

**ADRIAAN DE GROOT (1914 - 2006) – An Obituary**

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On August 14, 2006 Adriaan de Groot, eminent psychologist and distinguished Emeritus Professor, passed away in his house on the island Schiermonnikoog, the Netherlands. He received international fame for his contributions to chess psychology, in particular for his Ph.D. thesis *Het denken van den schaker* (1946, English translation *Thought and Choice in Chess*, 1965, second edition 1978) and for the publication of *Perception and Memory in Chess*, 1996, written together with Fernand Gobet. De Groot's list of publications contains more than 300 titles. De Groot in cooperation with the Professors H.J.M. Lombaers and S.J. Doorman was supervisor of Van den Herik's (1983) Ph.D. thesis. In 1999, Adriaan de Groot was declared "Dutch psychologist of the century". His last book, *Het forumwaarmark van wetenschap*, appeared in 2003. It was co-authored by Henk Visser.

**Artificial Intelligence**

Artificial Intelligence has drawn De Groot's scientific interest as early as 1963, with the paper *De programmering van het creatieve (Programming Creativity)*. It kept the attention of all participants of the 1963 conference on man and computer, in which also Evert Willem Beth, Max Euwe, and Nico Frijda participated. The paper was a direct reaction to the writings by Newell, Shaw, and Simon (1958, 1959). De Groot's criticism was based on his elaboration of the theories developed by Selz and Bahle as previously published in his Ph.D. thesis. In this book, he succeeded in bringing back the notoriously intricate thoughts of Otto Selz about problem-solving procedures to a clear connected network of ideas applicable to the way in which experienced chess players operate. ('Otto Selz was the first to consider consistently a directed thought process as a sequence of operations.') De Groot considered Otto Selz as his scientific supervisor, but "in 1943, he was interned by the Nazi occupation authorities in a concentration camp at Westerbork, Holland. Later he was transported to Poland, where he too, was devoured by the notorious 'final solution to the Jewish problem.'" (De Groot, 1978, p. 53). So he could not act as De Groot's supervisor in 1946. This task was performed by Professor G. Révész.

In the paper mentioned above, De Groot made a distinction between 'choosing' (out of a given set of possibilities) and 'making a choice' (without having the alternatives ready at hand), thereby anticipating Jackson's distinction of state-and-situation-space problems on the one hand and system-inference problems on the other hand. This is, in our opinion, still important in the study of creative processes. It does not mean that De Groot was sceptical towards *artificial creativity*. His conclusion was that "it is, in principle, certainly possible to program the creative, on the condition that one knows what one means with it and analyzes which creative methods are used by a creative person."

**Impact of Ph.D. thesis**

History and the development of science do not always concur. De Groot's paper on creativity did not have the impact it deserved. Yet, Newell and Simon were acquainted with De Groot's dissertation and they used it to their advantage in order to conclude that the predictions of their implemented theory on the amount of search were "quite consistent with De Groot's empirical findings on the behavior of highly skilled human chess players."

**Chess**

In the 1960s chess obtained a top priority in the AI-research domain and it is De Groot's merit that his pioneering work has been such a great stimulation for Newell, Shaw, and Simon (1957), relatively long before the appearance of the English translation of his Ph.D. thesis in 1965. A.D. de Groot, however, was a critical psychologist, and he raised some 'fundamental methodological questions' about their approach in his book on methodology of 1961 which are still valid today, such as: by which criteria do we judge the agreement of human protocols and computer processes?

In the revised English edition of his dissertation, which appeared under the title *Thought and Choice in Chess*, De Groot (1965) made actual comparisons between programs and persons. His conclusions were fairly

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The winning move is 1. Bxd5, because

after 1. ... Bxd5 followed by 2. Bxf6 Bxf6 3. Nxd5 exd5 4. Nd7 White has material advantage;

after 1. ... Nxd5 followed by 2. Nxd5 White will be a piece up.

The main point of research is on the analysis after 1. Bxd5 exd5 2. Qf3, with a superior position. In a thorough analysis it can even be shown that this position is won. This was not De Groot's (1946) research question, but De Groot (1978, p. 90) states "The position is thus 'objectively solvable'; the analysis bears out that White can win. This does not mean, however, that the player at the board is able to find the forced win. As a matter of fact the relevant variations are not easy to find and are rather deep. On the other hand a complete analysis is not needed in order to decide on the choice of the best move, 1. BxN/5. For most of the less prominent players the real difficulty did not lie in the depth of calculation but rather in thinking of seriously considering a move that exchanges the 'strong', 'attacking' Bishop on R2 for a Knight. In many of the protocols of weaker players the move 1. BxN/5 is not even mentioned".

### Active to the end

It is true that De Groot remained sceptical about the answer to the questions on intuition up to his very high age, but it is also remarkable that he kept encouraging the investigations. His scientific attitude and his sense of sympathy never left him alone. With the passing away of Adriaan de Groot, a great stimulating scientist and personal friend passed away.

The authors are grateful for the intensive cooperation during part of their lives with Adriaan de Groot. We both experienced it as very special, very encouraging, and always goal directed.

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