

## 5. In search for the master's understanding – back to De Groot

The chess player thinks in silence. If you want to investigate this thinking, you have to solve the problem of making the thought process in some way visible or audible. In our days there are several techniques that make processes in the brain to some extent visible. One of the first, and certainly one of the most important scientists that investigated the thought process of the chess player, Adriaan de Groot, didn't have these techniques at his disposal.

So for his famous study into *The thought process of the chess player*, De Groot chose a series of experiments with 'thinking out loud'.<sup>1</sup> A number of chess players, of varying strengths, were asked to think about a position, as if they were to move in a serious game, and at the same time to put their thoughts into words.

De Groot was well aware of the fact that this (literally!) does not go without saying. Is the chess player able to look into his own thoughts, can they be well expressed in words, is nothing lost in the process, doesn't the question to think out loud change the thought process, doesn't it slow this process down?<sup>2</sup> Without trivialising those problems, De Groot was of the opinion that his experimental method was well suited to do scientifically reliable research into the thought process of the chess player.



Adriaan de Groot

With this subject of investigation, De Groot took a direction that was radically different from the mainstream movements in the psychology of those days. That makes his work meaningful also outside the context of chess.

During the first half of the twentieth century, behaviourism was the dominant theory in psychology. Behaviourism was opposed to all kinds of speculations about the working of the mind that could not be empirically proven. Psychology should restrict itself, in the study of human behaviour, to what is perceptible in an objective manner: the behaviour of human beings and what it is caused by (i.e. stimulus and response). Out of necessity, the psychologist has to keep silent about what is in between: the working of the human mind. After all, the scientist cannot look into

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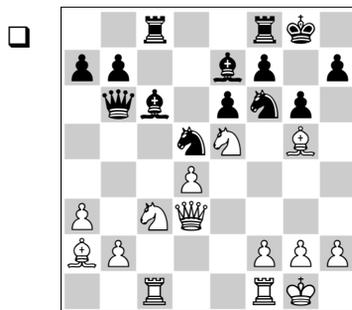
somebody else's head, and looking into one's own head (introspection) gives only subjective and therefore unreliable results.

Since introspection was not regarded as a reliable method, the psychologist had no good access to the human mind. That's why behaviourists sometimes were characterised as psychologists without 'psyche'. A well-known joke amongst psychologists makes fun of this rigorous attitude: two behaviourists are making love, and afterwards one asks the other: 'For you it was good, how was it for me?'

The so-called 'cognitive revolution' in the middle of the twentieth century brought behaviourism to an end. Research into the workings of the human mind came into full swing, partly due to the rise of artificial intelligence and the steady progress in neurology.

De Groot was therefore ahead of his time. He wanted to analyse the thought process of the chess player in all its aspects and did not comfort himself with a simple stimulus-response model: put a position in and a move rolls out.

To investigate what happens in between, De Groot wrote down many oral reports and investigated them with meticulous care. The following position he presented to almost all the participants in his experiments.



Amongst them were some strong grandmasters (Keres, Alekhine, Euwe, Flohr and Fine) and some masters. Studying this position, they clearly distinguished themselves from the lesser gods (ranging from expert to club player). Out of the five grandmasters, four chose the best move; out of the three masters, two chose the best, but the remaining eleven players all missed the best possibility.

White is to move. A nice opportunity for those who like to 'participate' in this historic experiment. I'm not asking you to think out loud, though it might be interesting to try. You'll notice this is not as easy as it may seem. (The answer is given at the end of this chapter.)

De Groot drew several conclusions from his investigations.<sup>3</sup> Most often quoted are his findings concerning the difference between the (grand-)master and the lesser player. In the recorded reports, De Groot saw no great differences regarding the process of decision-making: the grandmaster calculated not much more or deeper

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and didn't seem to decide on his move in a fundamentally different way than the lesser player.

The difference proved to be mainly of a qualitative nature: where the grandmaster quickly saw 'what it was about' and what the most promising possibilities were, the amateur needed much more time, or didn't get there at all. The grandmaster gets to the essence of the position so quickly thanks to his enormous experience with and knowledge of a multitude of different types of positions, patterns, plans and combinations. Even when he hasn't seen the actual position before, the similarity with all the bits and pieces of his chess knowledge leads him to the main problems and possibilities of the position in a few glances.

Sometimes this is summarised a bit crassly as: the chess player does not think, but only activates his memory. And, one step further: playing chess is not 'really' an intellectual activity.

This is certainly not the opinion of De Groot. Building up masterly experience requires masterly talent: 'this "experience" is not the obvious, not the ordinary thing that can be taken for granted, but precisely the most fundamental and distinguishing hallmark of the master. The very fact that he has managed to build up such an extensive and finely differentiated system of fecund experience, that he has become so extraordinary skilled, is the pristine proof for his "masterly" disposition.'<sup>4</sup>

As far as I can see, most of the findings of De Groot are still standing firm. Many of them have become widely accepted, but some of his points can still serve as eye-openers. As it happens, manuals keep being published, that try to sell the story that great progress can be made by looking better at the position or by reorganising your thought process.

