11. Intuition, Rationality and CHESS EXPERTISE

The opposite of moves that have proven to be successful coming to mind automatically, almost randomly, are moves that come to mind much less easily, though they may be the strongest in the given situation.

International Master, Willy Hendricks
In Sense and Nonsense in Improving your Chess p. 42

One might think that chess, a game sometimes referred to as “the gymnasium of the mind,” is an obvious counterexample to the just-do-it principle, for it would seem that contrary to just-doing-it, chess experts are engaged in effortful, deep strategic thought. And I do in fact think this. However, in the philosophical literature on expertise, chess, especially speed chess, is used to illustrate how one’s best actions are not even in part the result of rational thought, but are rather instances of simply seeing straightaway what to do, and doing it. For example, in line with the extreme form of just-do-it, which tells us that expert actions simply happen to the expert, Hubert Dreyfus argues that although analysis and deliberation play a role in chess in sub-optimal situations, the best moves made by chess players at the international master level or grandmaster level involve neither analysis nor deliberation nor even conceptualizing the board. Rather, Dreyfus tells us that “after much experience, the chess master is directly drawn by the forces on the board to make a masterful move.” High-level chess, on Dreyfus’s view, is bred neither in the heart nor in the head, but out there on the board.

I think that this view is mistaken and in this chapter shall critically analyze Dreyfus’s view that when chess players are at their best, they do not think, but rather simply move. Dreyfus’s position contrasts with John McDowell’s view that reason or at least conceptualization plays a necessary role in all of our actions: it’s concepts all the way down, for McDowell. However, when it comes to speed chess, McDowell’s view presents merely a less extreme version of the just-do-it principle, proscribing not all mental processes (as Dreyfus does), but just explicit thoughts, or thoughts that are expressible in words. On McDowell’s view, although high level chess players have implicit, or not consciously accessed, conceptual knowledge about what they are doing as they are playing, in a very fast game such players “do not explicitly think its content…unless the flow is broken.” To be sure, even if chess is the gymnasium of the mind, it is reasonable to think that that during a one-minute game there is no time for thought. However, I shall argue that experts at speed chess do think explicitly about their actions. Of course, chess players do not deliberate over every possible move but rather, as Dreyfus emphasizes, they “zero in” on a limited number of possible moves. Nonetheless, contra Dreyfus, I shall also argue that there is a sense in which such zeroing in is both conceptual and rational.

1 footnote at first usage abt use of term arational according to Gobet
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Many of the ideas expressed in this chapter are based on work I have done with philosopher and national master chess player Cory A. Evans, and I am grateful to him for all he has taught me about chess and his generosity in granting me permission to recount some of our work here.

Setting the stage with the example of driving

On Dreyfus’s view, we perform best when we neither think, nor even do, but rather merely let ourselves be drawn into action. This happens, as he sees it, when we adeptly perform our everyday activities, such as opening familiar doors or climbing the stairs, as well as when professionals who are considered experts in their fields do their jobs. For both the layperson climbing a flight of stairs and the expert musician, chess player, and nurse at work, years of practice have hewn their actions, as Dreyfus sees it, into smooth, seamless wholes that can be performed, and indeed are best performed without the actor reflecting on or deliberating over what is to be done, and, as we have seen, in a sense, without the individual doing anything at all.

Besides chess, he illustrates his view by discussing an activity with which many might be more familiar, namely, driving. In work with his brother, Stuart Dreyfus, he describes the actions of the expert driving as follows:

> The expert driver, generally without any attention, not only knows by feel and familiarity when an action such as slowing down is required; he knows how to perform the action without calculating and comparing alternatives. He shifts gears when appropriate with no awareness of his acts. On the off ramp his foot simply lifts off the accelerator. What must be done, simply is done. (2004, p. 253)

Beginners, according to Dreyfus and Dreyfus, “make judgments using strict rules and features, but with talent and a great deal of involved experience, the beginner develops into an expert who sees intuitively what to do without applying rules and making judgments at all” (2004, p. 253). In accord with the just-do-it maxim, the expert doesn’t think, but just does what needs to be done.

Elsewhere, Dreyfus claims that “mindedness is the enemy of expert coping,” where by “mindedness,” he means the gamut of mental processes (thought, reflection, deliberation, attention, and so forth) and by “expert coping,” he means not being an expert at coping, in the sense of being an expert at doing OK (as in “I’m coping”), but rather, being able to perform in a smooth, efficient, effortless and highly accurate manner. He also refers to this as “involved” or “absorbed coping”. Expert coping is exemplified, according to Dreyfus, in our everyday actions, such tying our shoes or, for experienced drivers, driving in normal conditions, as well as in the kinds of actions performed by experts such as world-class athletes and chess players in their moments of glory. It is not that he sees an expert’s actions as always “nonminded.” He does not deny, for example, that world-class chess players deliberate over their moves in situations when their expert intuition, which he sees as immediate and unreflective, fails to provide the right move (1986). However, when performing at their best, according to Dreyfus, the actions of the grand-master chess player are no more based on deliberation than your movements when you go to open a familiar door.

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4 Many of us, but not all of us. Dreyfus lives in the California Bay area. People are familiar with driving there (I grew up around there; I know). In Manhattan, we’re more familiar with chess. The East Coast/ West Coast dichotomy is revealed in another of Dreyfus’s comments, for as an example of something you can perform mindlessly is crossing a street (anthology). This is generally true in Berkeley where cars stop for pedestrians. In midtown Manhattan, where I currently live, you’re likely to get killed by adopting a Dreyfusian stance.


6 [Save for later chapter: he takes his understand of everyday expertise to generalize to professional-level expertise, such as grand master-level chess playing and professional baseball. Indeed, in work with his brother, Stuart Dreyfus, and funded by the United
Dreyfus makes a number of related points here, all of which individually could be seen as support for various restricted versions of the just-do-it maxim: Experts proceed without attention to what they are doing; experts do not calculate or compare alternatives; experts are arational\(^7\) (they are not in a position to justify their actions); they act spontaneously (they proceed without deliberation); and they rely on neither rules nor standards to decide on or justify their actions. To add to this, he also claims that experts act “intuitively,” which, for Dreyfus, involves “the understanding that effortlessly occurs upon seeing similarities with previous experiences” (see p. 28 and passim in Dreyfus and Dreyfus 1986), and that “expert coping [is]... direct and unreflective” which he takes to be the same as “nonconceptual and nonminded” (see p. 355 in Dreyfus 2007a). Taken together, these points add up to a fairly extreme version of just-do-it, for they leave very little, if any, room in occurent expert action for the mind at all.

To address Dreyfus’s argument for this extreme view as it applies to chess, as well as McDowell’s less extreme position, let me categorize the central questions as follows: (1) Can expert chess players proceed just as well when they are not attending to (focusing on) the game? (2) Do expert players rely on neither rules nor standards to decide on or justify their actions? (3) Do they proceed, as Dreyfus holds, without deliberation and thought (for example, without calculation, comparing of alternatives, reflection)? Or is such deliberation and thought, as McDowell holds, typically only implicit? (4) Are their actions based on intuitive, arational responses to a situation (that is, are their actions effortless, nonconceptual, arational responses that occur upon seeing similarities to previous experiences)? Affirmative answers to these questions support various just-do-it principles, while negative answers tell against such principles.

In sum, the answers I provide are as follows: (1) Dreyfus has not made a convincing case for the view that expert chess players proceed just as well, if not better, when they do not attend to the game; (2) The rules of the game are usually not consciously present, yet sophisticated heuristic rules may be consciously employed; moreover, contrary to Dreyfus’s suggestion that the rules are not in the mind at all, chess players can readily access them; (3) experts deliberate, often explicitly, even in speed chess, but not over everything; and (4) their best actions are not grounded in intuitive responses, if intuitions are seen as arational and nonconceptual. However, if intuitive responses are seen as both rational and conceptual (though not necessarily declarative), expert-level chess involves not only thought and deliberation, but also intuition.

