the same and performers will cease to develop.

With respect to learning from repeated attempts, our approach is in line with the general thrust of Ericsson’s (2008, 2014, 2020) practice research. Coaches can, for instance, draw athletes’ attention to specific aspects of

moving and help athletes to appreciate consequences of change. At the same time, we are reluctant to see the coach's task as determining appropriate goals and providing instructions on the means for achieving goals (Ericsson, 2020). Identifying goals and deciding how to achieve these goals are for us, indispensable activities of a connoisseur. If coaches do these things for their athletes, they will deprive athletes of opportunities to develop connoisseurship.

### ***Identifying and cultivating qualities of skilful athletic dispositions***

Conceiving skilful performance as the actualisation of a dispositional complex means thinking about skilful performance in more than technical terms. In kinescapes involving acrobatics that contain an element of fear for example, skill involves a capacity to move and feel anxious at the same time. In our research with pre-service physical education teachers, learning to unicycle involved unicycling short distances while fearing physical injury (Barker, Nyberg & Larsson, 2020a). Some pre-service teachers nonetheless rode without support and those who attempted to ride became courageous and skilful *concurrently*. What positivists might describe as a split process of first thinking and then moving (the participants had to first “overcome fear” in order for their bodies to perform the required actions) actually took place as overcoming-fear-and-riding. Conversely, those who continued to embody fear by, for example, holding on to support structures such as beams, wall bars and partners, struggled to ride a unicycle, even after almost eight hours of practice.

All kinescapes necessitate peculiar physiological responses but these responses cannot be separated from what individuals are thinking. In the case of unicycling a degree of muscular tension in the hip adductors helps the rider to stay on the cycle. Over-tensing as a result of anxiety was common in the first sessions and resulted in muscle soreness for many participants. Discomfort dissipated as individuals discovered an appropriate amount of tension and their muscles became accustomed to new ways of moving. Again, calm, skilful thinking and appropriate physiological response appeared not as two separate actions but as one process.

Dispositions develop through habitually acting in certain ways (Bourdieu & Wacquant, 1992) and in an important respect, individuals *become* who they are by repeatedly engaging in practices (Andersson & Maivorsdotter, 2017; Barker, Barker-Ruchti, Rynne & Lee, 2012, 2014b). Even so, Ryle (1949/2009) proposes that individuals are unlikely to become “intelligent” (p. 23) agents by engaging in unreflective, drill-type repetitions. For individuals to develop intelligent capacities, Ryle (1949/2009) suggests that their judgement must be stimulated while engaging in these practices. In one respect, this assertion simply reinforces the importance of connoisseurship

and reflective judgement, an assertion that is consistent with Ericsson's (2008) deliberate approach to practicing. A discerning disposition can be extended, however, if we broaden our understanding of skill and consider cultural dimensions of kinescapes (see Uehara, Button, Falcous & Davids, 2016, for a call to acknowledge the influence of sociocultural factors on skill development). Thinking-acting intelligently within a kinescape also requires athletes to appreciate the social norms, values and expectations that help to comprise that kinescape. The norms surrounding foul play, for example, can be quite different in rugby compared with football. In elite level football, it can be acceptable for a player to exaggerate the effect of an opponent's foul to secure a free kick. In elite level rugby, this kind of action will often earn deprecation. Experienced players in the respective sports generally understand norms from having "submerge[d] their bodies in the routines and cultures' of their respective sports" (Shilling, 2008, p. 44). Consequently, they may have developed something of a football or rugby disposition when it comes to being fouled. *Skilful* players though may be able to judge how norms work in specific situations and may even know when norms can be circumvented. A football player might, for example, judge from the referee's posture, the current score, and the number of free kicks awarded in the previous minutes that an additional display of determination to stay on her feet before falling is needed if she is to be awarded a free kick. After a high tackle, a rugby player might stay on the ground a fraction of a second longer than necessary to secure a penalty but rise and jog back to her position to avoid castigation from opponents or fans. As in other performance situations (see Ryle, 1949/2009, p. 48), skill in these hypothetical examples lies not in two processes of intellectual preparation and execution but in the actualisation of a disposition.

## Discussion

In reconsidering skill development, we have raised several issues that are relevant to the traditional epistemological assumptions identified at the outset of the paper and that warrant further discussion. In this section, we focus on three specific issues: (1) coach and athlete roles in skill development, (2) the place of athlete reflection, and (3) the changing of habits.

