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Editorial

Review of expertise and its general implications for correctional psychology and criminology

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ABSTRACT

In this introductory article we begin by setting out the aims of this special issue, including: why the expertise paradigm may prove fruitful in understanding the proximal processes surrounding cognition, emotion and behavior at the scene of the crime; and to draw together strands of an emerging field at this important time in its development. We then go on to outline what we see as the key components of perceptual and procedural expertise as defined in mainstream cognitive psychology. We then review strands of complementary knowledge from allied fields in cognitive science that have developed in parallel and lend support for core basic elements of expertise. Adopting the notion that expertise is on a continuum and that most individuals will not reach the extreme end of competence, we describe a model of functional expertise which most people could achieve with practice. Finally, we then discuss 'dysfunctional expertise' that offenders might display through practice in a particular criminal domain and consider how this might enhance our understanding and prevention of criminal behavior.

1. Aims of the special issue

One of the many challenges faced by researchers working in the domain of offender behavior and rehabilitation, is to understand more clearly the proximal processes involved in the decision to commit a crime i.e. the decisions taken in the days and hours leading up to, during and immediately after the crime. Over the last decade or so, a number of authors in the fields of forensic psychology, criminology and allied disciplines have alluded to (explicitly or otherwise) a distinct form of decision-making utilized by the offender at several points along this decision chain. More recently referred to explicitly as expertise in criminal decision-making (Bourke, Ward, & Rose, 2012; Garcia-Retamero & Dhami, 2009; Nee & Meenaghan, 2006; Topalli, 2005; Ward, 2000; Wright & Decker, 1994, 1997; Wright, Logie, & Decker, 1995) numerous other authors have described these processes using related concepts such as bounded rationality and cognitive templates or scripts (Bennett & Brookman, 2010; Brantingham & Brantingham, 1993; Copes & Vieraitis, 2009; Leclerc & Wortley, 2014; Shover & Honaker, 1992; Cherbonneau & Copes, 2006; Opp, 1997; Cornish & Clarke, 1986; Wright & Decker, 1997). The aim of this special issue therefore is to draw together strands of an emerging field at this important time in its development. A particularly valuable and exciting aspect of our current enterprise in our view, is the contribution of scholars from a variety of disciplines, allowing a richer, more triangulated and more valid contribution to the development of theory in the field. We hope that this endeavor will make a considerable step forward in our understanding of the cognitive processes surrounding a variety of crimes, and in so doing enable us to intervene more effectively and ultimately reduce criminal behavior.

2. Aims of this article

The aim of this article is to review what is known about expertise in mainstream cognitive psychology and to discuss related concepts from allied fields that appear to be telling similar stories in order to weave together a more cohesive explanation of offender decision-making. We will adopt an integrative pluralist approach to theory building (Kendler, 2005; Mitchell, 2003; Ward, 2014), seeking to draw together several levels of analysis focused on explaining the process of interest using different perspectives (in our case psychology, criminology, economics and neuropsychology). We will end with a discussion of the implications our findings have for forensic psychology and allied criminal justice fields, and what the future might hold.

3. What is expertise: elements and controversies

Scholars have written about expertise for decades from a variety of perspectives. Notable work has been done on chess players, pilots, doctors, typists, and firefighters to name but a few (see Vicente & Wang, 1998 for a review). Others have noted a number of unifying aspects that appear to define expertise whatever the domain (Feltovich, Prietula, & Ericsson, 2006; Palmeri, Wong, & Gauthier, 2004). Expertise

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refers to both structural representations of knowledge and skills in memory as well as observable, behavioral manifestations. For the purposes of this article, we define expertise as the acquisition of *cognitive processes and consequent behavior that are demonstrably superior to those new to a given domain, in the sense that they are faster, more cognitively economical, are triggered automatically in relevant environments and are based on considerable experience and honing of skill over time* (Ericsson, 2006a).

It is important to say at the beginning of this article that we strongly adhere to the notion of a continuum of expertise (Chi & Bassok, 1989; Hoffman, Shadbolt, Burton, & Klein, 1995) from novices to masters and acknowledge that it is rare for individuals to reach the extreme end of proficiency, except through continual, deliberate and challenging practice (Ericsson, 1996). Most individuals we regard as experts in their fields, be they surgeons or car mechanics, reach a plateau of expertise and are not expected to make concerted attempts to increase their mastery, other than to keep up-to-date with skills and knowledge, through everyday practice and experience (Ericsson, 2006b). This is distinct from, for instance, highly accomplished sports people or musicians who continuously engage in challenging practice to increase their mastery. Nevertheless, examples of everyday expertise can be seen from early on in the expertise continuum and we will return to this issue again below in relation to offenders.