### Attention

What is the relevance of attention in chess? Do expert chess players attend to the game? By “attention,” I understand Dreyfus to mean focusing on what you are doing (as opposed to merely being immersed in the sensation of doing it). This is a weaker notion than deliberation, which I shall address in response to question 3, and which involves thinking about and deliberating over what you are doing. Dreyfus certainly rejects the stronger claim that expert chess is thoroughly reflective, but he also seems to reject the weaker claim that it involves attending to the game, for as he says, in support of the principle of interference, “in general paying attention to... [what one is doing] leads to a regression from expertise to mere competence” (see p. 374 in Dreyfus 2007b).

As I have stressed, I think that, in Dreyfus’s favor, there are numerous examples of times when focusing on what you are doing at least seems to interfere with performance. Ask yourself, for example, why you lift your feet approximately 1.3 inches above each stair as you climb? Although there is a reason for doing this—much less might lead to bumping into the step and much more might lead to fatigue—this reason is not in your mind guiding your behavior as you ascend a staircase. You don’t need to think about

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\(^7\) Gobet ( ) points out that since the word “arational” combines a prefix from ancient Greek, and a root from Latin, a better term might be agnomic (since the perhaps preferable term “alogic” already has a technical meaning). Perhaps this is so, but for consistency sake I stick with Dreyfus’s terminology here. Gobet does as well.
it; you just do it. Many, though not all everyday actions seem to proceed in this way: thinking about how to type in my password does seem to interfere with typing it, but I can think quite carefully about tying my shoes without any interference, perhaps because it was a few years ago that I taught my children how to do this. Focusing on what you are doing when you are doing it does seem to interfere, then, with some everyday expert performance. However, as the arguments in prior chapters suggest, there is a significant difference between how attention affects rote skills and how it affects the skills exhibited by professional level experts. The expert emergency room nurse, the professional ballet dancer, or tennis player, I have argued, when in the thick of things, often do and should pay attention to or focus on what they are doing.

Dreyfus, however, suggests that when performance proceeds well in high level chess, attention, at a minimum, does no good. And he cites a mini-experiment that pitted International Chess Master Julio Kaplan against a slightly weaker player in a game of lightning chess (where each player has 1 min to play the entire game), during which Kaplan had to rapidly add numbers aloud. The result, he tells us, is that “even with his analytic mind completely jammed by adding numbers, Kaplan more than held his own against the master in a series of games” (see p. 33 in Dreyfus and Dreyfus 1986). This experiment, he seems to think, suggests that attending to one’s moves is not an important or essential element in expert chess skill. “Deprived of the time necessary to see problems or construct plans,” Dreyfus tells us, “Kaplan still produced fluid and coordinated play” (see p. 33 in Dreyfus and Dreyfus 1986).

Does Kaplan’s performance indicate that attending to the game is not necessary for expert performance? Certainly, he still played well, but did the lack of attention cause him to play less well? The description of the experiment leaves out some details. We don’t know, for example, how much weaker the “slightly weaker” player was than Kaplan. Maybe Kaplan is distracted but because of the ability differential is still able to hold his own. Moreover, we aren’t even told if Kaplan won. And if he lost to the slightly weaker player, the experiment would seem to indicate that attention is important to the game. But even if Kaplan had won, it may be that he was still attending to the game, for it may be that the addition facts were so automatic that they didn’t interfere significantly with his attention. And there have been some studies which indicate that when chess players are asked to perform a task that is not automatic it does interfere with chess performance. For example, Baddeley and Hitch (1974) asked master-level chess players to reproduce board positions while randomly generating letters and found it resulted in a 66% decrease in ability to remember board positions and a 33% decrease in ability to solve chess problems, which would seem to indicate that some aspect of attention is important. Finally, since Kaplan was adding numbers out loud, it is possible that this distracted his opponent making it easier for Kaplan, even if distracted himself, to hold his own.

To try to better understand the Kaplan experiment, I ran two informal experiments. In the first, I had two master level players who are both expert lightning players, each play master level opponents online while adding single digit numbers. In line with Dreyfus’s results, both felt that they played as well as they usually did (and both happened to win). However, both also stopped adding when things got difficult, with one, for example, taking quite a long time to add 8 plus 1 (“8 plus 1…uh…uh…8 plus 1…uh…what’s going on here? He’s not moving his bishop…uh….8 plus 1, 9”) while the other made some uncharacteristic arithmetic mistakes right towards the beginning. Neither observed the other or spoke to each other about the experience, but both said that far from their analytic minds being jammed by the addition task, they focused almost entirely on the chess and let the addition proceed automatically. The one who made the arithmetic mistakes at the start said, “I’m a cribbage player, so once I figured out that you were giving me all single digit numbers, I can do that all automatically.”

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8 See also Saariluoma and Kalakoski (1998) for an illustration of how the Brooks’ letter task, which involves counting the corners on block letters, degrades chess performance. For a view quite similar to the view I present here on awareness in chess see Gobet and Chassy 2008; Gobet and Chassy 2009
In the second informal experiment, I tried to jam the analytic mind up a bit more and had a (retired) International Master play lightning while adding double digit numbers. He performed the addition correctly—though at one point pausing before giving an answer for quite a long while—but he lost the game and was not at all pleased with his performance. In response to my question, “How do you feel you did?” he replied, “What do you mean, how do I feel? How do you think I feel? I’m playing an IM while adding double digit numbers. I’ll tell you how I feel: I’m going to go back to the cabin right now and slit my wrists.” Fortunately, he didn’t follow up on his plan, though, nevertheless, I learned that really good chess players hate to lose, and in fact, I couldn’t even convince other players to try this experiment. Of course, part of the reason why my one subject lost was that he was playing against another very strong player. Still, his perception was that adding the numbers significantly interfered with his performance.

Of course, presumably even Dreyfus would say that chess players would not perform just as well no matter how distracted they are. A serious enough interference would presumably, on Dreyfus’s account, interrupt absorbed coping. However, given the above problems with his experiment on Kaplan, I would say that Dreyfus has not even shown that a minor distraction interferes with the game. If you take generating random numbers a minor distraction, the Baddeley and Hitch experimental data, indicates that even a relatively simple distraction is enough to significantly degrade chess performance. And my informal experiment involving adding double digit number is consistent with this as well.9

A trip into the world of chess also that suggests that attention is essential to expert-level play. For example, high-level players demand absolute quiet in tournament halls so that they can concentrate; and many players go to great lengths to avoid hearing any music before games for fear that a tune will get stuck in their heads, as it were, and distract them from the game. Focus, it seems, is paramount. (To be sure, not all great players refrain from listening to music, even during tournaments since there is at least one exception: the Dutch chess player Daniël Stellawgen. Stellawgen would always listen to it before his games, and sometimes (using a headset) during his games. But, as he has explained, the reason why he did this was that the classical music he listened to had neither a bass line nor a steady melody and thus could not get stuck in his head and even prevented him from getting music stuck in his head, something which used to happen to him frequently before using classical music in this way. So in this case, a player listened to music during games precisely to avoid getting music stuck in his head!)

As another illustration of expert coping without attention, Dreyfus (2005) cites Charles Taylor’s example of a man flawlessly navigating a path up a hill while his mind is totally absorbed in anticipating an ensuing difficult conversation (p. 56). In cases such as these, Dreyfus thinks, we do not pay attention to what we are doing at all. Rather, we just do it. But what counts as cases such as these? It seems that although one may scale a hill without attention, chess is more like the difficult conversation (and the data on cell phone use during driving makes it seem that driving should be as well).

