Commentary on Fernand Gobet's (2018) "The Future of Expertise: The Need for a Multidisciplinary Approach"

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Fernand Gobet's recent piece, "The Future of Expertise: The Need for a Multidisciplinary Approach," makes a number of strong yet unfounded criticisms of the Dreyfus Skill Model. Gobet's highly selective reading leads to a gross mischaracterization of the work he discusses. In this way, Gobet's paper appears to be a victim of its own expressed "need for a multidisciplinary approach" to the study of expertise. (Note that the comments here are co-authored by Stuart Dreyfus and B. Scot Rousse, but that "I" and "my" always refer to Stuart, while "our," "we," and "us" refer to Hubert and Stuart Dreyfus.)

The passage in question is the following:

A consequence of this lack of communication between fields is that too much important information is ignored, which can lead to serious mistakes. A striking example is provided by Dreyfus and Dreyfus's book *Mind over Machine* (1986) and numerous subsequent publications, in which the authors describe their five-stage theory of expertise. They argue that experts do not carry out search nor use analytical thinking. Rather, they act in a pure intuitive way.

The argument is plausible in principle but is in fact inconsistent with empirical data. Dreyfus and Dreyfus wholly ignore the considerable body of evidence first collected by De Groot on chess (1946/1978) [1978/2016] but later replicated and expanded by other researchers showing that experts do in fact carry out considerable amounts of search when necessary. It is an interesting task for historians of science of future generations to explain how such a theory, which is at variance with empirical data and indeed common sense, had such an impact in the social sciences and beyond. (Gobet, 2018, 3-4)

But here Gobet has provided a complete caricature of our view; it is a straw man constructed from a narrow and distorting reading of our work. In fact, on the topic of expertise in chapter 1 of our book *Mind Over Machine*, there is an entire section on "deliberative rationality" that concerns the situation of an expert who is unsure about what to do in a situation that is similar to ones previously experienced, and so engages in a kind of situated deliberation (Dreyfus and Dreyfus, 1986/1988, 36-51). It is false to say that according to our view experts "do not carry out search or use analytical thinking." Such a claim is based on a failure to represent accurately what we actually wrote. Not only does the section on deliberative rationality undermine Gobet's rendering of our view, but the italicized sentence in which we summarize our take on expert intuition does so as well:

"*When things are proceeding normally, experts don't solve problems and don't make decisions; they do what normally works*" (Dreyfus and Dreyfus, 1986/1988, 30-31). Gobet's criticism depends upon his failure to have appreciated the significance of the first half of this sentence.

Gobet refers only to *Mind Over Machine*, a work meant for popular audiences, and he fails to cite or engage with any of our more technical work. If he had done serious research, both within *Mind Over Machine* and beyond it, he would have both lost the grounding for his criticisms and gained more support for his own generally worthwhile call for a multidisciplinary approach to the study of expertise.

When Gobet states, "Dreyfus and Dreyfus wholly ignore the considerable body of evidence first collected by DeGroot on chess," he reveals the narrowness of his engagement with our work. In a paper (Dreyfus, 1982) preceding our book I cite and approvingly discuss several passages from DeGroot about the primacy of intuitive expertise in chess and I comment upon the following DeGroot remark concerning (grand)masters "He immediately knows...in which direction he must search" (DeGroot, 1978/2016, 320). With respect to this claim about search I write:

> The DeGroot reference to the well-known practice of the chess player of calculating out into the future should not be interpreted as evidence that skilled decision-makers in other domains do likewise. This examination of possible futures becomes feasible in chess because the objective and complete nature of a chess position makes a future position as intuitively meaningful as a present one. Furthermore, the fact that strong masters perform at expert level when restricted to 10 seconds per move indicates that these calculations are not crucial to performance. (Dreyfus, 1982, 151)

Even though this discussion of DeGroot does not appear in *Mind Over Machine*, the paper in which it does appear was nevertheless almost at Gobet's fingertips, if he had looked. It is cited by Benner, Tanner, Chesla, 2009, a book Gobet himself cites in Gobet, 2009 (where he

also refers to a broader array of my work on skill, such as Dreyfus, 2004, and the updated paperback version of Dreyfus and Dreyfus 1986/1988). The 1982 paper that discusses DeGroot is also readily available through a cursory internet search done for scholarly articles with terms such as "Stuart Dreyfus Skill Acquisition."[1]

The discussion of chess from Dreyfus, 1982 is summarized in the aforementioned "Deliberative Rationality" section in *Mind over Machine*. Concerning deliberation and the skill model we write there: "A chess master sometimes senses opportunities beyond what he can immediately see in a position...In this case he puts calculation in the service of intuition by examining sequences of moves which lead to other situations which he then evaluates intuitively" (Dreyfus and Dreyfus, 1986/1988, 39).

Had Gobet read either of these sources with more care he could not have written about us, "They argue that experts do not carry out search..." from which he then draws the grandiose yet baseless conclusion: "It is an interesting task for historians of science of future generations to explain how such a theory, which is at variance with empirical data and indeed common sense, had such an impact in social sciences and beyond."

A much more recent paper, "System 0: The Overlooked Explanation of Expert Intuition" (Dreyfus, 2014) draws upon philosophy, cognitive science, operations research (optimization mathematics) and neuroscience and thus contributes to the multidisciplinary approach to expertise that Gobet rightfully calls for in his recent paper. Readers of this journal are encouraged to consult Dreyfus, 2014 in order to help remedy some distorted impressions about the state of research into expertise given by Gobet's recent article.

Footnote

1. One version of this paper (Dreyfus, 1982) retrievable via a basic internet search is available here: http://www.dtic.mil/dtic/

tr/fulltext/u2/a097468.pdf (Accessed November 2, 2018). This version is a pre-published (though identical) version prepared for the Air Force Office of Scientific Research (AFSC), USAF, and distributed by the UC Berkeley Operations Research Center. In this document, the passage quoted just above is found on p.31.

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