The Development of Professional Judgment and Decision Making Expertise in Applied Sport Psychology

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This paper establishes current theoretical understanding on the development of professional judgment and decision-making (PJDM) expertise within applied sport psychology (ASP). Traditional and naturalistic paradigms of decision making are contrasted and the resulting blending of systematic analysis and intuition most appropriate for applied practice is explained through the concept of skilled intuition (Kahneman & Klein, 2009). Conditions for the development of skilled intuition are considered alongside recognition of the fragility of human judgment and the subtleties of the ASP environment. Key messages from cognitive psychology literature on the development of PJDM expertise are offered and recommendations made to facilitate the acquisition of decision-making expertise in ASP.

Keywords: performance, applied practice, professional practice

Previous literature considering the nature of professional judgment and decision making (PJDM) in applied sport psychology has suggested a mechanism to help us understand the complexity involved (intentions for impact, Martindale & Collins, 2005), offered implications for evaluation, reflective practice, and training (Martindale & Collins, 2007), and called for expert practitioners to make their thinking visible to benefit novice and developing practitioners (Martindale & Collins, 2010). A recent PJDM case study of reflection-in-action has offered additional insight into how practitioners think in action and exemplified the influence of practitioner PJDM on implementation at multiple levels of practice (Martindale & Collins, 2012).

Given that the case has now been made for the importance of PJDM in applied sport psychology (ASP) and other related professions (e.g., applied practice seen as a series of judgments and decisions, with consequent implications for training, continuing professional development, and reflection), and sufficient parameterization of the area has been outlined, attention should inevitably turn to the development of PJDM expertise within the field. To give full consideration to this emerging area of literature and research, this paper is dedicated to establishing current theoretical understanding on developing PJDM expertise, and the practical application of this to the context of ASP.

The paper will begin by asking, “what type of thinking is best used in applied sport psychology decision making?” The answer to this question calls for careful navigation through the contrasting traditional and naturalistic paradigms of decision-making and how they might differentially apply to the planning and execution of applied sport psychology interventions. The conditions for the development of skilled intuition are then discussed alongside recognition of the fragility of human judgment. Conditions for the optimum development of PJDM expertise in ASP are specifically considered with regards to the subtleties of the practice environment. Attention then turns to the cognitive psychology literature on the development of judgment and decision-making expertise and the concepts, perspectives, and issues considered relevant in an ASP context. Finally, the training of decision-making expertise is considered, providing recommendations for the learning strategies, goals, and tactics necessary to facilitate the acquisition of decision-making expertise in ASP. These recommendations are used to make suggestions for future research directions in this area.
Intuitive or Analytical: What Type of Thinking is used in Applied Sport Psychology Decision Making?

It has been argued that effective practice relies on the careful consideration of professional knowledge, theoretical orientation, presenting cues, client needs, situational context, relationships, and goals, among other factors (Martindale, 2011). Indeed, the role of analytical thinking is generally accepted as a central feature of the helping professions (e.g., Egan, 2002). However, before it is possible to answer the question above with clarity, it is necessary to explore the concept of intuition in more depth. Intuitive thinking was not originally perceived favorably by traditional judgment and decision making theorists (e.g., Tversky & Kahneman, 1971) and the relative merits for applied practice have only come to light in recent years (e.g., Klein, 1998). In this regard, it is useful to consider the important distinction between different types of intuitive thinking, as suggested by naturalistic decision making (NDM) and the more traditional heuristics and biases (HB) approaches (Kahneman & Klein, 2009). NDM research explores intuitive judgments that arise from experience and manifest skill (e.g., recognizing the signs and symptoms of athlete burnout) through use of a recognition primed decision (RPD) strategy; Klein, Calderwood & Clinton-Cirocco, 1986, as cited in Phillips, Klein, & Sieck, 2004) while, in contrast, HB research has been concerned with intuitive judgments that arise from simplifying heuristics, and which are therefore less likely to be accurate and more prone to systematic biases (e.g., use of stereotyped thinking such as a female endurance athlete being likely to have an eating disorder; Kahneman & Klein, 2009). As further clarification, Simon (1992) provided a concise definition of skilled intuition which helps to demystify intuition as an intangible or irrational process: “The situation has provided a cue; This cue has given the expert access to information stored in memory, and the information provides the answer. Intuition is nothing more and nothing less that recognition” (p. 155).