**Rules**
Let me move on to the second question: Do experts proceed without relying on rules or standards to decide on or justify their actions? In chess, one can, as Dreyfus does, distinguish two kinds of rules: on the one hand there are rules of the game, which govern how the pieces move, that specify time limits and when draws will occur, and so forth, and on the other hand there are heuristic rules, which advise one as to general strategy, such as to control the center and make even trades when you are ahead. Consciously following the rules of the game or heuristic rules counts as rational action since such rules provide one with a reason to act. But according to Dreyfus, the expert does neither of these. Indeed, according to Dreyfus, the expert does not even follow the rules unconsciously: the beginner learns the rules and the competent player relies on them, but the expert abandons them, just as competent bicyclists set aside their

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9 Furthermore, there are some kinds of tasks that seem to interfere with chess performance more than others. For example, it is thought that chess performance is degraded by tasks that interfere with visuo-spatial processing and executive processing more than tasks interfering with verbal processing (Saariluoma 1992; Robbins et al. 1996).
training wheels: “To assume that the rules we once consciously followed become unconscious,” Dreyfus tells us, “is like assuming that, when we finally learn to ride a bike, the training wheels that were required for us to be able to ride in the first place must have become invisibles” (see p. 52 in Dreyfus 2005). Rather, on his view, the expert chess player’s mind does not contain the rules at all, even unconsciously.

Dreyfus argues that the rules of the game are not “stored in the mind,” but rather function “as a landscape” on the basis of which the game is played (2005, p. 53). And it does seem that that rules of the game generally function in the background rather than the foreground of the expert's mind. But I think that Dreyfus overextends when he says that rules of the game are not in the mind at all and suggests that an expert chess player might not even remember them (see p. 53 in Dreyfus 2005). Dreyfus tells us that “even if [the expert] can't remember the rules, they nonetheless govern his coping,” and “he normally can be led to remember them” (see p. 53 in Dreyfus 2005). However, it seems that chess players do not need to be led to remember the rules; they just remember them and are able to teach them quite readily.

Or rather, this is true of the basic rules of chess. Sometimes a very complicated situation may arise during a tournament and even a Grandmaster might need to consult the rule book. Yet, some players seem to have even the entire rulebook stored in their minds. A vivid example of this occurred during the 1994 Intel World Rapid in New York. In one much talked-about game in the chess world, Grandmaster Victer Korchnoi made an illegal move against Grandmaster Anatoly Vaisser. In the televised match, Korchnoi indicated that he was unclear on the precise penalty, and he proceeded to ask the arbiter for the rulebook. That proved unnecessary as Vaisser immediately recited the entire half-page rule, word-for-word. Vaisser, quite vividly, remembered the rule without prompting.

So it seems that rules of the game are, if not typically at the forefront of a player’s mind, at least in the background. Beyond this, very occasionally a rule might figure prominently in a player's deliberations, such as when a player might deliberate over and decide not to enter the dreaded rook-bishop versus rook ending, despite knowing it was a win, because he or she fears that the 50-move rule (which says that if you make 50 moves without a pawn moving or a piece capturing, the game is declared a draw) might come into play. So in stating that the rules of the game are not “stored in the mind,” Dreyfus is at least overstating his case.

What about heuristic rules? Again, it seems that basic heuristic rules, such as move your knight before your bishop and capture towards the center, are not on the forefront of the expert's mind. But, contrary to Dreyfus, it also seems that they are not out of the mind entirely, even when they are not consciously consulted, for most good players can rattle them off quite easily.10 Again, this is a basic skill chess coaches (who are often themselves highly skilled players) manifest.

Heuristic rules, since they frequently conflict, are not adhered to as firmly as rules of the game. And when they do conflict this leads to deliberation, which is my next topic. However, there are what might be thought of as advanced heuristic rules specific to particular positions, which rarely conflict and sometimes are on the forefront of an expert's mind, consciously guiding high-level play and serving as justifications for moves. For example, when contemplating particular kinds of sacrifices, the International Master Larry Evans, first considers, then follows the following rule: “[I]n the Maroczy Bind with the bishop on g7, don't sacrifice the two knights for the a-pawn, the d-pawn, and the exchange, unless you also either win the b-pawn or can force off a lot of material.” Evans says he learned this rule from Julio Kaplan in the 1970s, when Kaplan was training him for international play. And though he admittedly often can't remember what he ate for breakfast, he has remembered this rule ever since.

That great chess players engage in high-level rule based conscious thinking is also suggested by the comments of grandmaster Patrick Wolf, whom the psychologist Christopher Chabris interviewed in 1991. (Wolf later became two time U.S. champion and for a period occupied a position as one of the top 100 players in the world.) Chabris (in a very non-leading question) explained to Wolf that when playing

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10 Though this is generally true, very modern, very young chess playing prodigies are sometimes so computer-driven that they never have to learn these rules. However, this is exceedingly rare. For a discussion of the use of how players rely on computers in contemporary chess, see Hartman (2008), especially his analysis of how the use of computers in pre-game preparations has led some chess theorists to describe chess as "rule-independent," and based more on calculation (pp. 55–56 and fn 21).
chess, he, himself, “hardly ever think[s] of any overarching recommendation,” and wanted to know whether Wolff “knew] of any strong players who ever actually thought in general terms during a game…as opposed to just seeing variations.” Wolff responds as follows:

*I think in general terms during the game … I would be very surprised if there were a single very strong chess player who did not think in general terms. It’s just that it depends what one means by general terms…*

Chabris clarified that by general terms he means something along the lines of “now I want to think about ideas of how to get my rook onto the seventh rank.” Wolff’s response:

*Oh yes, sure, absolutely. And I think it’s something that all strong grandmasters have to learn how to do. It’s one of the things that separates chess players of a certain class. I’m sure that one of the very things that separates the strongest players from the not-so-strong players is the strength and clarity of that thinking …*

To be sure, not all specific heuristics are conscious, or at least not all are consciously represented in words, such as those Evans used to describe the specific heuristic above, or as Gobet puts it, specific heuristics “do not need to be encoded declaratively.” Rather, as Gobet points out, many are learned through extensive practice and study of the game and form a “perceptual chunk,” to which possible actions get attached.11 This is where specific heuristics shade into a form of zeroing in, yet, as I shall argue in my discussion of expert level chess intuition, they still may be rational and conceptual.

Although grandmasters may sometimes beat weaker players without ever relying on anything beyond heuristics, it is times where specific heuristics are flouted which decide who wins in games between grandmasters.12 For example, in the famous game Botvinnik vs. Capablanca (AVRO 1938), Botvinnik, a future World Champion, defeated Capablanca, a former World Champion by breaking a heuristic rule and subsequently coming up with a winning move. In their particular position, Capablanca used an advanced heuristic rule to justify capturing a stray pawn. But Botvinnik, after prolonged thought, brilliantly allowed this. He broke the rule, it seems, because he consciously realized that in that particular rare position, Capablanca would not be able to retreat his pieces in time. In general, rules are of no helps in truly novel positions with no themes (that is, positions totally dissimilar from any past games with which the expert is familiar) and highly tactical positions (that is, in highly complex positions where broad plans are less important than trying to figure out exactly what is happening). Here, then, Botvinnik’s brilliant move is an example of not following rules, yet it certainly is not an example of just-do-it.

Dreyfus (2005), however, argues that expert play must not rely on heuristic rules since “if one followed the reconstructed rules articulated by an expert one would not exhibit expertise but mere competence” (see p. 54 in Dreyfus 2005). But the consequence does not follow; although merely learning a grandmaster’s repertoire of heuristic rules may not turn a competent player into a grandmaster, this does not mean that the grandmaster never relies on heuristic rules when deciding on a move. Rather, the reason why this would not turn a competent player into an expert is because in addition to employing heuristic rules, experts also calculate out the consequences of moves and have an ability to zero in on a few extremely good moves, which brings us to the topics of the next two sections.