We have asserted that coaches and athletes should be involved in the development of movement connoisseurship. We have stressed the importance of intelligent routines and habitual practices. In both respects, we have proposed that coaches and athletes have active roles to play in the development of skill. Here, we are reminded of Abraham and Collins (2011) gastronomic analogy of coaching. Abrahams and Collins claim that innovative coaches are like great chefs – they have an extensive range of knowledge and can be creative when things go awry. To our minds, a kinesio-

cultural approach to skill development applies this same logic to athletes. Skilful athletes can benefit from having extensive embodied knowledge which necessarily involves adapting their actions – or better, their thinking-actions – to the physical and cultural demands of the situations they face.

It is worth reiterating that any theoretical perspective has consequences for practice. While one consequence of the perspective considered here may be that reflective connoisseurs become better at adapting to different conditions in Abraham and Collins' (2011) sense, it is likely that target hitters who receive instruction from experienced coaches will improve performance of a particular technique more rapidly (Gabbett, Wake & Abernethy, 2011). Reconsidering skill development inevitably requires reconsidering skill. It would be somewhat of a nonsense to change the way one coaches for skill development but expect individuals to develop the same kind of skill.

Second and related, the idea that skilled athletes can be highly sensitive and can make a variety of judgements does not sit particularly well with the traditional motor learning assumption that skilled behaviour is automated and non-reflective (Carson & Collins, 2016; Gröpel & Mesagno, 2019). Indeed, conscious processing in high performance conditions is frequently framed as a significant problem (see Beilock & Carr, 2001), a framing undergirded by a binary split of mind and body (Carson, Collins & Kearney, 2018).

From a non-binary perspective that merges mind and body (see also Shusterman, 2009; Toner & Moran, 2015), reflections are people's performances. For analytical and practical purposes, thoughts are not noise that athletes learn to filter out as they become more skilled. Instead, they are part of the phenomenon of moving skilfully. The thinking-acting of the skilled performer will be qualitatively different to the thinking-acting of the novice. This point is often recognised in scholarship that focuses on attentional focus (see, for example, Collins, Carson & Toner, 2016; Toner & Moran, 2015; Wulf, 2016), even if at times there still appears to be a tendency to treat attention and physical performance as two separate phenomena.

Shifting from skill-as-automatisation to skill-as-judgement casts the issue of sub-optimal performance in a different light. A traditional explanation given when an individual's performance fails to meet expectations is that the performer "paid too much attention to his body" (golf provides apt examples – see Wulf, 2016). However, such an explanation works post-hoc and assumes a causal relation between the unobservable phenomenon of an athlete's thought processes and the observable phenomenon of an athlete's actions. The unobservable aspect makes the explanation difficult to refute with empirical evidence (see Collins, Carson & Toner, 2016, for a sophisticated challenge to the superiority of external focus of attention claim). An alternative is to see unexpectedly poor performances as instances

of unintelligent thinking-acting. When a professional golfer has a bad round, we might simply say that he did not think-act as well as he or anyone else expected and that his thinking-actions were incompatible with the requisites of the day. The reason for poor performance then lies in the synthetic process of combining mind-body-skill-context rather than solely in the athlete's mind.

Finally, we have suggested that developing intelligent habits is an important part of becoming a skilful performer. Individuals do not however enter sport free of habits. On the contrary, athletes enter sporting contexts with a host of habitual ways of being in their worlds (Barker, Barker-Ruchti, Rynne & Lee, 2014b) that have the potential to affect skill development. Further, habits continue to be shaped outside of sport as athletes interact with family, friends, employers and so forth. This complexity challenges the notion of universal principles of skill development and suggests that differentiated approaches are necessary (see Araújo & Davids, 2004, 2011). This is not to say that athletes develop skill in entirely personal ways. Comparable family, education, and childhood sport experiences can explain similarities in dispositional development (Hodges & Williams, 2019). We are however proposing that since not all experiences are shared, different habits will emerge. Attempting to facilitate skill development with a decontextualised coaching method without consideration of individual characteristics is likely to disadvantage individuals who, under other circumstances, may have been successful.