Thus, it seems as though both intuitive and analytical types of thinking are necessary in applying sport psychology knowledge. This becomes more obvious when considering the various timescales over which the practitioner may operate; such as work at a program or intervention level which involves considerable planning and design falls largely into the realm of analytical thinking. At a program level for example, use of evidence-based practice which involves consulting contemporary literature, considering alternative courses of action, and selecting which intervention/s best suit an athlete at a given time. Or at an intervention level, refinements made to an imagery training program being carried out to simulate performance while an athlete is injured (see Martindale & Collins, 2012 for more detail). In contrast, working at the session level where the practitioner is required to respond almost immediately to clients’ needs, concerns, and feedback could more typically be classified as predominantly intuitive (albeit skilled) thinking. For example, changing the planned direction of a discussion because of the spontaneous insights shown by a client (e.g., a teachable moment). Therefore, the PJDM that practitioners are required to carry out on a day-to-day basis is likely to involve the complimentary integration of these apparently contradictory approaches. Klein (2009) refers to this as a blending of systematic analysis and intuition and suggests that the RPD strategy may combine intuition with analysis (pattern matching is the intuitive part, and mental simulation the deliberate analysis). Thus a practitioner may recognize a pattern/situation from previous experience (e.g., signs and symptoms of athlete burnout) and mentally run through various options/scenarios to ascertain which is likely to be the best course/s of action (e.g., assess athlete coping/perspective, speak with parents about general life stressors, work with coach to reduce training load). Although some may suggest that this alliance is only a marriage of convenience; there seems to be logic to the integration of NDM and analytical thinking since clearly both are required for optimum ASP practice (cf. Collins & Kamin, 2012).

The interconnection between analysis and intuition has also been independently described in the literature through dual-processing accounts (e.g., Evans, 2008; Kahneman, 2011). In such approaches, System 1 is generally considered to be unconscious, automatic, and rapid (characteristics associated with intuitive judgments –NDM; e.g., a decision to give an athlete some space following defeat appears to arrive without much effortful thinking) while System 2 is considered to involve controlled, systematic, and slow thinking (associated with deliberate or analytic decision making; e.g., spending time with a coach working out whether a new tactical approach should be incorporated immediately or at the start of next season). Despite this superficially attractive black-and-white representation of cognition, however, Evans (2008) claims that it is entirely possible that one system operates with Type 1 process and that the other includes a mixture of Type 1 and Type 2 processes. Independent of the more structurally based arguments which underpin Evans’s work, this contention further supports the idea of a blending or synthesis of intuitive and analytical decision making in applied practice as a characteristic of expert behavior. The obvious appeal and applied relevance of such a blend is that ASP issues are rarely, if ever, straightforward.

Thus, current thinking in this area suggests that, in real-world settings, a blending of systematic analysis and intuition exists to include the recognition of patterns stored in memory. This concept has been termed skilled intuition by NDM researchers and the conditions that are necessary for the development of this are explored in the following section.
Conditions for the Development of Skilled Intuition

Kahneman and Klein (2009) suggest that two conditions must be satisfied for skilled intuition to develop. Firstly, an environment of sufficiently high validity where there are stable and real-world realistic relationships between objectively identifiable cues and subsequent events (e.g., goodness of fit between athlete needs and suggested intervention/s to meet these needs). Secondly, adequate opportunity is necessary to learn and practice the skill through prolonged practice and feedback that is rapid and unequivocal (e.g., quality supervised experience and professional training routes offering clearer ‘right-wrong’ style feedback). Both conditions, the first in particular, appear somewhat difficult to determine given the open description of “an environment of sufficient regularity, which provides valid cues to the situation” (p. 520). In ASP, valid cues could be thought of as the data collected as part of a comprehensive needs analysis or assessment of the athlete (e.g., athlete thoughts, emotions and behaviors regarding a particular issue or concern).

