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THE IMPROVING
CHESS THINKER

Second Edition
Revised and Expanded

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Preface to the Second Edition

This edition is a major upgrade. Here's an overview of the most significant changes. We have:

- Added protocols to all the class (rating under 2000) chapters but significantly boosted the "Expert and Above" chapter with numerous additional protocols by players in the 2000-2500 range, for a total of almost one hundred protocols;

- Added the chapter "The Most Common Thought Process Mistakes," which provides discussion and examples of these errors;

- Added a short chapter providing additional humorous and interesting stories about giving lessons and using the de Groot exercise;

- Made corrections and numerous additions to the material from the first edition;

- Expanded the Glossary to include more terms used within the book;

- Expanded Chapter 13, changed the title, and included a section about finding positions suitable for giving de Groot exercises, with an additional half-dozen sample positions; and

- Moved Chapter 9, "Thought Process Basics," to after the protocols. It was formerly Chapter 2.

The net result is a more extensive examination of the typical thinking processes of players below grandmaster level, and the lessons that can be learned from them. I believe that this work represents the most extensive compilation of examples illustrating how players think at all levels from beginner up to 2500, and hope that the reader will find it entertaining, instructional, and valuable from a historical viewpoint.

Introduction

I enjoy performing chess research in the following two areas:

1) How do players learn and improve?
2) How do players think during a game?

These two questions may seem to be only remotely related, but they have many aspects in common.

When someone is taught to play baseball, they don't primarily learn about innings, outs, and bases. Instead, they are taught how to bat, throw, catch, and run the bases. But when players learn chess, the only things they are usually taught – even by competent beginner's books – are the basic rules such as checkmate and draws, and how to move the pieces. Then they are taught more and more about what the pieces can do. A few principles like "Get all your pieces into the game," "At the start of the game try to control the center," "For your first move, push a pawn two squares in the center," "Castle your king early," or "Knight on the rim your future is dim" are thrown in for good measure.

But chess is a thinking game, and few beginners are taught *how to think* to find their move. No wonder everyone learns their "chess thought process" in a non-systematic way that quickly leads to bad thinking habits. A thought process represents all the generic "steps" or sequences of logic that go through the player's mind during both his move and his opponent's move. A thought *process* does *not* include the *content* of what is being thought.

For example, systematically searching for threats after an opponent's move is part of a process, but deciding where to put a bishop in a particular position is content.

Beginners are first taught basics such as how to differentiate the queen and the king, how each piece moves, and that the players alternate making moves. It is not effective to immediately thereafter attempt to teach a thought

process via suggestions such as, "The first thing you do is examine your opponent's move to see its effect on the position..." Beginners need time to assimilate basic concepts before attempting to implement higher-level ideas.

However, it is also true that *never* to teach someone the basics of the thinking process can lead to bad habits and, consequently, to unnecessarily chaotic mental habits. Some aspects of the thought process are common among good chessplayers and can be taught relatively early in a player's development.

I have explored this phenomenon in many places, notably online via my columns *Novice Nook* at Chess Café and *The Thinking Cap* at IM Jeremy Silman's website; in blogs and articles for Chess.com; and with books such as *Everyone's Second Chess Book, A Guide to Chess Improvement,* and *Looking for Trouble.*

The Improving Chess Thinker explores the results of "think out loud" exercises performed by subjects of differing levels of ability. These exercises are based on those performed by the first serious researcher into the chess thought process, Dr. Adriaan de Groot.

In the late 1930's, Dr. de Groot, a Dutch professional psychologist and chess master, recorded the thought processes of dozens of players at all levels (mostly stronger players). His purpose was to investigate scientifically how chessplayers really think. Players were given a position and asked to find a move while at the same time verbalizing everything they were thinking. Each subject's verbalization was recorded and transcribed; these transcriptions were called *protocols.*

Dr. de Groot analyzed dozens of protocols and published his results. His publication was a doctoral-type thesis that was eventually translated into English as the book *Thought and Choice in Chess* (1965; reprinted in 2008 by the Amsterdam Academic Archive). *Thought and Choice in Chess* is not so much a "chess book" as it is a psychology book about chess.

