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Defining elite athletes: Issues in the study of expert performance in sport psychology

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A B S T R A C T

Objectives: There has been considerable inconsistency and confusion in the definition of elite/expert athletes in sport psychology research, which has implications for studies conducted in this area and for the field as a whole. This study aimed to: (i) critically evaluate the ways in which recent research in sport psychology has defined elite/expert athletes; (ii) explore the rationale for using such athletes; and (iii) evaluate the conclusions that research in this field draws about the nature of expertise.
Design: Conventional systematic review principles were employed to conduct a rigorous search and synthesise findings.
Methods: A comprehensive literature search of SPORTDiscus, Academic Search Complete, PsycINFO, and PsycARTICLES was completed in September, 2013 which yielded 91 empirical studies published between 2010 and 2013. The primarily qualitative findings were analysed thematically.
Results: Eight ways of defining elite/expert athletes were identified, ranging from Olympic champions to regional level competitors and those with as little as two years of experience in their sport. Three types of rationale were evident in these studies (i.e., "necessity", "exploratory" and "superior"); while findings also indicated that some elite athletes are psychologically idiosyncratic and perhaps even dysfunctional in their behaviour. Finally, only 19 of the 91 included studies provided conclusions about the nature of expertise in sport.
Conclusions: This study suggests that the definitions of elite athletes vary on a continuum of validity, and the findings are translated into a taxonomy for classifying expert samples in sport psychology research in future. Recommendations are provided for researchers in this area.

Whether out of envy or admiration, we have long been fascinated by the breath-taking feats of expert or "elite"[1] athletes, such as the footballer Lionel Messi or the tennis star Rafael Nadal, who can perform apparently impossible skills with remarkable consistency and precision. In an effort to understand the cognitive and neural processes that underlie such exceptional skills, researchers in disciplines such as cognitive psychology, sport psychology, motor learning/skill acquisition, kinesiology, and neuroscience have developed a field of inter-disciplinary inquiry that is concerned with the scientific study of 'expertise' or the growth of specialist knowledge and skills through effortful experience (see Ericsson, 1996, for a detailed introduction). Although empirical research on expertise is little more than four decades old, psychological speculation about the nature and determinants of eminence in human achievement dates back at least as far as Galton (1869). Interestingly, whereas the first modern studies in this field (in the 1960s and 1970s) were conducted mainly on performance in formal knowledge domains such chess (see Chase & Simon, 1973; de Groot, 1965), more recent research (since the mid-1990s) has explored expert-novice differences in largely perceptual-motor domains such as dance (Bläsing et al., 2012) and sport (e.g., Müller, Abernethy, Eid, McBean, & Rose, 2010; Williams & Ford, 2008). Regardless of the domain under investigation, however, research on expertise is now a "hot topic" in psychology. To illustrate this trend, expertise has attracted distinctive methodological paradigms (e.g., Ericsson & Towne, 2013; Ericsson & Ward, 2007); special issues of academic journals such as *Applied Cognitive Psychology* (Ericsson, 2005), *Journal of Experimental Psychology: Applied*

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[1] We shall use the terms elite and expert interchangeably, as did Starkes and Ericsson (2003).

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(Ericsson & Williams, 2007) and *Journal of Sport & Exercise Psychology* (Williams & Ericsson, 2008); several scholarly handbooks (e.g., Ericsson, 1996; Staszewski, 2013); and considerable interest from popular science writers (e.g., Colvin, 2008; Gladwell, 2009; Syed, 2010). Arising from this confluence of research activity, evidence has accumulated to show that expert athletes differ consistently from relative novices with regard to a variety of perceptual, cognitive and strategic aspects of behaviour (see summary in Eklund & Tenenbaum, 2014). For example, compared to their novice counterparts, expert athletes tend to have a more extensive knowledge-base of sport-specific information and to be more adept at using this knowledge efficiently to identify, remember and manipulate relevant information in their specialist sport. To summarise, on the basis of the preceding evidence, it seems reasonable to conclude that research on expertise is a thriving and productive scientific endeavour.