## Conclusion

The aim of this paper was to reconsider skill learning and think beyond a target hitting understanding of skill development. In this endeavour, we have put forward an approach to skill development based on the metaphor of familiarising one's self with a landscape and the ideas of dispositional learning and connoisseurship. We want to finish with a couple of brief reflections on how these ideas might be met by coaches and scholars. First, it is difficult to say how committed coaches or coaching researchers are to a target hitting understanding of skill development. Perhaps some coaches and researchers already question instrumental and reductionist principles of coaching, seeing them as incommensurate with their experiences of reality. Or perhaps coaches and researchers see the target hitting metaphor – and the idea that if coaches can just deliver instructions in the right way or organise practice conditions correctly, athletes will attain optimal performance – as intuitively appealing and worth striving for. We have been concerned to present an alternative that outlines how coaches and athletes might “sharpen the senses” (Shusterman, 2011) and think-act in intelligent

ways, but we have made no claims to certainty regarding performance. Our approach is more aligned with an epistemology based on interpretation rather than calculation. Our hope, nonetheless, is that our invitation will resonate with readers' experiences of coaching and that readers will see our contribution as part of a broader project to extend ways of seeing skill development (Gibson, 2014; Varela, Thompson & Rosch, 2017). In this sense, it is part of a more general invitation to reconsider traditional assumptions and move forward.

We also recognise that moving beyond a target hitting understanding of skill development could have potentially far-reaching consequences and would require effort. To engage in kinesio-cultural coaching for example, practitioners would need specific knowledge of the kinescapes with which they are dealing, not in terms of how to perform techniques most efficiently but in terms of the general mechanical and cultural qualities of the particular kinescape in which they are working. Athletes would need to train in ways that extend their sensitivity, not just their capacity to perform techniques. Again, there is nothing to say that some coaches and athletes do not already have this knowledge or already work in these ways. Our point is that reconsidering is not simply an academic exercise; rather it involves change of practices. With these points in mind, we would conclude by expressing our hope that the reconsideration of skill development offered in this paper provides readers with inspiration for thinking-acting.

### Disclosure statement

No potential conflict of interest was reported by the authors.

### Funding

This work was supported by the Swedish Research Council under Grant [2017-03471].

### ORCID

D. Barker  <http://orcid.org/0000-0003-4162-9844>

H. Larsson  <http://orcid.org/0000-0002-0638-7176>

### References

- Abraham, A., & Collins, D. (2011). Effective skill development: How should athletes' skills be developed. In D. Collins, A. Button, & H. Richards (Eds.), *Performance psychology: A practitioner's guide* (pp. 207-229). Kidlington Elsevier.

- Anderson, D. I., Magill, R. A., Mayo, A. M., & Stell, K. A. (2020). Enhancing motor skill acquisition with augmented feedback. In N. Hodges & A. M. Williams (Eds.), *Skill acquisition in sport: Research, theory and practice* (3rd ed., pp. 3–19). Routledge.
- Andersson, J., & Maivorsdotter, N. (2017). The ‘body pedagogics’ of an elite footballer’s career path—analysing Zlatan Ibrahimovic’s biography. *Physical Education and Sport Pedagogy*, 22(5), 502–517. <https://doi.org/10.1080/17408989.2016.1268591>
- Araújo, D., & Davids, K. W. (2004). Embodied cognition and emergent decision-making in dynamical movement systems. *Junctures: The Journal for Thematic Dialogue*, 2, 45–57. <https://junctures.org/index.php/junctures/article/view/150>
- Araújo, D., & Davids, K. W. (2011). What exactly is acquired during skill acquisition? *Journal of Consciousness Studies*, 18(3–4), 7–23. <https://www.ingentaconnect.com/content/imp/jcs/2011/00000018/f0020003/art00001>
- Barker, D. M., Barker-Ruchti, N., Rynne, S., & Lee, J. (2012). Olympism as education: Analysing the learning experiences of elite athletes. *Educational Review*, 64(3), 369–384. <https://doi.org/10.1080/00131911.2012.665846>
- Barker, D. M., Barker-Ruchti, N., Rynne, S., & Lee, J. (2014a). ‘Just do a little more’: Examining expertise in high performance sport from a sociocultural learning perspective. *Reflective Practice*, 15(1), 92–105. <https://doi.org/10.1080/14623943.2013.868797>
- Barker, D. M., Barker-Ruchti, N., Rynne, S., & Lee, J. (2014b). Moving out of sports: A sociocultural examination of Olympic career transitions. *International Journal of Sports Science and Coaching*, 9(2), 255–270. <https://doi.org/10.1260/1747-9541.9.2.255>
- Barker, D. M., Bergentoft, H., & Nyberg, G. (2017). What would physical educators know about movement education? A review of literature, 2006–2016. *Quest*, 69(4), 419–435. <https://doi.org/DOI:10.1080/00336297.2016.1268180>
- Barker, D. M., Larsson, H., & Nyberg, G. (2020b). Exploring movement learning in physical education using a threshold approach. *Journal of Teaching in Physical Education*, 39(3), 415–423. <https://doi.org/10.1123/jtpe.2019-0130>
- Barker, D. M., Nyberg, G., & Larsson, H. (2020a). Joy, fear and resignation: Investigating emotions in physical education using a symbolic interactionist approach. *Sport, Education and Society*, 25(8), 872–888. <https://doi.org/10.1080/13573322.2019.1672148>
- Beilock, S., & Carr, T. (2001). On the fragility of skilled performance: What governs choking under pressure? *Journal of Experimental Psychology: General*, 130(4), 701. <https://doi.org/10.1037/0096-3445.130.4.701>
- Bobrownicki, R., MacPherson, A., Collins, D., & Sproule, J. (2019). The acute effects of analogy and explicit instruction on movement and performance. *Psychology of Sport and Exercise*, 44, 17–25. <https://doi.org/10.1016/j.psychsport.2019.04.016>
- Bourdieu, P. & Wacquant, L. (1992). *An invitation to reflexive sociology*. Chicago: University of Chicago Press.
- 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*, 46(6), 829–843. <https://doi.org/10.1007/s40279-015-0452-2>
- Carlgren, I. (2012). Kunskap för Bildung? [Knowledge for Bildung?]. In T. Englund, E. Forsberg and D. Sundberg (Eds), *Vad Räknas som Kunskap? Läroplansteoretiska Utsikter och Inblickar i Lärarutbildning och Skola* [What Counts as Knowledge? Curriculum Theory in Teacher Education and School](pp. 118–139). Stockholm: Liber.
- Carson, H., Collins, D., & Kearney, P. (2018). Skill change in elite-level kickers: Interdisciplinary considerations of an applied framework. In H. Nunome, E. Hennig, & N. Smith (Eds.), *Football Biomechanics* (pp. 173–190). Routledge.