**Deliberation**

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11 Comments on m and e also Gobet and Waters 2003; Campitelli et al. 2007; Wan et al. 2011  
12 In Cory and Montero, we said that ……As Gobet ( ) points out, however, this is a mistake.
Do experts proceed without deliberation (that is, without calculation, comparing of alternatives and reflection)? In an essay on the art of chess, the philosopher Stuart Rachels (2008), who is an International Master, emphasizes how, as he see it, “chess cognition is mostly unconscious” (p. 214). For example, he tells us, “in studying a position, a master may quickly understand that there are three viable possibilities for the player on move” (p. 214). And when a player does deliberate, he tells us, “there is typically little inner dialogue” and that “chess thinking is rarely linguistic” (p. 214). Yet, at the same time, in a footnote, he tells us, “individual players do, however, have their little habits,” and cites an example of one professional player who, even when he was certain to win, would always ask himself before each move whether he should offer a draw (p. 223). And as for himself, Rachels says that when he deliberated between two moves, one which he wanted to play and one which he “feared was better” he would “deliver a silent lecture” to see if he could convince himself that his preferred move was superior. So which is it? Is there typically little linguistic thinking or are players silently talking to themselves all the time? Rachels seems caught between the two positions.

Dreyfus isn’t torn. His view is that the best moves are not the result of deliberation. And in chess, as elsewhere, he also upholds the principle of interference, namely that thinking interferes with expert performance, or as he puts it, “the enemy of expertise is thought” (see p. 354 in Dreyfuss 2007a). Rachels apparently does not accept the principle of interference, for it he did, he would likely find a way to break the habit of lecturing to himself. Though he does not discuss this, he might hold that deliberation is somewhat epiphenomenal in chess playing. Dreyfus, however, goes further, claiming that it is harmful, or at least that it is harmful when the intuition is functionally well. For on his view, when something goes wrong, players do deliberate. As he tells us,

When a[n] [expert] has to deliberate in chess or in any skill domain, it’s because there has been some sort of disturbance that has disrupted her intuitive response. Perhaps the situation is so unusual that no immediate response is called forth. Or several responses are solicited with equal pull (see p. 57 in Dreyfus 2005).

Such deliberation, as he sees it, is rare:

Fortunately, the expert usually does not need to calculate. If he has had enough experience and stays involved, he will find himself responding in a masterful way before he has time to think (see p. 58 in Dreyfus 2005).

However, this does not seem to happen. Although in simple positions play may be guided entirely by heuristics, typically, as Rachel's suggests, even in such cases a player will briefly deliberate to verify that there are no tactical errors. And as soon as the game gets complicated, experts start to deliberate in earnest, a view which is suggested by a number of verbal protocol studies that ask players to chose the best move while voicing their thoughts, and as many players readily confirm. A complicated position does not necessarily mean that something has gone wrong and even in such situations one intuitive response may stand out as preferable, nonetheless, deliberation, according to players' first person reports and as suggested by verbal protocol studies, does occur.

Dreyfus, however, takes chess playing to illustrate the view that humans at their best do not rationally decide or even decide at all to act, but rather find themselves immediately responding to environmental cues. As Dreyfus sees it, this view flows out of the work of his philosophical ancestors, Martin Heidegger and Maurice Merleau-Ponty. On their phenomenological account, Dreyfus tells us, “what we are directly open to is not rational or even conceptual... [rather,] it is the affordance's solicitation—such as the attraction of an apple when I'm hungry—to which I am directly open” (see p.357

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13 As Gobet (20..) has commented, the empirical evidence for this is overwhelming. See for example, De Groot (1965), Charness 1981; Gobet 1986b, 1998, Saariluoma 1995, Campitelli and Gobet 2004, and Bilalić et al. 2009.”
in Dreyfus 2007a). But the problem with this picture for chess is that the very attractive apple is often poisoned. In these cases, letting yourself be pulled along by the forces on the board leads you right into your opponent’s trap.

Why, then, does Dreyfus think otherwise? And, moreover, why does he think that deliberation would hinder expert play? As with attention, it does seem that there are times when deliberating over your everyday actions impedes performance. Going back to the example of climbing the stairs, if you try to figure out whether you should raise your foot just like so, or a little more, or perhaps a little less, you had better take the elevator. And I think that beyond inspiration from his philosophical ancestors, part of Dreyfus’s motivation comes from his experience with situations such as these. But as I have been emphasizing throughout the book, there is a significant difference between everyday actions and expert actions and while deliberation may hinder the former, there is no reason to think that, in general, it hinders the later.

Of course, chess is not the only example Dreyfus looks towards in his argument for the principle of interference. Another favorite example, as we have seen in Chapter 4, is the case of New York Yankees former second baseman, Chuck Knoblauch, who suddenly developed severe throwing problems (Dreyfuss 2007a). I argued, however, that there is little reason to think that deliberation was the cause of any of Knoblauch’s problems. And neither Knoblauch, nor the other players who have been afflicted with similar problems seem to believe that thinking or deliberating was the cause of their performance decline; and the few investigations into this by scientists hypothesize alternate causes.14 In chess, however, it seems that we do not even have an analogue of a Knoblauch-type problem. Of course, when a player learns a new strategy or opening, though it may increase while performance at first takes a plunge. But, just as I argued in Chapter 6, in discussing examples of performance degradation when athletes first change their technique or equipment, there is little reason to think that the poorer performance is due to the thinking rather than to not having understood (in the case of chess) or mastered (in the case of athletics) the new approach.

So, again, why does Dreyfus emphasize that the truly great chess moves are performed outside the realm of the mind entirely? In terms of standard chess played on a long clock, then, there seems little reason to think that deliberation is not a key component of play—what else could they be doing during those long periods of silence?—and even a key component in making the best moves—great moves in tournaments are typically preceded by at least a moderate period of silence. Chess players, it seems, in standard games, deliberate over their best actions. Dreyfus’s view about chess, however, seem to be highly influenced by how he understands the game of lighting chess (which allows for one minute for each side per game), arguing that since grandmasters are able to play lightning chess so well (that is, at a master-level) without deliberating, that in terms of making great moves in chess, quite generally, deliberation is similarly unessential. (see p. 53 in Dreyfus 2005).15 But I think that this is not a very good argument for a couple of reasons. Let me explain.

The ability to play chess at the master-level during lightning games is extremely rare, with perhaps right now only two players able to this. Master-level chess is often more-or-less blunder free, and certainly the loss of major pieces (like the queen) to two or three move combinations is exceedingly unlikely. Yet even amongst most of the top lightning chess players these results are common. Only very best lightning chess players achieve consistently blunder-free play. Grandmaster Hikaru Nakamura, who plays online as “Smallville” and Grandmaster Roland Schmaltz, who plays online as “Hawkeye” are the two best lightning chess players in the world (at the time of writing this chapter) as measured by overall ratings on the Internet Chess Club network (virtually all serious lightning chess is played online—otherwise the pieces would fall over!). Nakamura and Schmaltz do occasionally play master-strength games, or, at least, they are able to defeat chess computers that are rated as master strength. (Because

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14 Though there is one article that suggests thinking might be a causal factor, however, the sole support for this is Dreyfus’s phenomenological investigations.

15 Also see (Gobet and Simon 1996a) who present data that illustrates that stronger players are able to perform well against weaker players even when their time is limited.
computers move almost instantly, chess computers are extremely strong opponents in lightning chess). No other players today can consistently beat master-strength computers and even Nakamura and Schmaltz occasionally make serious blunders that would not be seen at master-level standard time-control chess, especially against each other and against other very strong human lightning players. So at best, Dreyfus is making a point about a very small number of grandmasters.