Unfortunately, this latter conclusion may be challenged on the grounds that there is considerable confusion and inconsistency among expertise researchers with regard to the criteria used to define the term "elite" or "expert" athlete (Polman, 2012). For example, despite widespread acceptance of the "ten year rule" (Ericsson, Krampe, Tesch-Romer, 1993; Hayes, 1985) – or the assumption that it takes about 10 years of sustained deliberate practice to become an expert in any field or 10,000 hours (as popularised by Gladwell, 2009) – the terms "elite" and "expert" have been ascribed to athletes with as little as *two years* of accumulated practice (e.g., Welch & Tschampl, 2012). Similarly, they have been applied in a rather cavalier fashion to such heterogeneous samples as Olympic champions (e.g., Grant & Schempp, 2013), professional performers (Jordet & Elferink-Gemser, 2012), inter-varsity athletes (e.g., Steiner, Denny, & Stemmle, 2010), members of national squads (Bertollo et al., 2012), and athletes who were simply part of a competitive team (Voss, Kramer, Basak, Prakash, & Roberts, 2010). Clearly, such imprecision in the criteria used to define participants as "expert" athletes threatens the validity of research on expertise in sport. For example, at a theoretical level, it is difficult to draw valid conclusions about expertise from studies in which experts have been defined using significantly different criteria. Unfortunately, the extent of this definitional problem at the heart of expertise research has not yet been investigated systematically. Furthermore, few guidelines are currently available to help researchers define "expertise" as objectively as possible in the study of sport.

Against this background of confusion, the present paper attempts to fill three main gaps in the field by providing a review of research that has sampled elite/expert athletes. First, we aimed to analyse, and evaluate the validity of, the definitions used by researchers studying such participants. Second, we aimed to explore the rationale provided by the authors of these studies for employing elite/expert athlete samples. This information is crucial in determining the extent to which these studies sought to increase theoretical understanding of expertise. Thus our third aim was to explore the general theoretical conclusions that have been drawn about expertise from research with these athletes.

Method

Development of search strategy

Our review used conventional systematic review principles in order to ensure the rigorous selection of studies based on replicable criteria (cf. Centre for Reviews and Dissemination [CRD], 2009; Smith, 2010). To begin, a list of key words was trialled in a preliminary search on the SPORTDiscus database, and the findings from this exploratory search were reviewed so that the most efficient and effective search terms could be identified. The main focus of this review was definitions relating to *elite* or *expert* athletes, and therefore we primarily sought to retrieve studies which explicitly used these terms. Other relevant terms (e.g., "skilled" or "experienced") were initially trialled but combining these with *elite/expert* produced either an excessively high (over 280,000) or overly restrictive (just 300) number of possible inclusions, and therefore the terms *elite/expert* were prioritised. Furthermore, this review was primarily concerned with sport psychology research, but to capture studies from overlapping areas (such as motor control/performance and skill acquisition) we also included *cognitive psychology* and *neuroscience* in the search. The trialling process identified a number of irrelevant terms that were designated as 'limiters' to be removed them from the final results. The list of search terms employed was:

(elite OR expert*) AND athlet* AND sport AND (psychology OR neuroscience)

NOT (adolescent OR youth OR junior OR review)

The databases deemed to be most relevant (based on accessibility and relevance to the topic area), and therefore searched via EbscoHost, were SPORTDiscus, PsycINFO, PsycARTICLES, and Academic Search Complete.

Inclusion/exclusion criteria

Inclusion/exclusion criteria were employed to ensure that the boundaries of the review were clearly defined, and that the search strategy would identify all literature relevant to the aims of the review (CRD, 2009; Smith, 2010), while also keeping the number of inclusions manageable (which we deemed to be less than 100). The studies included in this review needed to be: (i) peer-reviewed research studies published in the English language; (ii) published (either in paper or online) between 2010 and September, 2013 when the formal search was finalised; (iii) original empirical, primary evidence/data; (iv) concerned primarily with either sport psychology or cognitive psychology/neuroscience (e.g., published in journals in these fields); (v) ones that explicitly described their sample as "elite" or "expert" in either the title or abstract (e.g., studies were excluded if they mentioned expertise but described *their* sample as "skilled" instead); (vi) ones that explicitly referred to elite *athletes*, and not coaches, referees, parents, or panels; (vii) ones that involved sporting activities as defined by the Oxford Dictionary of Sports Science and Medicine (Kent, 2006); (viii) ones that did not refer to young, junior, or adolescent elite athletes in the title, abstract or full-text (unless they *also* used, and provided data about, elite athletes in their sample); and (ix) as a final measure to help reduce the number of returns towards the 'manageable' threshold, all included studies needed to be published in journals with an impact factor.

Search returns

The search process was finalised on the 14th of September, 2013, and initially returned 731 potentially relevant studies. After duplicates and studies not published in English were removed, the titles and abstracts of the remaining potential targets were assessed for relevance. This step reduced the potential target papers to 240 articles. Another 80 papers were removed because they were not published in journals with an impact factor. Full-text copies were then obtained for the remaining 160 studies, after which a further 69 were excluded either because: (a) they stated in-text that they used young/junior athletes; (b) they were not sufficiently focused on psychology; or (c) they did not explicitly describe their sample

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