Interestingly, and before these distinctions were broadly applied in the literature, Shanteau (1992) considered the role of task characteristics in determining the competence of experts in different domains. Domains in which good and poor expert performance had been observed were identified but, where poor performance was observed, the stimuli (or situations) were usually dynamic and generally involved human behavior (e.g., clinical psychologists and counselors). As such, it is likely that ASP would be classified alongside these similar professions. Furthermore, Shanteau suggested that because experts in these domains are “being asked to evaluate and decide about what is in effect a moving target, they do less well” (p. 258). However, it was also observed that, paradoxically, experts in the less predictable behavioral domains are held to higher standards of performance. It could be argued that these domains (where problems are less predictable and decision aids are rare) are the very ones that would benefit from the development of skilled intuition coupled with concomitant auditing by more conventional/slower paced analytical reflection whenever possible in practice, and as much as possible away from the direct challenge of the environment (e.g., in continuing professional development, reflective practice, and peer supervision).

One difficulty that exists is how skilled intuitions can be distinguished from heuristic-based intuitions; especially given the dynamic characteristics of the environment described above. Imperfect intuition is considered to arise either because the environment is not sufficiently regular, or it has not been mastered (Kahneman & Klein, 2009). For example, a novice practitioner’s temptation to rush in with a proposed intervention, perhaps because of an overly ‘procedural’ (i.e., recipe-like) training. Such intuitions also come from memory and include intuitive errors (where the intuitive response is incorrect; e.g., to speak with the coach directly regarding athlete concerns about communication; Frederick, 2005), anchoring phenomenon (where an initial question biases the response; e.g., asking how anxious an athlete feels before an event; Mussweiler & Strack, 2000), and attribute substitution (in which a difficult question is answered by substituting an easier one; e.g., what mental skill will help with this performance issue?; Kahneman & Frederick, 2002). Notably, intuitions that arise from heuristics and biases are less trustworthy than intuitions based on specific experiences (a feature which offers support to the desirability of combination approaches, and also to the greater use of peer supervision to audit decisions).

As Kahneman and Klein (2009) point out, people are not aware of the origins of the thoughts that come to mind and, as a result, caution is necessary to prevent over confidence about the accuracy of a judgment. These authors suggest that: “the safe way to evaluate the probable accuracy of a judgment (our own or somebody else’s) is by considering the validity of the environment in which the judgment was made as well as the judge’s history of learning the rules of that environment” (p. 522). Thus, the professional training of applied sport psychologists is a critical feature in developing PJDM expertise; exposing trainees to declarative underpinnings of decisions made at every opportunity (cf. Martindale & Collins, 2010).

Building in such an audit process also helps to counter the inherent weaknesses in uncritical intuition. For example, the fragility of human judgment was cast into the spotlight in Phillip Tetlock’s (2005) book on “Expert Political Judgment”, which showed that experts were not significantly more reliable than nonspecialists in guessing what is going to happen in the field they study (Menand, 2005). Tetlock (2005) used the metaphor of the hedgehog and the fox to illustrate the ways in which experts may differ in their thinking processes. Hedgehogs tend to gravitate toward a big idea and that idea alone dictates the probable outcome, while foxes see the world as shifting mixture of self-fulfilling and self-negating prophecies. Tetlock points out that the media in particular is attracted to the deterministic, overconfident hedgehogs (two hedgehogs that do not agree is even better) who tend to get predictions spectacularly right or spectacularly wrong. Sadly, this is fast becoming the popular perception of an expert especially of those appearing regularly in the media (e.g., sport psychologists being drawn into discussing whether this player or that will win the competition/tournament/event based on little knowledge of the performers themselves, see Andersen, 2005). A message of hope is forthcoming from Tetlock’s work however, and that is the suggestion that expert judgment can be improved by applying lessons from cognitive science; some of which will be considered next.

Conditions for the Development of PJDM Expertise in Applied Sport Psychology

As previously outlined, PJDM in ASP appears to have elements of both analytic and intuitive thinking and, perhaps more accurately, a blending of the two. Consequently, this
raises the question of which decision-making tradition(s) to turn to for guidance on the conditions necessary for the development of PJDM expertise.