4. Elements of expertise

4.1. Chunking

One of the most established aspects of any description of expertise in decision-making is the idea of *chunking* in memory. As the novice begins to practice a behavior (intentionally or otherwise) that they are eventually to become experienced in, they learn to recognize (through repeated exposure and consequent learning through trial and error) which cues are more relevant to making accurate inferences (i.e. successful decisions) about the environment and which cues to ignore. As a result of becoming more proficient at recognizing the cues and patterns in our environment through practice, we begin to chunk or group our memories of these patterns and cues in long term memory to enable us to retrieve them more quickly and therefore respond more efficiently and effectively to problems or challenges (Shanteau, 1992). Some of the earliest experimental examples of chunking come from the world of chess. de Groot (1946/1965), for instance, showed how experienced chess players had markedly superior memory for chess positions presented for only a few seconds, compared to newer players. Over time, we also begin to chunk and store the features associated with our more successful patterns of *response* to these cues (in other words strategies that inform our behavior) within the same memory structure, and all this useful knowledge including recognition of cues and how to respond develops into a cognitive schema. Cognitive schemas are memory shortcuts and involve the structure and organization of these chunks of information in long term memory. They comprise abstract, prototypical maps or mini-recipes regarding how to respond, given particular regular and familiar configurations of cues in our environment (Fiske & Taylor, 1991). They allow individuals to respond automatically (recognize x, respond y) and their principle function is to simplify decision-making and behavior, freeing up space in working memory to deal with more conscious and immediate issues and to preserve cognitive resources for these from an evolutionary point of view (Shanteau, 1992).

A good example of a developing a basic cognitive schema is learning to drive. Many of us remember wondering when we started to learn how on earth we were going to master foot pedals, steering wheel, gear stick and visual perception of the incoming environment simultaneously, but with practice things quickly become increasingly automatic until we barely have to think about what to do. As a result of increased experience through repeated exposure to learning events, those with expertise do not necessarily have more schemas, but those they have become larger and more complex (Fiske & Taylor, 1991). Returning to work in the chess field, Chase and Simon (1973) showed that the cognitive chunks held by expert chess players store complex configurations of typical chess piece arrangements plus knowledge about how to act on them successfully. Using these chunks they make fast and frugal decisions based on heuristics to evaluate what to do next. More inexperienced players, with far less exposure to these configurations, are hindered by a step-by-step approach, imagining as many outcomes to chess moves as possible, using chunks with single chess pieces. When presented with random configurations of chess pieces however, experts become little better than novices indicating that their superiority is largely based on experience, rather than innate ability (Gobet & Simon, 1996). Interview and experimental work indicates that schemas used by the experienced are more complex, coherent, strategy-oriented and interconnected compared to the less discriminate and more superficial recollections about tasks that novices report (Dane & Pratt, 2007; Hambrick & Engle, 2002). This allows for increasingly accurate, automatic and unconscious recognition of relevant stimuli and instantaneous action (Chase & Simon, 1973; Logan, 1988); faster coding of familiar stimuli (Chi, Feltovich, & Glaser, 1981; Klein, 1993); and the ability to multi-task (Palmeri et al., 2004).

Alongside the chess examples, evidence of chunking has been noted as a fundamental component of expertise in a variety of experienced professionals. In medicine, for instance, diagnostic expertise has been related to three types of knowledge structure in memory: causal; analytical; and experiential (see Norman, Eva, Brooks, & Hamstra, 2006 for a review). Chunking occurs in all three in order to allow quick and easy analysis and diagnosis of potential illnesses from the vast array of knowledge stored after the clinician initially recognizes a pattern of symptoms (also stored in the same schema). Similarly, experienced computer programmers can remember significantly more lines of programming after brief presentations in comparison to students (Barfield, 1997; Ye & Salvendy, 1994) suggesting larger and more densely structured chunks.

4.2. Automaticity

A controversial aspect of experienced decision-making, which has special resonance in the world of forensic psychology, is the issue of how quickly the process becomes automatic and therefore potentially unconscious. Based on groundbreaking experiments using visual searches that encompass targets and distracters in the 1970s (the most notable of which is Logan, 1988; Posner & Snyder, 1975; Schneider & Shiffrin, 1977) true automaticity was thought to require four distinct features (the process should be unintentional, outside awareness, uncontrollable and highly resource-efficient). Further, it has been suggested (and is still thought to be the case by a number of scholars) that for cognitive processes to become fully automatic, they require thousands of repetitions of an experience in an identical performance environment (Shiffrin & Schneider, 1977). However, if this were the case (using the car driving example again) it would take considerably longer than typical to develop the expertise required to drive a car and for it to become automatic. Additionally, one would have to undertake lessons in precisely the same environment and in the same car each time. It is known from other work that the nature of cognitive processing changes within a very short period of practice (e.g. becomes less deliberate, Schneider & Shiffrin, 1977) and that brain changes in relation to expertise can been seen after one hour of practicing a task (Hill & Schneider, 2006). In the offending world, markedly superior, automatic, recognition memory for burglary-related environmental cues have been demonstrated in experienced but teenage burglars, compared to non-burgling young offenders who were in turn more knowledgeable than police officers and then students (Logie, Wright, & Decker, 1992; see Nee et al., 2015-in this issue, this issue for a fuller account). This suggests that levels of automaticity can build up relatively quickly (in very young people) and may not require thousands of repetitions of identical