But this is not what distinguishes the better from the lesser player. It is the knowledge that the grandmaster brings along with him, that enables him to see (recognize) at high speed what it's about. He sees what he already knows. If you don't see it, looking better or in a different way is of no help.

Now and then I meet players who want to improve their chess, and are convinced that it is possible to raise their level substantially by, as it were, 'turning a switch in their head'.

They have been playing for some time already, have reached quite a decent level, and they think: 'What's the difference between me and the master? Surely I am an intelligent person, I understand what it's about in chess and have gathered quite some knowledge. If I discuss a position with players rated much higher than me, I don't have the impression that they understand much more than I do. Something has to be wrong in my way of thinking. If I can only turn that switch, I must be able to get near master strength.' Referring to De Groot, I regretfully have to disappoint them: the magical switch has not been found yet.

Let's return to the diagram. A typical isolated queen's pawn (IQP) structure, that can result from several different openings. In this structure White often has the

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more active pieces, more space and some chances against Black's king. Black has pressure against the d4-pawn and a nice square on d5.

Black's last move was ...♖b6. This attacks b2 (though it is not clear that taking on b2 is already a threat) but also introduces some tactics that are bad for Black, due to the weakened protection of the ♕e7 and the possibility of ♜d7 for White, gaining an exchange.

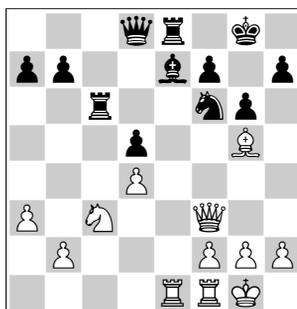
White can reap the fruits with **1.♕xd5!**. Black unfortunately cannot take back with a piece, since 1...♕xd5 2.♕xf6 ♕xf6 3.♜d7 loses an exchange and after 1...♜xd5 2.♜xd5 the bishop on e7 is lost. So Black is forced to take back with **1...exd5**, and that's already a small success for White.

Euwe: 'The knight on f6 is weak, the bishop on e7 unguarded, and the bishop on c6 is badly positioned. On mere positional grounds, one can already decide in favour of 1.♕xd5. Is there a direct follow-up?'

There is. After **2.♖f3** the black position is creaking everywhere.



Now **2...♖d8** is forced, since 2...♜g7 loses material to 3.♜g4 (apart from taking on f6 this also threatens 4.♕h6+). With **3.♖ce1** White increases the pressure and Black is left without a good defence. After, for example, 3...♖e8 4.♜xc6 ♖xc6 (see diagram)



5.♖xe7! ♖xe7 6.♜xd5, White wins material.

So **1.♕xd5** leads to a winning advantage. All the other moves fail to give an advantage to White. If 1.♜xd5 ♜xd5 White has nothing special since 2.♕xd5 is answered by 2...♕xg5.

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### Notes

1. A.D. de Groot (1914-2006) was a prominent psychologist (in the Netherlands he was, among other things, known as the founder of the 'Cito-toets', an exam almost all children finish their primary school with). He was a strong chess player. In 1946 his dissertation *Het denken van den schaker* was published. In 1965 it was translated (and expanded) as *Thought and choice in chess*.

2. In this respect there were large differences between the participants in the experiments. Max Euwe, for example, had little difficulty with talking while thinking, and in his opinion the written protocols represented his thinking in a satisfactory way. Salo Flohr, on the other hand, had great difficulty speaking while thinking and often fell into silence. Another effect of this type of experiment can be that the participants behave differently than in a normal 'over-the-board' situation. De Groot reported that some of the (weaker) participants had the feeling they were in some sort of exam and tried to think in an exemplary way.

3. In addition to this sort of experiment with thinking out loud, De Groot also carried out tests in which the testee could look at a position for a short time and then had to reconstruct it. In this test, great differences between grandmaster and club player came to light.

4. *Thought and Choice in Chess*, page 321. In the Dutch original, *Het denken van den schaker*, it sounds more elegant: 'deze "ervaring" is niet het vanzelfsprekende, gewone, maar juist het meest essentiele en bijzondere, waardoor zich de meester onderscheidt. Het feit, dat hij het heeft klaargespeeld een zoo uitgebreid en fijn gedifferentieerd systeem van vruchtbare ervaring op te bouwen, dat hij zoo buitengewoon geroutineerd heeft kunnen worden, is juist in de eerste plaats karakteristiek voor zijn "meesterlijken" aanleg' (page 254)