- Carson, H., & Collins, D. (2016). The fourth dimension: A motoric perspective on the anxiety–performance relationship. *International Review of Sport and Exercise Psychology*, 9(1), 1–21. <https://doi.org/10.1080/1750984X.2015.1072231>
- Collins, D., Carson, H., & Toner, J. (2016). Letter to the editor concerning the article “Performance of gymnastics skill benefits from an external focus of attention” by Abdollahipour, Wulf, Psotta & Nieto (2015). *Journal of Sports Sciences*, 34(13), 1288–1292. <https://doi.org/10.1080/02640414.2015.1098782>
- Eisner, E. W. (1976). Educational connoisseurship and criticism: Their form and functions in educational evaluation. *Journal of Aesthetic Education*, 10(3/4), 135–150. <https://doi.org/10.2307/3332067>
- Ericsson, K. A. (2008). Deliberate practice and acquisition of expert performance: A general overview. *Academic Emergency Medicine*, 15(11), 988–994. <https://doi.org/10.1111/j.1553-2712.2008.00227.x>
- Ericsson, K. A. (2014). Why expert performance is special and cannot be extrapolated from studies of performance in the general population: A response to criticisms. *Intelligence*, 45, 81–103. <https://doi.org/10.1016/j.intell.2013.12.001>
- Ericsson, K. A. (2020). Towards a science of the acquisition of expert performance in sports: Clarifying the differences between deliberate practice and other types of practice. *Journal of Sports Sciences*, 38(2), 159–176. <https://doi.org/10.1080/02640414.2019.1688618>
- Ericsson, K. A., Krampe, R. T., & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100(3), 363–406. <https://doi.org/10.1037/0033-295X.100.3.363>
- Fischman, M. G. (2007). Motor learning and control foundations of kinesiology: Defining the academic core. *Quest*, 59(1), 67–76. <https://doi.org/10.1080/00336297.2007.10483537>
- Gabbett, T., & Masters, R. (2011). Challenges and solutions when applying implicit motor learning theory in a high performance sport environment: Examples from Rugby League. *International Journal of Sports Science & Coaching*, 6(4), 567–575. <https://doi.org/10.1260/1747-9541.6.4.567>
- Gabbett, T., Wake, M., & Abernethy, B. (2011). Use of dual-task methodology for skill assessment and development: Examples from rugby league. *Journal of Sports Sciences*, 29(1), 7–18. <https://doi.org/10.1080/02640414.2010.514280>
- George, A. L., & Bennett, A. (2005). *Case studies and theory development in the social sciences*. MIT Press.
- Gibson, J. J. (2014). *The ecological approach to visual perception: Classic edition*. Routledge.
- Gröpel, P., & Mesagno, C. (2019). Choking interventions in sports: A systematic review. *International Review of Sport and Exercise Psychology*, 12(1), 176–201. <https://doi.org/10.1080/1750984X.2017.1408134>
- Hirst, P. H. (2010). *Knowledge and the curriculum. A collection of philosophical papers*. Routledge & Kegan Paul.
- Hodges, N., & Williams, M. (Eds.). (2019). *Skill acquisition in sport: Research, theory and practice* (3rd ed.). Routledge.
- Hopwood, M., Mann, D., Farrow, D., & Nielsen, T. (2011). Does visual-perceptual training augment the fielding performance of skilled cricketers? *International Journal of Sports Science & Coaching*, 6(4), 523–535. <https://doi.org/10.1260/1747-9541.6.4.523>
- Kelso, J. A. S. (1995). *Dynamic patterns: The self-organization of brain and behavior*. The MIT Press.
- Lam, W., Maxwell, J., & Masters, R. (2009). Analogy learning and the performance of motor skills under pressure. *Journal of Sport and Exercise Psychology*, 31(3), 337–357. <https://doi.org/10.1123/jsep.31.3.337>