NDM has been described as the process of making decisions under time pressure in a dynamic or changing environment (Lipshitz, 1997). Although the applied sport psychologist is sometimes required to make decisions under time pressure (e.g., athlete request for refinement to their performance simulation program in the middle of a training session or major competition) there is also considerable scope to analyze before the next meeting, training session, or competition (e.g., consideration of imagery theory and best-practice guidelines to ensure the training/event program is underpinned with scientific rationale). Thus, while some of the conditions for NDM are met; not all of them are necessarily typical of this approach. However, the decisions made in NDM situations often involve unstructured problems, uncertain information, and shifting goals (Cesna & Mosier, 2005) which are also some of the conditions faced by applied sport psychologists (e.g., ambiguous selection/ performance criteria). Perhaps due to the complexity of decisions made in dynamic environments (e.g., the huge number of possible variables to consider act upon) and because of the high cognitive demand placed on the practitioner, in managing where and when to place their attention, understanding the role of expertise has been considered an important feature of NDM research (Montgomery, 2005). As such, NDM research and associated methodologies carry many potential benefits for applied sport psychology practitioners.

And yet, psychology is not a profession traditionally studied by NDM researchers; perhaps due in part to the (comparatively) ‘poor’ performance of experts in these professions (cf. Shanteau, 1992) or because of the greater appreciation afforded to professions with standard methods, clear feedback, and direct consequences for errors (Kahneman & Klein, 2009). For example, the feedback received is considered to be delayed, sparse, and ambiguous in professions such as psychotherapy (Kahneman & Klein, 2009). Indeed, professions which fall into the bracket of experts performing poorly (such as clinical psychology, psychiatry, and psychotherapy) are considered more prone to fractionated expertise, and therefore more susceptible to overconfidence (Kahneman & Klein, 2009). Furthermore, these same authors’ premise that people in professions with standard methods, clear feedback, and direct consequences for error (i.e., apparently more black and white, right/wrong answers to challenges such as weather forecasters, engineers, and logistics specialists) appear to appreciate the boundaries of their expertise; implying that professionals operating without these markers do not. It seems that the current fashionable theory, namely NDM, either avoids or dismisses these comparatively more complex, or at least less objectively quantifiable professions. Indeed, it is worth considering if the difficulties of studying these shades of gray environments have encouraged researchers to look for ways to avoid examining it.

This suggestion notwithstanding, however, there are a number of issues with these contentions; not least the image cast that professionals working in less objective scenarios should be confined indefinitely to the scrap heap of poor expert performers. Indeed, it has been suggested that it may even be impossible to achieve expert predictive or diagnostic ability in such high-variability settings (Phillips et al., 2004). Thankfully, Gigerenzer (1989) offered the insightful observation that, historically, most domains now considered to be structured or of high validity (e.g., meteorology) began as unstructured domains before the advancement of science and decision aids. Furthermore, Shanteau (1992) offered the hypothesis that the performance of professionals working in less ‘valid’ tasks (in which conditions are more changeable and differ frequently, such as ASP) should improve if they can be made more like the high validity tasks. It is suggested that this could be done by either changing the task characteristics or by encouraging the appropriate employment of strategies used in more predictable domains (e.g., the use of checklists in medical surgery; Gawande, 2011). Of course, while this sounds very positive, caution must be exercised so that in simplifying we do not destroy the very complexity which we are attempting to address (in other words that we do not start to prepare individuals for an artificially simplistic environment). This concern notwithstanding, a final more optimistic assertion from Shanteau (1992) is that: “it should be possible to prescriptively improve expert competence, even when there are no objectively verifiable answers” (p. 260). In short, focused attention should improve the process; even if a tidy set of outcome changes are harder to discern. Reflecting on the diverse pathways which decision making in ASP may take (almost always numerous possible plausible options) coupled with the clear route diversity which seems to characterize the expert practitioner (Martindale, 2011), it seems that the NDM-based standpoint on the development of expertise does not capture the full picture.