Second, there is an enormous difference between grandmaster and master chess ability; if a master and a grandmaster play 100 games, the master would be very lucky to beat the grandmaster even once. So with less time for deliberation, the decline in ability is quite significant. One way in which this decline in ability is illustrated is by comparing openings during standard games and lightning. In modern slow time play, it is unheard of for top players to vary significantly from leading opening theory.¹⁶ For example, all of the openings from the 2010 world championship match are extremely solid lines. However, when lightning games are played, you see all sorts of bizarre openings.¹⁷

Finally, Dreyfus assumes that lightning chess is played too quickly to allow for deliberation:

> When the Grandmaster is playing lightning chess, as far as he can tell, he is simply responding to the patterns on the board. At this speed he must depend entirely on perception and not at all on analysis and comparison of alternatives (see p. 53 in Dreyfus 2005).

But according to a number of expert lightning players this is not so. Cory Evans, who has been rated over 2700 at lightning chess on the Internet Chess Club server (the best cite for high-level online chess play) which, at the time, placed him clearly among the top ten players on the server, explains that as he sees it, even though lightning chess is highly guided by heuristics, deliberation still occurs at crucial junctures, albeit very fast deliberation. Whereas in a normal game one might deliberate over, say, the advisability of launching an attack and the appropriateness of a certain sacrifice, in lightning chess, according to Cory, one tends to deliberate more over the simple brute tactical details of the game, such as “does Nxf7 win a rook with a two move combination?” When Cory played lightning chess daily, part of his training included rapid-fire analysis of positions with an aim at completing deliberations in fewer than 5 seconds. The point of this drill, it seems, was to teach him not to just-do-it.

> When Cory asked Grandmaster Hikaru Nakamura about this, he also claimed to calculate when playing lightning chess. Of course, with far less time, far less deliberation occurs. For example, while he might see as far as fifteen or twenty moves ahead in a tournament format, he'll rarely see beyond three moves ahead in lightning. And, if this is correct, it would seem relevant to why he plays lightning at only master and not grandmaster-level. And Gobet, himself a (retired) international master has said that these accounts conform to his own experience playing lightning chess, commenting that “although I do not think there is experimental evidence on this, this conclusion fits my own experience of playing such games, and I would guess that this must be even more the case with top-level grandmasters.”

Do Evans, Nakamura, and Gobet really calculate when playing so quickly? Again, in line with my methodological principle, I take their descriptions of such calculations as defeasible evidence for their truth. However, I decided to conduct an informal experiment of my own to test both Dreyfus’s view that in playing very fast games high-level chess players would not be able to “say anything at all about [their] reasons for making a particular move” and that “the master could only respond to the demand for a reason by saying ‘I made the move because I was drawn to make it.’”¹⁸ I also wanted to test McDowell’s weaker

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¹⁶ At the time of writing this chapter, Morozevich is probably the lone counterexample.

¹⁷ During the 2010 World Championship, for example, we witnessed: Grunfeld Exchange, Catalan, Slav, Catalan, Slav, Catalan, Slav, Catalan, Nimzo-Indian, Grunfeld, English, Lasker Defense. The only one of these that is not considered the absolute height of orthodox opening theory is the Grunfeld, and for this reason was considered a risky choice by Anand, even though it is still a perfectly respectable opening. However, when lightning time control is involved, you see a variety of unsound openings such as the Albin Counter- Gambit, hyper-aggressive lines in the Dutch, and a lot more speculative Sicilian variations. There are also a number of psychological studies supporting the idea that time pressure impedes performance (e.g. Chabris and Hearst 2003)

¹⁸ 2013 p. 35
claim that speed chess does not involve explicit deliberation, and that “if one compels a [chess master] to say what he thus knows in response to the question ‘what are you doing[?]’ one will break the flow.”\(^{19}\) I had four chess players—two master players, one national master level and one (retired) international master player—report, to the best of their ability, the thoughts that occurred to them as they played a lightning game online against similarly ranked players. Before trying the experiment, they all doubted that they would be able to do this since they felt, not that lightning chess was all perceptual responses, but that stating their thoughts in words would slow them down too much. However, surprising all of us, every player was able to say quite a bit, nonstop and very rapidly, with comments such as “If I play B6, he plays F3; is that the idea? B6, F3; what about C5, D5, D5, D5. If he plays D5 I get into a Leningrady thing; but I don’t want a Leningrady thing…” and “Oh I can’t really play knight there?; knight here maybe; he’ll just take the queen” and “I want to attack on the king’s side but nothing’s happening; I guess I’ll just go here because I think he might castle queen’s side.” And not once did this task seem to interfere with their performance, both the outcomes of the games (three won, one lost) and their own personal evaluations of the game: they all thought that they at least as well as they usually do, with one commenting, “I think it actually helped my game.” The IM, in response to my question of whether he played well, said “I never think I play well, but I played like I play.”\(^{20}\) Thus, even if—as some defenders of just-do-it like to say to me in response to this experiment—such thoughts are an artifact of the request to verbalize what is going on in their minds, it would seem that, contrary to the principle of interference, such thoughts are compatible with (and perhaps even conducive to) expert performance.

Dreyfus, recall, relies on lightning chess to illustrate the paucity of deliberation in chess with normal time controls. Yet, if expert players deliberate during lightning chess, as I have argued, they would seem to deliberate even more when they have time to think before each move. A five-minute “blitz” game is not that much longer than a one-minute lightning game, and sometimes Dreyfus uses blitz to make his point about the paucity of deliberation in chess, so I also ran some informal blitz experiments on my same group of expert chess players and found that even with just four more minutes, the deliberation was much more extensive, with players sometimes engaging in a bit of that “silent lecture” that Rachels mentions, though, of course, for the purposes of the experiment, out loud.\(^{21}\)

To get a sense of deliberation during a normal time control game, which can extend for hours and hours, consider an explanation International Master Larry Evans gives of his deliberations during one such game (Evans-Allen, Philadelphia International 1977, published in Informant 22).

This is what the board looked like:

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\(^{19}\) Cf. Wayne Martin’s use of lightning chess as an illustration of a situation in which, although one makes a judgment, one does not explicitly review the evidence for one’s judgment. Citing his own experience, he writes that when playing speed chess, “I make judgments—I reach a conclusion that is in some sense responsible to evidence—even though I don’t undertake any conscious deliberation and I experience my judgment as issuing more-or-less instantaneously.” As (I assume) Martin is not making a claim about highly skilled lightning chess players, my conclusions are consistent with his view.

\(^{20}\) Of course, lightning chess also relies significantly on pattern recognition, and since as pattern recognition, which allows players, basically instantaneously to see a good move, or a limited number of candidate moves, or to focus on only certain lines of search, it seems likely that pattern recognition is more important in speed chess than is calculation. However, there is some indication, albeit very weak, that in speed chess, a player’s ability to deliberate quickly is actually more important than his or her ability to recognize patterns on the board. So far, all of the world chess championships that have been decided by a five minute game have been won by the younger player. And, as seems likely and is suggested by Charness (1981) study, younger grandmasters rely more on calculation than older grandmasters, it could be the younger player’s superior ability to quickly calculate that is decisive in these outcomes. No doubt, other factors might fully explain the outcome. For example, it may be that the younger players have simply practiced more speed chess than the older players. Reflex time may be relevant as well (though in a five minute as opposed to a one minute or quicker game, this may not be decisive.) And as the number of chess matches at issue is so small (only ), it is not even clear that there is a real phenomenon here to uncover. So at best we have a very weak indication of the relative importance of deliberation over pattern recognition in speed chess, and ultimately, as I explain in the section on intuition, I leave open the question of the relative importance of deliberation and pattern recognition in expert chess playing quite generally.