- Liao, C., & Masters, R. (2001). Analogy learning: A means to implicit motor learning. *Journal of Sports Sciences*, 19(5), 307–319. <https://doi.org/10.1080/02640410152006081>
- 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. <https://doi.org/10.1177/1745691616635591>
- Magill, R. A. (1977). The processing of knowledge of results information for a serial-motor task. *Journal of Motor Behavior*, 9(2), 113–118.
- Mattes, J. (2016). Attentional focus in motor learning, the Feldenkrais method, and mindful movement. *Perceptual and Motor Skills*, 123(1), 258–276. <https://doi.org/10.1177/0031512516661275>
- McNarry, G., Allen-Collinson, J., & Evans, A. B. (2021). Sensory sociological phenomenology, somatic learning and ‘lived’ temperature in competitive pool swimming. *The Sociological Review*, 69(1), 206–222.
- Memmert, D., Hagemann, N., Althoetmar, R., Geppert, S., & Seiler, D. (2009). Conditions of practice in perceptual skill learning. *Research Quarterly for Exercise and Sport*, 80(1), 32–43. <https://doi.org/10.5641/027013609X13087704027517>
- Millar, S., Oldham, A., & Donovan, M. (2011). Coaches’ self-awareness of timing, nature and intent of verbal instructions to athletes. *International Journal of Sports Science & Coaching*, 6(4), 503–513. <https://doi.org/10.1260/1747-9541.6.4.503>
- 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). Lawrence Erlbaum.
- Nyberg, G. (2014). Exploring “knowings” in human movement The practical knowledge of pole-vaulters. *European Physical Education Review*, 20(1), 72–89. <https://doi.org/10.1177/1356336X13496002>
- Nyberg, G. (2015). Developing a ‘somatic velocimeter’ – The practical knowledge of free-skiers. *Qualitative Research in Sport, Exercise and Health*, 7(1), 109–124. <https://doi.org/10.1080/2159676X.2013.857709>
- Nyberg, G., Barker, D., & Larsson, H. (2020). Exploring the educational landscape of juggling – Challenging notions of ability in physical education. *Physical Education and Sport Pedagogy*, 25(2), 201–212. <https://doi.org/10.1080/17408989.2020.1712349>
- Nyberg, G., Barker, D. M., & Larsson, H. (2021). Learning in the educational landscapes of juggling, unicycling and dancing. *Physical Education and Sport Pedagogy*, 26(3), 279–292. <https://doi.org/10.1080/17408989.2021.1886265>
- Nyberg, G., & Carlgren, I. M. (2015). Exploring capability to move–somatic grasping of house-hopping. *Physical Education and Sport Pedagogy*, 20(6), 612–628. <https://doi.org/10.1080/17408989.2014.882893>
- O’Connor, D., Larkin, P., & Williams, A. M. (2018). Observations of youth football training: How do coaches structure training sessions for player development? *Journal of Sports Sciences*, 36(1), 39–47. <https://doi.org/10.1080/02640414.2016.1277034>
- Polanyi, M. (1958/2002). *Personal knowledge: Towards a post-critical philosophy*. Routledge.
- Polanyi, M. (1969). *Knowing and being. Essays by Michael Polanyi*. University of Chicago Press.
- Porter, J., Wu, W., & Partridge, J. (2010). Focus of attention and verbal instructions: Strategies of elite track and field coaches and athletes. *Sport Science Review*, 19(3–4), 77–89. <https://doi.org/10.2478/v10237-011-0018-7>
- Renshaw, I., Araújo, D., Button, C., Chow, J. Y., Davids, K. W., & 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. <https://doi.org/10.1080/17408989.2015.1095870>

