



Reply to Dreyfus and Rouse (2018)

Fernand Gobet

Department of Psychological Sciences, University of Liverpool

Correspondence: Fernand Gobet, fernand.gobet@liverpool.ac.uk

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Dreyfus and Rouse (2018, p. 181) argue that Gobet (2018) “makes a number of strong yet unfounded criticisms of the Dreyfus Skill Model” and that “Gobet’s highly selective reading leads to a gross mischaracterization of the work he discusses.” In particular, Dreyfus and Rouse argue that “it is false to say that according to our view experts ‘do not carry out search or use analytical thinking’.” In this reply, I will show that these charges are uncalled for, and that my description of the five-stage model, albeit very short, was a fair rendition of Dreyfus and Dreyfus’s model (1986/1988).

Dreyfus and Rouse (p. 182) state that “Gobet’s criticism depends upon his failure to have appreciated the significance of the first half of [the following] sentence”: “*When things are proceeding normally, experts don’t solve problems and don’t make decisions; they do what normally works*” (Dreyfus & Dreyfus, 1986/1988, pp. 30-31). So we need to consider two cases: normal situations and abnormal situations.

Let us begin with the case where things proceed normally, which is what happens most of the time with experts. In this case, the previous quotation makes it clear that Dreyfus and Dreyfus think that there is no look-ahead search nor analytical problem solving. This view has been unambiguously stated in several publications. For example, Stuart Dreyfus (2004, p. 181) concludes his article by writing the following:

The tradition has given an accurate description of the beginner and of the expert facing an unfamiliar situation, but normally

an expert does not calculate. He or she does not solve problems. He or she does not even think. He or she just does what normally works and, of course, it normally works.

It is the second case—when things do not proceed normally—that Dreyfus and Rouse think I failed to appreciate. In *Mind over Machine*, just before the section on “deliberative rationality” that Dreyfus and Rouse highlight, Dreyfus and Dreyfus (1986/1988, p. 31-32) wrote the following:

While most expert performance is ongoing and nonreflective, when time permits and outcomes are crucial, an expert will deliberate before acting. But as we shall show shortly, this deliberation does not require calculative problem solving, but rather involves critically reflecting on one’s intuitions [emphasis added].

This statement, which is entirely consistent with my description stating that “experts do not carry out search nor use analytical thinking” (Gobet, 2018, p. 109), dovetails with Dreyfus and Dreyfus’s model. As Dreyfus and Dreyfus (1986/1988, p. 36) put it, “the moral of the five-stage model is: there is more to intelligence than calculative rationality.” A few lines below, they expand on this idea.

The word rational, deriving from the Latin word *ratio*, meaning to reckon or calculate, has come to be equivalent to calculative thought and so carries with it the connotation of “combining component parts to obtain a whole”; arational behavior, then,

refers to action without conscious analytical decomposition and recombination.

Competent performance is rational; proficiency is transitional; experts act arationally. (Dreyfus & Dreyfus, 1986/1988, p. 36)

The section on deliberative rationality begins with clear indication that look-ahead search and analytical thinking is not expert-like: “The conscious use of calculative rationality produces regression to the skill of the novice or, at best, the competent performer.” Next, Dreyfus and Dreyfus (1986/1988, p. 36) do indeed discuss the fact that players anticipate moves and pursue strategies, but with the qualification that “quality of move choice depends surprisingly little on anything beyond pure intuitive response.”

Thus, when things are not proceeding normally, Dreyfus and Dreyfus (1986/1988) state both that (a) experts do not use calculative problem solving and (b) experts use calculative problem solving. As there is no indication of the different circumstances under which (a) and (b) apply, these two statements simply contradict each other. My choice of using (a) is reasonable, as it is consistent with the concept of arational behavior and the “moral of the five-stage model” that the authors themselves describe.

The other main charge leveled by Dreyfus and Rouse (2018, p. 182) is that, by writing that “Dreyfus and Dreyfus wholly ignore the considerable body of evidence first collected by DeGroot on chess [...]”, Gobet (2018, p. 109) “reveals the narrowness of his engagement with our work,” as shown by the fact that he omits to mention that Stuart Dreyfus (1982) cites De Groot’s (1978) research. However, my remark clearly referred to “Dreyfus and Dreyfus’s book *Mind over Machine* (1986) and numerous subsequent publications.” The fact that Stuart Dreyfus (1982) cites De Groot does not invalidate the correctness of my assertion, as this paper was published before the 1986 book. In fact, the 1982 paper raises an obvious question: Why did Dreyfus and Dreyfus (1986/1988 and later publications), who knew about De Groot’s results, choose to ignore them, as these results directly relate to the question of

the presence or absence of analytical thinking in chess experts? All the protocols from the standard think-aloud experiment listed in De Groot (1978) provide evidence for search and, indeed, thinking (hence the title of his book: *Het Denken van den Schaker* [Chess players’ thinking] in Dutch and *Thought and Choice in Chess* in English. Importantly, while two of the chess positions used by De Groot might be considered as unusual (positions B and C), the third position (position A) certainly must be considered as “normal”. For example, several players noted similarities with known positions or openings. At face value, these results refute Dreyfus and Dreyfus’s model with normal situations;¹ as noted above, their standpoint about unusual situations is inconsistent.

It is also unfortunate that Dreyfus and Dreyfus (1986/1988) did not mention De Groot’s views on intuition, because De Groot, having collected data from world-class chess players, had interesting things to say about this topic. For example, De Groot mentions intuitive experience as intuitive know-how, the use of intuition to complete an argumentation, and indeed the idea that “most skills depend largely on ‘intuitive experience’, i.e., on a system of methods that one cannot explicitly describe” (p. 309).

As mentioned in Gobet (2016, 2018), and witnessed by the current exchange, multi-disciplinary research is hard because of organizational structures, technical jargon, customs, mental sets, loyalties, and the possibility of miscommunications between fields. In addition, different disciplines have different traditions about how to deal with data and even what to consider as data. Only by surmounting these difficulties can we hope for a better understanding of expertise.

Footnote

1. For a detailed discussion of how the five-stage model fares with respect to empirical data, see Gobet and Chassy (2008, 2009) and Gobet (2012).

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