\(^{21}\) See also Gobet and Simon’s 1996a paper on Kasparov’s simultaneous matches against national teams.
And here is Evans’ description, given after the game, of what he thought about (understanding chess notation is not necessary to get the idea that the processes involve deliberation):

This position is an isolani—a middle-game trade-off where White has an isolated center pawn (bad) which simultaneously gives him space and attack (good). If given one more move, Black will consolidate his position with 1... Bb7, after which he is at least equal.

Therefore, I knew it was now, or never. The fight in this position is over the square d5, so I looked at ways to control d5 through a combination. I therefore knew immediately to avoid the attractive looking Nb5, which moved away from the strategic fight.

I considered first 1.Bxd5, but after 1...Nxd5 2.Nxd5 exd5 it did not look like White had an advantage. So, I looked at reversing the sequence by playing first 1.Nxd5.

After 1.Nxd5 Black can play one of two moves (A) 1...exd5 or (B) 1...Nxd5. If (A) White can play 2.Bb4 followed by 3.Bxe7 Qxe7 4.Bxd5+, winning. So, Black must play (B). After 1.Nxd5 Nxd5 white needs a combination. After carefully analyzing I discovered the winning sequence, reproduced below:


Was this exactly what was going on in his mind? Probably not, however, Evans has said that this is basically how he was thinking and, if anything, it would seem that, as Gobet points out, “based on the extant scientific literature,” the “careful analyzing” that led to Evan’s winning sequence was “no trivial matter and demanded extensive search in the jungle of possible moves and counter moves.” Are there times when the clock is running out and a player needs to move without thought? Perhaps. But when there is time, even a miniscule amount of time, expert players think, and they do so without any detrimental effect. Moreover, just like the soldier’s description in Chapter 5 of how, ideally, soldiers should avoid situations where one must simply respond without considering what to do, ideally chess players avoid situations where they need to respond without considering the move. Expert chess players, then, deliberate if it is at all possible and perhaps sometimes even when it might seem impossible, for according to Cory Evans, expert lightning players do not get themselves in a situation where deliberation is impossible in part because, as he states it, “I can still can think even if I have half a second left.”

Intuition

Dreyfus also argues more generally against chess ability being a particularly analytic skill by suggesting that grandmaster chess players are not especially mathematical. He quotes his brother, who was the captain of the chess team at Harvard, who claims that his analytic approach to chess stymied his progress: “while students of mathematics and related topics predominate in the population of young people enthusiastic about chess, you are as likely to find a truck driver as a mathematician among the world’s best players. You are more likely to find an amateur psychologist or a journalist” (p. 25). Is this correct? To be sure, the very best players are as likely to be mathematicians as truck drivers, since the very best players are invariably professional chess players and thus neither mathematicians nor truck drivers! Nonetheless, as de Groot’s (1978) data suggests on the occupations grandmasters indicates, among the best players that do have careers outside of chess, many are attracted to mathematical careers (p. 364–366).
I have argued that chess players deliberate and calculate not only when, as Dreyfus says, “there has been some sort of disturbance that has disrupted [their] intuitive response,” but even when all is going well and they are about to go in for the winning move. Yet not everything can be the result of deliberation. At some point, something has to be given to chess player to deliberate over and typically when a highly skilled chess players looks at the board after the opening, certain ideas for moves seem to simply come to her, some of which may be rejected immediately and others of which, the “candidate moves,” are deemed worthy of consideration. The set of initial moves that comes to a player, as well as those that may present themselves during the process of deliberation, do not themselves arise out of deliberation. Moreover, in their deliberations over candidate moves, experienced players do not deliberate over every possible line of play, and this ability to focus in on a few lines that need to be examined is also not the outcome of deliberation. As Gobet explains, “pattern recognition and search are not an either/or question, but are interleaved,” and that “[d]uring look-ahead search, pattern recognition suggests possible moves not only with respect to the current board position, but also with respect to the positions that are anticipated (Gobet’s commentary on Montero and Evans). In general, the range of possibilities over which deliberation occurs is highly limited, and although deliberation leads a player to reject certain moves, the array of possibilities itself is not a result of deliberation.

Dreyfus calls the phenomenon of certain moves presenting themselves “zeroing in” and zeroing in, in at least some sense, can be understood as a form of intuition, for the moves, as I just explained them, suggest themselves rather than arise from deliberate thought; it is difficult to know what exactly guides a player’s zeroing in, however, it seems reasonable to think that it is, as Dreyfus describes the phenomenon of intuition at one point, the result of what “occurs upon seeing similarities with previous experiences” (see p. 28 in Dreyfus and Dreyfus 1986).

If this picture is correct, then both deliberation and intuition are part of high level chess. And, contrary to Dreyfus’s view, it would seem that deliberation at least typically occurs before even some of the greatest moves in chess. Though not a traditional chess game, that deliberation is important to even the greatest moves is illustrated by the 1999 “Kasparov versus the world” in which Garry Kasparov played against the “world team,” which was headed by a handful of grandmasters in consultation with over 50,000 people. Kasparov is a long-time advocate for the importance of intuition in chess play, however, he also claimed that not even that this was the best game he ever played, but that, with characteristic modesty, “it is greatest game in the history of chess.” Yet with not just minutes nor even hours per move, but two days per move, he (and his team) definitely had time for deliberation as well as for effort, for he also claims to have never exerted more effort during a game.

This contrasts Dreyfus’s view that the best moves in chess are not guided by the mind at all, but are rather pulled out of a player by forces on the board. But it doesn’t show that such forces are not part of chess expertise as well, for deliberation may do nothing more than to check to see if such forces are moving a player in the right way and sometimes correct the forces when they are not. This would still be consistent with what I have called “The Master Cogito,” which states that experts on their mettle frequently engage their minds, that doing so does not necessarily or even generally interfere with expert performance, and that experts should not, in general, avoid doing so. Thus, just as I can accept that many aspects of, say, a tennis player’s serve are not guided by or monitored by the mind, I could, consistently with the master cogito, accept that zeroing in is an aspect of chess performance that is, as Dreyfus holds, not mental at all. However, I am not sure that zeroing in, as well as what some see as intuitive choice between positions, should be understood as non-mental.

All proficient players zero in on a few initial positions and lines of attack. However, rather than thinking of zeroing in as being guided by an external force that moves the body, it would rather seem to be a form of perceptual chucking whereby a player associates patterns on the board with a small number of possible chess moves. Dreyfus’s description of intuition above makes zeroing in sound indeed very much like a form of chunking or pattern recognition. But on Dreyfus’s understanding, zeroing in is not a mental processes at all. For Dreyfus, it is simply something that happens to us, and the grandmaster’s

23 (see p. 57 in Dreyfus 2005).
“seeing” the checkmate occurs in the movements of the arm rather than in the movements of the mind. I want to suggest, however, that zeroing in is at least in part an internal, possibly mental process.

Dreyfus thinks both that it is primarily intuition that differentiates top-level players from merely proficient ones, and that intuition is a nonminded processes—in particular, that it is an arrational and nonconceptual process. I want now to argue that intuition is both rational and conceptual, though I ultimately shall leave open the question of whether it is primarily intuition that differentiates strong players from weaker ones. But let me say a few words about this topic before I do so.

Since a computer must perform a humanly impossible amount of searching in order to play grandmaster level chess, it seems clear that what differentiates computer chess from human chess is our ability to narrow down the tree of possible moves. But is it superior intuition that separates the great from the very good human players? Although all proficient players zero in on initial possible lines of play (in some sense, not necessarily the Dreyfus sense of zeroing in), grandmasters are better at this than weaker players, for grandmasters are better able to identify lines which are relevant and lines which are not (see pp. 317–20 in de Groot 1978).