The distinction between domains with varying task characteristics has similarities with cognitive continuum theory (CCT; Hammond, 1966) according to which applied sport psychology would be placed somewhere between the analytic and intuitive ends of the scale. This composite, which involves a hybrid of cognitive techniques, has been referred to as quasi-rational thought (e.g., Hamm, 1988). However, Shanteau (1992) explains that CCT is not particularly compatible with theories of expertise; for example, CCT is based on a general approach to all human judgment whether expert or naïve. As such, this theory seems limited in what it can bring to discussion of how to develop PJDM expertise.

In conclusion, reflection on the conditions necessary to develop PJDM expertise in ASP provides a clear call for the unified integration of analytical and NDM approaches (e.g., Kahneman & Klein, 2009; Montgomery, 2005). The debate as to whether ASP displays the necessary task characteristics and conditions for the development of intuitive expertise will not be settled here, regardless of where it is considered to sit on the
high-validity—zero-validity continuum. In the meantime, the development of the process focus mentioned earlier is a very useful first step, but does this require explicit attention or can it just occur naturally? In other words, can we as practitioners sit back and wait for our PJDM expertise to develop with time and experience or are there active steps which we can take? Tschirhart and Klein (2009) suggest that if an environment produces valid cues and good feedback, skill, and expert intuition will eventually develop in individuals of sufficient talent. Notably, however, they fail to offer more substantial or useful guidelines on how this may best be accomplished. Frustrating as this is, a key issue for many performance related professions; however, it does highlight a gap in current research and understanding.

This lack notwithstanding, in a relatively young discipline such as ASP it seems feasible to argue that insight into the skill and intuition of experts in this field may be influential in the very development of the valid cues and good feedback that are so desperately needed by those learning the profession (see previous calls in the literature for experienced/expert practitioners to make their thinking visible; Ross & Pierce, 2010). In other words, there is much scope to develop the task characteristics and use of strategies that will allow the competence of experts to improve as Shanteau (1992) suggested. In light of this position, it is entirely logical to now consider the (somewhat limited) body of literature on the crucial question of how to develop professional judgment and decision-making expertise in applied sport psychology.

Developing PJDM Expertise in Applied Sport Psychology

In their chapter on decision making expertise, Yates and Tschirhart (2006) suggest that, despite scholarship in a range of fields including psychology, education, marketing, politics, operations, and the military, this variety of expertise appears much less well developed than one might expect. One possible explanation offered for this slow development (see comments earlier regarding research difficulty) is that the implicit subjectivity involved represents "a significant and challenging departure from most expertise scholarship, which prizes unambiguous performance criteria" (p. 423). Furthermore, a level of ambiguity remains about the decision concept itself, and about notions of decision quality and expertise.

In an attempt to clarify these issues, Yates and Tschirhart (2006) describe three perspectives on decision quality and decision making expertise; namely, satisfying-results (whether the result is satisfying; e.g., whether the athlete is satisfied with the intervention employed), coherence (the procedures employed are logically coherent; e.g., goodness-of-fit between the athlete needs and the intervention), and process-decomposition (the successful execution of specific elements within the overall process; e.g., successful implementation of mental skills training within a performance enhancement program) as possible models for appraising decisions and decision making expertise. Difficulties are highlighted with each of these perspectives and, as such, the authors propose a cardinal decision issue perspective (Yates, 2003) for a more complete appreciation of decision processes (i.e., decision processes are the means by which the cardinal issues are addressed for the decision at hand). The ten cardinal issues (need, mode, investment, options, possibilities, judgment, value, tradeoffs, acceptability, and implementation) can thus be placed in a big picture context to provide an overview of the cardinal decision issue perspective. Of particular interest is that judgment is presented as an aspect of decision behavior. More specifically, it is stated, "clearly, judgments and decisions are distinct, but equally clearly, judgment accuracy imposes an upper bound on decision quality" (p. 432).