With the 1938 AVRO tournament nearby, Dr. de Groot garnered some of the best players of the day to participate in his experiment: Alexander Alekhine, Reuben Fine, Dr. Max Euwe, Paul Keres, and right on down the line to a few class players. Most of the protocols were by players of at least master strength. Dr. de Groot wanted to find out how players arrived at a move in a

Appendix A contains Dr. Max Euwe's protocol (recorded transcript) of the "de Groot A" position, plus some observations. Appendix B contains computer-aided analysis of each exercise position.

How to Use This Book

This book can be used in multiple ways:

- As a text supporting psychologists, demonstrating how chessplayers think at various levels;

- As a "chess book" showing players how the thought process works in practice. This includes aspects such as which approaches are effective and which are not, how much time players use in determining a move, how much effort is spent on various tasks such as identifying candidate moves, and so on;

- As a manual for improving one's chess thinking process. This can be accomplished by doing any or all of the following:

  o The protocols in the book are for the six positions found in Chapter 1. Before reading the rest of the book, take each of the six positions and carefully choose which move you would play, taking no longer than you would in an important slow event. That way you can compare the moves you chose and the thought process you used to choose them with the players' protocols throughout the book;

  o Read the chapter (2 through 8) representing your rating class. Then read the chapters one and two classes above your level to see what knowledge, process, and logic is applied by superior players to arrive at their move;

  o Focus on the sections of the book which address the thought process and its cousin, time management, found primarily in Chapters 9-13;

  o Skim the protocols and focus on the comments after each and on the summaries for each section. Much of the instructional value in the book is contained in these comments;

  o Learn from the general principles involving the thought process. These principles are placed in *italics* outside the protocols.

Chapter 1

The Exercise

The de Groot experiment allows a researcher to determine how chessplayers find their moves during competitive play. This is clearly different from how a player solves a puzzle. In a puzzle, the solution is guaranteed. Thus a player can adopt the attitude that, "If this attempt does not solve the puzzle, then I will try something else. The solution has to be there."

In the de Groot exercise, the players (or subjects of the experiment) are asked to find moves just as they would in a tournament game. During a game there is no guarantee that there is anything good to find, such as a mate or the win of material. The position may contain no clear ideas or candidate moves that lead to winning or even drawn positions. In many practical positions there is no "best" move – there may be several almost equally good alternatives.

Thus a researcher performing the de Groot exercise is interested in how players find their moves when the goals are open-ended and a clearly best move may or may not exist. For the chessplayer, performing the exercise and learning from its results can have enormous practical benefits.

Since chess is a mental sport – a thinking game – the process used to find a move is of importance not only in examining the source of the player's current strength, but also in determining his future possibilities for improvement. If a player has a poor process for move selection, then his ability to increase his playing strength is impaired, even if his other chess skills and knowledge improve. An exercise that can diagnose a player's process and expose him to a superior player's process is a beneficial tool for both instruction and psychological study.

In *Thought and Choice in Chess,* de Groot relied on one position for many of his conclusions. He also included two other "primary" positions and a few

supplemental ones as well. In giving this exercise to hundreds of my students, friends, and acquaintances, I also utilized mostly de Groot's first position, which he labeled "de Groot A." But I also occasionally used the other two primary de Groot exercises ("de Groot B" and "de Groot C") as well as a few of my own.

The following six diagrams are the ones discussed in this book. The first three are from de Groot's book; "de Groot Shafritz" is from one of my games; and the final two were from my students' games.