But is zeroing more important to grandmaster skill than deliberation, which involves long chains of tactical thinking? The psychological data on the relative importance of intuition over tactical thinking for high level chess appears inconclusive. De Groot’s (1978) seminal research is sometimes cited as showing that while grandmasters are much better than lesser players at zeroing in on good candidate moves, chess players of different strengths are equally good at tactical thinking—as Dreyfus puts it, that “players at all levels of skill have been shown to be equally good at this” (pp. 37, 198). However, de Groot’s work shows no such thing since he studied exclusively very good players. Rather, what de Groot claims to have found was that there were only very small differences in the macrostructure of the searches among candidate masters and grandmasters. However, more recent studies have magnified these differences. For example, data collected by Charness (1981), also based on a think-aloud protocol, indicates that the best players search both wider and deeper than less skilled ones, and a reanalysis of de Groot’s original data by Reynolds (1991) suggests that there are differences unnoted by de Groot between Grandmasters and less highly skilled players in terms of their tactical thinking. And, more recently, van Harreveld et al. (2007) looked at the relative effect of time pressure on players of various strengths and, assuming that time pressure affects slow processes such as calculating more than fast processes such as zeroing in, conclude that calculating is at least important for the strongest players as it is for weaker players although as van Harreveld points out, “playing with faster time controls induces a lot of “noise” [such as the importance of refined motor skills and increased stress] into a game” (see p. 591 in van Harreveld et al. 2007). (p. 591, see also Holding and Reynolds (1982) and Saariluoma (1990). So it may be that at least some Grandmasters shine because of their relative superior tactical thinking.

Even putting this data aside, it could be that grandmasters do not push themselves to their tactical limits during psychology experiments—or at least not during experiments where they are not engaged in an actual game against a real opponent. De Groot, himself, was well aware of this possibility and claimed that if pressed, there is no doubt that the grandmaster can calculate deeper; as he put it, “it is certainly easier for [the best players] to calculate to a depth of five, six or seven moves, to analyze a certain situation, systematically to work out an intricate plan, or even to digest multibranches networks or variations” (p. 320). Deep tactical thinking, as opposed to pattern recognition, is painfully effortful, and while there is great motivation in an actual tournament to put up with the pain, when Grandmaster are

24 Not only is the data mixed, but there is considerable disagreement as to how to interpret some of it. For example, query Gobet and Simon (1996) argue that because Kasparov’s chess rating drops from 2,750 to 2,646 when playing a simul which restricted the amount of time he had on each move, limiting a players time for calculation has little effect on quality of play, as a 100-point decrease in rating is “slight.” However, van Harreveld et al. take the same decrease to be “a significant decrease,” pointing out that at the time they were writing the paper, such a drop in rating would place the then strongest player in the world at somewhere around 60th place. To put this in perspective, today a 2650 FIDE might be able to make about $40,000 a year playing chess; a 2750 player could easily make over $200,000 per year. 190 B. Montero, C.D.A. Evans
25 How important tactical thinking is for a Grandmaster may depend and the players age, for according to Charness (1981) “two players possessing the same rating may vary greatly in chunking pattern if one is young and the other comparatively old . . . " (p. 30).
merely presented with a position from a game and asked to think aloud while choosing the best move, this motivation will be lessened significantly.

On the other hand, numerous studies have emphasized the importance of pattern recognition in chess. De Groot himself held that pattern recognition and the ability to connect the patterns to possible moves was the more important factor in chess expertise based, not so much on his protocol study, but on a study in which he tested players of varying ability for their recall of chess positions after a brief exposure to them. Finding that grandmasters’ recall was almost perfect while amateurs’ recall was significantly worse, de Groot concluded that superior pattern recognition is the defining feature of chess excellence. Chase and Simon (1973a, 1973b; see also Simon & Chase, 1973) replicated this experiment and additionally found that grandmasters and novices did not differ significantly in their ability to memorize random positions. (Though note that more recent studies have shown that given sufficient exposure time, high-level players are better than novices at recalling random positions.26).27

Let me move onto the question of whether zeroing in, or intuition, is rational and conceptual, or whether it is, as Dreyfus sees it, entirely nonminded. It does seem that some chess players are able to simply zero in on the right move and “just do it,” or on Dreyfus’s extreme view, “just let it happen.” Bobby Fischer, for example, was known to walk by a game, glance at a board position, which others had long been struggling to analyze, and immediately see the best move. It seems that he instantly and automatically zeroed in on one move and knew it was the best one. How did he do this? Arguably, what he saw was that the position was sufficiently similar to a position in a game he knew so as to warrant the same move. And this would seem to be a rational process; it is like seeing a familiar flaw in a philosophical argument and being able, right away, to say what is wrong with it. Both of these processes sometimes at least have what Dreyfus would take to be the marks of rationality: you can articulate them (for example, “in his argument for dualism, I instantly saw that he was using a mistaken definition” or “I saw that the position was a Dragon Sicilian Yugoslav Attack, and so I instantly saw that sacrificing on the h-file would lead to checkmate, as it inevitably does in those kinds of positions”) and they provide justification for your actions. Rationality, for Dreyfus, also implies conceptualization. And one way he emphasizes the arational nature of expertise is by arguing that in situations where expert chess players just see what to do, they do not conceptualize what they are doing. Yet to see the position as a Dragon Sicilian Yugoslav Attack, or as an islolani, as Evans did in the Evans vs. Allen game, involves conceptualization; it is seeing the board in a certain way. And such examples are easily multiplied.

Dreyfus thinks that zeroing in is arational. He tells us,

the master may make moves that are entirely intuitive and contrary to any preconceived plan. In such instances, when asked why he did what he did, he may be at a loss to reconstruct a reasoned account of his actions because there is none..... Nothing about the position need be nameable and thinkable as a reason for moving (see pp. 54–55 in Dreyfus 2005).

According to Dreyfus, then, there is no reason in the player’s mind for why she made a certain moves, not merely no good reason, but none at all. Does this happen?

As Gobet points out, there are examples in the technical literature of times when players do not explain the reasons for their final choice among the possible moves that they deliberated over (Gobet cites: O’Kelly de Galway 1963; Tal 1997; Beliavsky and Mikhalchishin 2002). This is not an example of zeroing in on one or a few initial moves, but is an example where the choice among candidate moves is intuitive, that is, not the result of deliberation. But are such times examples of when there is no guiding

26 “Both Lories (1987) and Gross (1982, as described by Hartston & Wason, 1985) have found that given sufficient exposure time, masters could recall random positions better than could novices.6 Gobet and Simon (1996a) confirmed a skill difference in the random position condition with a meta-analysis of 13 studies. In a similar vein, Ericsson and Harris (1990) found that repeated practice in memorizing chess positions by a non-playing subject could raise performance on the recall task to expert levels.

27 See also Chase and Simon, (1973) and de Groot, (1978). Intuitions without concepts lose the game 191
reason at all guiding play? Or might there be one, albeit a very thin one, such as, for example, the simple reason that that particular move seemed to cinch the mate? Recall, that on Dreyfus’s view, if a player were to be able to express the reason for why she made a great move which was guided entirely intuitively, entirely by the forces on the board, all she could say was “I was drawn to move.” But in most of these cases that Gobet mentions, I presume that a player would still be able to say something like, as Kasparov does at one point, in response to a question about how he was able to see one move so quickly, “I didn’t need to calculate…I saw that that would win.” This, it seems, is a reason, namely that he made the move because he saw that it was a winning move.

Occasionally, a player might not even be this. But, still, in some such cases there may be explanations for the player’s actions other than that she was simply drawn to move. For example, perhaps the grandmaster chooses move A over move B merely because A and B were the only serious options and, failing to find a reason to pick one over the other, she merely chose the simpler move. But relative simplicity is not a good reason to choose a move so, to save face, she claims that she had no reason. In such a case, it would be luck rather than the forces on the board that is responsible for the move being the right one.