In their closing remarks, Yates and Tschirhart (2006) state that it is painfully obvious how much remains unknown about decision-making expertise. Yet they also paint an optimistic picture by suggesting this area is ripe for future fundamental and developmental research. In contrast, another chapter on expertise in judgment and decision making (Phillips et al., 2004) suggests that much work in this area has followed the tradition of heuristics and biases (Kahneman & Tversky, 1972, 1982). Decision research concerned with improving decision processes and describing basic mechanisms has shown that the impact of reducing bias is marginal (e.g., de-biasing; Fischhoff, 1982) and has not been assessed in natural on the job settings. Furthermore, Phillips et al. (2004) propose that expertise offers much more to decision makers than bias reduction. For example, Glaser (1996) describes the following changes that occur when expertise is developed: variable, awkward performance becomes consistent, accurate, complete, and efficient; individual acts and judgments are integrated into overall strategies; with perceptual learning, a focus on isolated variables shifts to perception of complex patterns; and there is an increased self-reliance and ability to form new strategies as needed.

Thus, as expertise develops in ASP we would expect to see the performance of practitioners change from being variable, inconsistent, and awkward (e.g., in establishing a working alliance with a client) to becoming consistent, accurate, complete and efficient. Rather than judgments or decisions being made in isolation (e.g., identifying numerous discrete areas for work) they become integrated into the overall strategy or program of work. Similarly, rather than focusing on isolated variables (e.g., one off incidents of aggression) the practitioner is able to perceive complex patterns of behavior. Finally, practitioners exhibit an increased self-reliance (e.g., they no longer feel the need to check everything with a supervisor) and are able to generate new strategies as appropriate.

In discussing the nature of expertise, Phillips et al. (2004) consider two traditions: laboratory-based (to approximate the natural performance of experts under controlled conditions) and naturalistic (the examination of expertise in natural settings). While NDM research-
ers have been predominantly interested in domains that require high stakes, time-pressure, uncertainty, and competing goals (e.g., emergency services); Phillips et al. (2004) suggest that findings about expert judgment and decision processes from these domains may be generalized to domains that are not so crisis-driven. This is encouraging given that the conditions for development of PJDM expertise in ASP are not entirely congruent with typical NDM research domains (see previous section). Ultimately, the goal of NDM is to study people performing tasks under conditions that are typical for their workplace; rather than solely under time pressure.

Other perspectives on expertise presented are that of representation (i.e., experts seem to represent problems at a deeper level than novices; Chi, Feltovich, & Glaser, 1981; Glaser & Chi, 1988) and what experts know and can do that others do not and cannot (i.e., declarative and procedural knowledge; Anderson, 1983). In an extension of these concepts, Klein and Miliello (2005) have suggested several additional categories of knowledge related to expertise that are worthy of consideration: perceptual skills, mental models, sense of typicality and associations, routines, declarative knowledge, running mental simulations, spotting anomalies and detecting problems, finding leverage points, managing uncertainty, and taking one’s own strengths and weaknesses into account.

Thus, as an applied sport psychologist develops PJDM expertise they can expect to develop their abilities to: perceive what is important in any given scenario (e.g., which information provided by the athlete is vital and which is redundant), access a stored model or representation (e.g., relating to the phases of acquiring new coping skills), sense how typical a situation is and if there are other important factors involved (e.g., influence of external life stressors on performance), activate routines (e.g., in relation to clinical referral or the notification of ethical issues), be able to elaborate on why their suggestions are justified (e.g., using evidence of best practice or scientific underpinning), run through possible scenarios in their mind (e.g., play through various options and likely consequences of delivering a difficult message to a coach), spot irregularities or issues (e.g., in how an athlete is reviewing their performance), find ways of working around issues (e.g., adapting a goal setting program for a de-motivated player), manage uncertainty (e.g., implementing contingency planning based on whether selection criteria for a major event are met or not), and take their own strengths and limitations into account (e.g., ensuring recovery time for support staff during trips away with the team). Certainly, many of these techniques and strategies have been apparent in our exploration of effective ASP consultation (Martindale, 2011).

