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The study of expert behaviour has attracted widespread attention since the seminal work of de Groot (1965) and Chase and Simon (1973). Of particular interest is how experts, even under time pressure, can make relatively good decisions in spite of strong limits in their computational capacities. A substantial amount of research has focused on chess playing, as this domain offers a well-validated and ecological measure of expertise (the Elo rating). Obviously, this question has important repercussions beyond game playing, and extensive research has been carried out about decision making in domains such as fire fighting, medical diagnosis, and aviation (e.g., Zsambok & Klein, 1997).

While the importance of both recognition and search mechanisms is generally accepted, researchers disagree as to their relative importance. De Groot (1965) showed that even chess grandmasters seldom look at more than 100 possible continuations of the game before choosing a move. This number is vastly smaller than the number of legal moves (on average, for a middlegame position, the number of legal continuations six ply deep is about 1.8 billion, and increases exponentially for greater depths). De Groot (1965) also found that top-level grandmasters do not search reliably deeper than candidate masters, although more recent data suggest that masters search slightly deeper, on average, than weak amateurs (e.g., Gobet, 1998). De Groot (1965) as well as Chase and Simon (1973) propose that recognition, by allowing knowledge to be accessed rapidly, enables look-ahead search to be highly selective. Holding (1985), by contrast, argued that the main determinant of chess skill is the ability to plan ahead by search, rather than reliance on recognition of positional patterns.

Support for the role of pattern recognition in expert behaviour comes from two main lines of research: (a) perception and memory, and (b) decision making. Evidence from perception and memory indicates that experts can rapidly recognize the key features of a problem, and that there are important differences between experts' and non-experts' eye-movements (de Groot & Gobet, 1996; Gobet, de Voogt & Retschitzki, in press). Research has also shown that experts have a remarkable memory for domain-specific material (Chase & Simon, 1973; de Groot, 1965; de Groot & Gobet, 1996). Interestingly, their superiority extends to the recall of random positions, although the skill difference is then much smaller than with game positions. CHREST, a detailed computer model of pattern recognition, has accounted for these results (de Groot & Gobet, 1996; Gobet & Simon, 2000; Gobet & Waters, 2003).

The second line of evidence comes from rapid decision making (e.g., Zsambok & Klein, 1997). In particular, research with chess players suggests that grandmasters can play at a high level even under severe time pressure (e.g., Gobet & Simon, 1996). SEARCH, a computational model based on CHREST, accounts for several data from expert problem solving, such as how average depth of search increases as a function of skill (Gobet, 1997).

Recently, proponents of the predominant role of search processes have collected data aiming at undermining the importance of pattern recognition. In particular, Chabris and Hearst (2003), using data from rapid chess and blindfold chess, have questioned Chase and Simon's (1973) and Gobet and Simon's (1996) account. In this talk, I'll show that Chabris and Hearst's (2003) data, far from invalidating theories based on pattern recognition and selective search, actually support them.

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