Furthermore, if one accepts that there are spatial concepts that might not be verbally articulately, a reason for a move might depend on such concepts yet not be expressible, or fully expressible. Are there such concepts? I find it plausible to think that there are. Areas of mathematical reasoning, for example, seem to depend on such concepts. Though is it generally accepted that every proof in math must be presented in words, it is arguable that some spatial reasons is only cumbersomely translated into words, and might be much more elegantly be presented in a picture. The blackboard is an essential aspect of teaching math not only to write down concepts and proofs, but also to illustrate spatial ideas visually. Gobet assumes that concepts much be declarative and also that all conscious thought is declarative. However, it may be that some of chess thinking, reasoning and conceptualization is both conscious and nondeclarative.

As Gobet has emphasized, in such examples, not all of what is contained in the insight can be expressed. In the Dragon Sicilian Yugoslav Attack, he points out,

sacrificing on the h-file sometimes works, and sometimes does not. The reason might be clearly verbalizable (e.g., the black king can escape), can be ascertained only after analyzing numerous variations to great depths, or can even sometimes rely only on the player’s “gut feelings” (intuition).

But what are these gut feelings? Do they not also incorporate the judgment that sacrificing on the h-file was the right (or wrong) thing to do in the given situation? If so, it would seem to enter the realm of the mental, the rational and the conceptual. Gobet claims that the Dragon example “beautifully illustrates the idea that perception, and hence intuition, precedes conceptualization, since it twice uses ‘I saw,’ indicating an immediate and perceptual act.” But isn’t it more accurate to see it as illustrating, as Gobet himself puts it so well, that in such situations “the two areas of thinking and perception are hardly ever separable, and in many cases even indistinguishable.” Yes it might be that in such situations concepts without perception lose the game, but perception without concepts doesn’t do any better.

**Intuition as Conceptual**

There is a more general argument for the view that expert chess play—even the aspect of play that involves merely “seeing the right move,” or making an unexplained choice among possible moves—is conceptual. This argument was made perhaps most elegantly by Alfred Binet in 1893. Though Binet was not much of a chess player himself, he became fascinated with chess at the Café de la Régence in Paris, which in the nineteenth century was the center of the chess world. Binet was impressed by how chess players could remember their games so well and concluded that a game is memorable not because the individuals’ moves are memorable but because the underlying reasoning is memorable. “For the good player...memorizing famous games...is no more difficult than reciting a bit of poetry. The logical
sequence of moves links them together in memory as are the verses by their cadence” (see p. 151 in Binet 1966/1893). Binet emphasized the difference between conceptualized chess memory and nonconceptualized sensory impressions (see p. 151 in Binet 1966/1893).

When a person memorizes a long string of numbers, the ephemeral quality of such memories seems to indicate that they are like simple sensations.... the numbers he tries to retain are meaningless and uninteresting. They are nothing but sensory impressions on his ear; meaningless associations, they represent chance, chaos, they are without rhythm or reason; this is why they cannot be fixed firmly in mind.

And indeed, mnemonists, who fix extraordinarily long string of numbers into memory[,] do assign meaning or images to the numbers. And this allows the number to enter long term memory. (I tried this myself and found that with just a bit of conceptualization—for example, 84, that’s one more than the street address at which I grew up—I was able to place pi to the 100th decimal into my long term memory. Memorizing significantly longer bits, however, call for a more systematic and well worked out system of assigning meanings to the numbers.) In contrast, however, to those who simply memorize the string of number without meaning—like you might do to remember a phone number simply for the purposes of dialing it immediately—and subsequently forget them, Binet tells us that Paul Morphy (the greatest chess player of Binet’s era) dictated ten games he played 8 months earlier to his publisher. The great chess player's memory, he says, “is not a memory of sensations but a memory of ideas” (see p. 151 in Binet 1966/1893). These are the ideas the player had during the game and such ideas would seem to be conceptual and also rational, in as much as they provide some reason (though not necessarily a complete one) for the player's actions.

As I see it, the research on pattern recognition in chess, which I mentioned earlier, and which illusratates how experienced players, but not weaker players, can set up a board position from the middle of a well-played game correctly after seeing the position briefly, supports this view. The pattern is encoded in memory and it is a memory not merely of nonconceptualized sensations, if indeed, there could be such a thing.

Gobet tells us that “the standard explanation for the experiments on chess memory recall is that players use perceptual chunks, which are not necessarily verbalizable and conceptual.” He writes,

Having been my own and only subject in an experiment where the aim was to memorize as long a sequence as possible of briefly presented chess positions, and having memorized about 1,800 positions in total, I do have some expertise on this subfield of chess skill (Gobet and Simon 1996b; Gobet 2011). While some positions clearly can be conceptualized (e.g., a “Dragon Sicilian Yugoslav Attack with opposite castles,” to use our old friend), and while some can even be fully recognized as part of a known game, other positions simply cannot be coded that easily. And even when they elicit a concept, this concept sometimes characterizes the position so poorly that it becomes essentially useless. Thus, the claim that intuitions are rational and conceptual is not defensible empirically.

But again, although this conclusion follows on the understanding of intuitions that Gobet is relying on which sees intuition as a form of perceptual chunking, it does not seem to follow on Dreyfus’s understanding of intuition as something entirely nonmental. And, comments by Gobet and Chassy (2009, p 152-153) elegantly illustrate this: chess masters, they point out, “show nearly perfect recall with a presentation as short as 5s”; however, “even though their task is to memorize the position, they also understand its meaning fairly well at the end of the presentation.” Of course, it may be that the request to memorize the position motivates the players to conceptualize the situation more than they might
otherwise. However, it may also be that players understand the position because pattern recognition is a conceptual affair.

The details of truly unconceptualized, automatic actions, like Charles Taylor's example of a man flawlessly navigating a path, do not leave memory traces, or at least not long lasting ones. When all goes well with such actions, the particulars of how they were accomplished are either quickly erased from the mind or were never imprinted there to begin with. In such situations, it does seem that there are no whys and wherefores; the body takes over leaving the mind free to contemplate something else. Perhaps this is why the memory of the sensory feeling of severe pain fades so much with time. You might remember that you were in serious pain, but after a couple of months, the exact feeling starts to slip about and after a couple of years, while you still remember that a certain occurrence was painful, you might not remember what that pain was like. The pain, it seems, had not enough conceptual content to hook into your memory. For expert grandmaster chess players, however, the moves have conceptual hooks which produce long-lasting memories.  

The baseball player Steve Blass, who in his memoir speaks of his own “massive recall”, describes Pete Rose as having even greater conceptual hooks on his game:

> He knows the game. And he doesn’t just remember every hit he ever got but probably every *pitch* he ever saw…He has total recall of his career  . (p. 6-7 check quote).

If expertise is like navigating a path without any conscious awareness of its twists and turns, then why is it that experts seem to remember so many twists and turns?

### The Gymnasium of the Mind

I have argued that expert chess players attend to their games and deliberate, though not over everything. The actions that result not out of deliberation are intuitive in the sense that they are based on experiences of similar situations in the past. But such intuitions, I argued, are rational (minimally, they are seen as good moves) and conceptual (for example, they may be conceptualized as good moves and may contain spatial conceptual content). Of course, as with other areas of expertise, a grandmaster chess player could approach a game as if it were a flight of stairs to surmount, and still beat most of us mere mortals, but, if my arguments are correct, this is not the approach exemplified in the best games. Chess, I conclude, even lightning chess, when played at a high level, in no way supports the idea that experts just do it, but rather is indeed, as has oft been said, the gymnasium of the mind.

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28 Beilock and Carr (2001) have done some interesting work on so-called “expert-induced amnesia,” which indicates that college golf-team players do not remember as much about the mechanisms of their movements as novices. However, they remembered many more higher-level aspects of their movements. Mapping this onto chess, we would not be surprised to find that novices recall thinking about the basic rules and basic heuristics much more than experts, who would recall thinking about the broader plans used in the game and any novel opening themes they encountered.