To further understand expertise in decision making, Phillips et al. (2004) present the previously mentioned RPD model (Klein, 1998; Klein et al., 1986, as cited in Phillips et al., 2004) to describe how, in natural settings, experts rely on an extensive knowledge base to make judgments about situations and decide how to act. It is worth noting that this model has been developed to include variations where a situation is ambiguous or unfamiliar (e.g., by seeking additional information) and where the decision maker is required to evaluate the quality of an initial course of action. The RPD model (originally developed based on observations of firefighter decision making; notably a more objective solution setting than ASP) is descriptive, but also provides a frame within which characteristics of experts can be distinguished from those of novices. For example, experts do not appear to directly compare multiple options (e.g., in selecting which intervention to use with an athlete at a given time), but to use a recognition-primed strategy to make decisions (Klein, 1998). In addition, expert decision makers use satisficing, first described by Simon (1957; as cited in Phillips et al., 2004), where a course of action that is workable is selected early then stuck with, even though it may not necessarily be the optimal decision. In this regard, it is worth considering how many times applied sport psychologists will acknowledge initial mistakes and make an immediate U-turn, as opposed to a gradual shift to a new approach. This understanding of the attributes of expert decision makers is useful to inform the development of PJDM expertise in ASP. Accordingly, we have offered some examples and illustrations of how the development of PJDM expertise in ASP may look.

### Training PJDM Expertise in Applied Sport Psychology

Phillips et al. (2004) highlight that their theoretical views on expert decision makers share the same basic premise of Kahneman and Tversky’s (1972, 1982) heuristics and biases research, but that the RPD model moves beyond this by dealing with issues of representation and process not previously considered (i.e., expertise leads to a broader and more refined set of heuristic processes that promote exceptional performance). The authors propose that this view of expertise in judgment and decision making suggests a counter-intuitive approach to improving decision making. Rather than developing domain-general decision skills with the goal of following processes that are closer to normative standards and that eliminate biases; it is suggested that improving the quality of decision processes can be facilitated by the development of substantive, domain-specific expertise.

This rationale for training expertise rather than decision skills per se is complemented by a review of literature in which Klein (1998) identified four key ways in which experts learn: engaging in deliberate practice, and setting specific goals and evaluation criteria (e.g., supervised experience in a range of practice environments to meet individual goals assessed through specific evaluations criteria); compiling extensive experience banks (e.g., time spent on the job); obtaining feedback that is accurate, diagnostic, and reasonably timed (e.g., quality, comprehensive, quick feedback from supervisor/peer/client group); and enriching their experiences by reviewing prior experiences to derive new insights and lessons from mistakes.
In discussing further how people acquire expertise in judgment and decision making within the confines of the characteristics described above, Phillips et al. (2004) express the need to distinguish between specific and general intuitions. Specific intuitions are defined as judgments related to a particular task within a domain (e.g., estimating whether a particular athlete will be quick to pick up a cognitive restructuring suggestion) while general intuition is defined as knowledge or experience within a particular domain (e.g., accessing a broad range of knowledge/experiences when offering a coach a perspective on the reasons for defeat). As such, there are apparent differences in how these types of intuition may be trained. For example, as specific judgments are relatively discrete, they can be isolated as targets for training; however, a practice and feedback approach is considered to be less applicable to training general intuitions.

Building on this, Phillips et al. (2004) derived six goals from the empirical findings on expert and novice differences in knowledge and learning strategies: enhance perceptual skills (e.g., what information is important to glean from the athlete/situation), enrich mental models about the domain (e.g., models/representations of how approaches/skills/strategies/tools may be implemented with an athlete/coach/team), construct a large and varied repertoire of patterns (e.g., range of experiences working with athletes/coaches/teams from which to draw), provide a larger set of routines (e.g., range of routines which can be implemented with athletes/coaches/teams), provide a larger experience base of instances (e.g., range of situations/examples from which to draw), and encourage an attitude of responsibility for one’s own leaning (e.g., lifelong learning and professional development). It is worth contrasting here how broadening this learning is with the common view of experts as becoming more consistent in their strategies—a greater, but justified, diversity which may be used to argue against the popular competency-based models of CPD. The authors suggest that a scenario-based instructional approach that addresses these six goals is promising for facilitating the development of decision-making expertise in a specific domain such as applied sport psychology. For example, a carefully designed series of decision scenarios combined with effective coaching can significantly increase decision quality (Phillips & Battaglia, 2003, as cited in Phillips et al., 2004). Thus, while the traditional practice and feedback approach may be inadequate; cognitive feedback has been found to reliably improve performance on judgment tasks (e.g., Balzer, Doherty & O’Connor, 1989). This could be used in conjunction with process and outcome feedback (see Martindale & Collins, 2007).