- Ryle, G. (1949/2009). *The concept of mind*. Routledge.
- Shea, J. B., & Morgan, R. L. (1979). Contextual interference effects on the acquisition, retention, and transfer of a motor skill. *Journal of Experimental Psychology: Human Learning and Memory*, 5(2), 179–187. <https://doi.org/10.1037/0278-7393.5.2.179>
- Sheets-Johnstone, M. (2011). *The primacy of movement*. John Benjamins Publishing.
- Shilling, C. (2008). *Changing bodies: Habit, crisis, creativity*. Sage.
- Shoemaker, P. J., Tankard, J. W., & Lasorsa, D. L. (2004). *How to build social science theories*. Sage.
- Shusterman, R. (2009). Body consciousness and performance: Somaesthetics east and west. *The Journal of Aesthetics and Art Criticism*, 67(2), 133–145. <https://doi.org/10.1111/j.1540-6245.2009.01343.x>
- Shusterman, R. (2011). Soma, self, and society: Somaesthetics as pragmatist meliorism. *Metaphilosophy*, 42(3), 314–327. <https://doi.org/10.1111/j.1467-9973.2011.01687.x>
- Singer, R. N. (1968). *Motor learning and human performance: An application to physical education skills*. Macmillan.
- Smith, W. (2016). Fundamental movement skills and fundamental games skills are complementary pairs and should be taught in complementary ways at all stages of skill development. *Sport, Education and Society*, 21(3), 431–442. <https://doi.org/10.1080/13573322.2014.927757>
- Solomon, G., Golden, A., Jr, Ciapponi, T., & Martin, A. (1998). Coach expectations and differential feedback: Perceptual flexibility revisited. *Journal of Sport Behavior*, 21(3), 298–311.
- Thomas, G. (2007). *Education and theory: Strangers in paradigms*. McGraw Hill.
- Toner, J., & Moran, A. (2015). Enhancing performance proficiency at the expert level: Considering the role of ‘somaesthetic awareness’. *Psychology of Sport and Exercise*, 16, 110–117. <https://doi.org/10.1016/j.psychsport.2014.07.006>
- Tzetzis, G., Votsis, E., & Kourtessis, T. (2008). The effect of different corrective feedback methods on the outcome and self confidence of young athletes. *Journal of Sports Science & Medicine*, 7(3), 371. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3761887/>
- Uehara, L., Button, C., Falcous, M., & Davids, K. W. (2016). Contextualised skill acquisition research: A new framework to study the development of sport expertise. *Physical Education and Sport Pedagogy*, 21(2), 153–168. <https://doi.org/10.1080/17408989.2014.924495>
- Varela, F. J., Thompson, E., & Rosch, E. (2017). *The embodied mind, revised edition: Cognitive science and human experience*. MIT press.
- Vera, J. G., Alvarez, J. C. B., & Medina, M. M. (2008). Effects of different practice conditions on acquisition, retention, and transfer of soccer skills by 9-year-old schoolchildren. *Perceptual and Motor Skills*, 106(2), 447–460. <https://doi.org/10.2466/pms.106.2.447-460>
- Wacquant, L. (2004). *Body and soul: Notebooks of an apprentice boxer*. Oxford University Press.
- Wenger-Trayner, E., Fenton-O’Creevy, M., Hutchinson, S., Kubiak, C., & Wenger-Trayner, B. (Eds.). (2014). *Learning in landscapes of practice: Boundaries, identity, and knowledge-ability in practice-based learning*. Routledge.
- Whetten, D. A. (1989). What constitutes a theoretical contribution? *Academy of Management Review*, 14(4), 490–495. <https://doi.org/10.5465/amr.1989.4308371>
- Withagen, R., & Michaels, C. F. (2005). On ecological conceptualizations of perceptual systems and action systems. *Theory & Psychology*, 15(5), 603–620. <https://doi.org/10.1177/0959354305057265>
- Wulf, G. (2016). Why did Tiger Woods shoot 82? A commentary on. *Psychology of Sport and Exercise*, 22, 337–338. <https://doi.org/10.1016/j.psychsport.2015.05.006>