In addition, three learning tactics are suggested by Phillips et al. (2004), as well as practice and feedback, to develop skilled intuitive decision making expertise. Firstly, the use of case studies is suggested to be the predominant approach for studying and reflecting on decisions. In particular, they are considered to boost the vicarious experience base and enrich the mental models of the decision maker. Secondly, coaching is suggested as an adjunct to practice to provide feedback and facilitate the strengthening of the learner’s intuitions. A third technique for building intuition is suggested to be presenting the learner with advance organizers, or instructional material, that direct attention to relevant aspects, declarative knowledge, and mental models most appropriate to the task at hand. However, it is also highlighted that these tools must be used within the context of actual or simulated practice, reviewed post hoc, and then revisions made accordingly.

In summary, Phillips et al. (2004) suggest it is possible to facilitate the acquisition of decision-making expertise in specific domains with well-structured, scenario-based training sessions. In addition, understanding the components of expertise will better prepare novices to build their intuitions, and training interventions based on models of expertise are proposed to help individuals form a base of experience and more complete mental models of their domain. This is a very positive picture for ASP training but, to our minds, exhibits a surprising and potentially limiting omission. Despite the suggestion that this approach incorporates what has been learned by traditional judgment and decision-making researchers, and builds on findings from both approaches to the development of skilled judgment and decision making, we cannot help but notice the lack of emphasis on the analytic aspect of practice features. Certainly, the emergent literature surrounding this aspect of blended judgment and decision making expertise is noticeably absent, and yet decision making exercises which slow down the action and teach students how to process information, recognize important cues, and make effective decisions (i.e., analyze) are actively used in low-fidelity training in other professional domains (Zimmerman & Harris-Thompson, 2008). Thus, the addition of a semiformal process, including weighing different options and evaluating alternatives to demonstrate the analytic and reflective aspect of the judgment and decision making process, would appear necessary.

Summary: So Where Are We?

This paper has reviewed pertinent literature related to the differing approaches to PJDM expertise (e.g., the RPD strategy) and highlighted that existing literature contains some hugely significant gaps; for example, whether applied psychologists could ever be considered experts in their domain. Noticeably, there is little existing literature on how to develop PJDM expertise in ASP and, in particular, even less on the analytic end of the continuum. This is not necessarily surprising given the lack of understanding over the different degrees to
which intuition may be part (but only part) of the answer. Certainly, there appears to be a dearth of guidance on the training of these crucial skills, especially in so-called vague environments which, we would suggest, are a common feature of our profession.

**Future Directions: Where Next?**

The suggestions emerging from theory and literature in developing judgment and decision-making expertise could be used to train PJDM Expertise in ASP. In particular, a scenario-based approach could be adopted to incorporate the use of case studies, instructional materials, and coaching in an attempt to facilitate the acquisition of decision-making expertise in applied sport psychologists. In addition, participants could be asked to explicitly weigh options and evaluate alternative courses of action to demonstrate analytic thinking; together with the weighting criteria which they are applying. The goal here would be to move practitioners up the learning curve at a faster rate by encouraging the formation of a base of experience, and more complete mental models of their domain. The ability to make thinking visible to peers and supervisees could help provide cognitive apprenticeship (Collins & Holm, 1991) and establish further cognitive authenticity within the profession (Ross & Pierce, 2010).

Finally, there is a need to explore the subtle balance between analytic and intuitive PJDM across the time spectrum of activity to support professionals in this field (cf. Martindale & Collins, 2012) other related fields (cf. Abraham & Collins, 2011 on coaching) and in other domains of performance psychology in the pursuit of expert human behavior and performance.

**References**


Erratum