If you have not looked ahead and attempted to play the positions, I suggest you now set aside some time and decide which move you would play in each of the following six positions, assuming a 40/2 (40 moves in 2 hours) time control and sufficient time on your clock. If you want to make note of how you came to your conclusions and the salient points behind the move you selected, that can be additionally helpful.
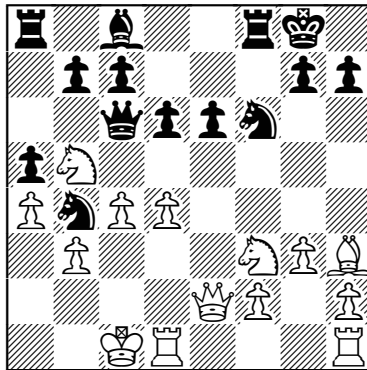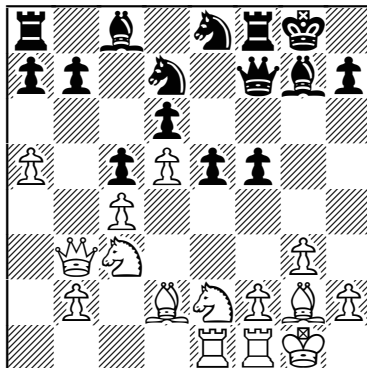
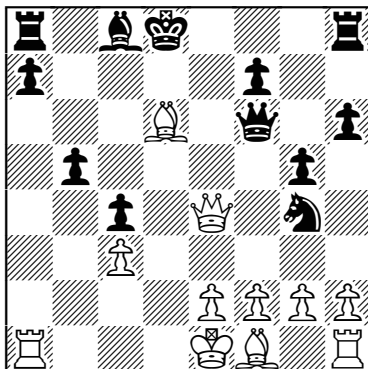**de Groot A: White to play**
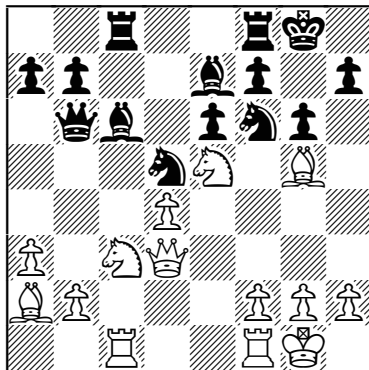
de Groot B: Black to play
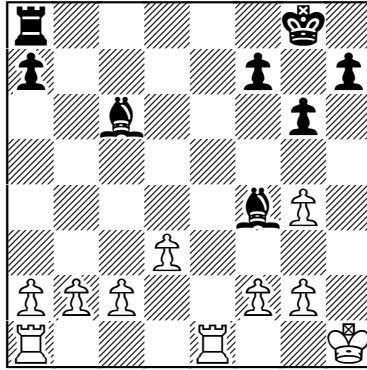
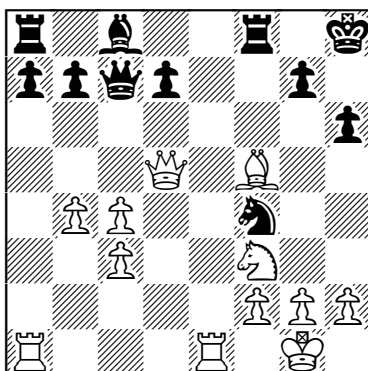**de Groot C: Black to play**

de Groot Shafritz: White to play

de Groot Zyme: White to play

de Groot Ernie: White to play

All of the above positions are at least somewhat analytical. Among the six, the de Groot Shafritz is the most "quiet" but it still depends partly on analysis. The most frequently used position, de Groot A, requires analysis primarily. Thus the bias in this book is toward the analytical thought process. While it is possible to do a de Groot exercise with a purely non-analytical position, it is not as instructive. So I always choose a position requiring at least some analysis.

The best ways for a student to improve his thinking process in *non-analytical* positions are the "traditional" best ways to improve chess judgment: extensive experience in slow games, reviewing one's games with stronger players, reading annotated master games, learning principles and how to ap-

Chapter 2

Class F and Below

This chapter includes players rated below 1000 USCF, or roughly below 1150 Internet Chess Club (ICC) standard.

This beginning level is composed primarily of youngsters or adults who have just started playing. Their thought processes (especially youngsters') are usually way too fast, quite superficial, and rarely systematic, and they contain little regard for safety.

For each protocol, I list the de Groot position (for example, de Groot A, de Groot B, de Groot C, etc.; see Chapter 1 for those positions); the age of the subject; the subject's rating; and the time the subject spent to choose his move.

Comments in parentheses indicate outside actions or comments that reflect the action of the player, such as (silent) if he paused for a long time. Comments in brackets are my thoughts. My frequent use of [*sic*] means that the subject is making a clear mistake in analysis or visualization. In contrast, [!] indicates that the player has made a comment that is either very insightful for their level of ability or a surprising error. A frequent note is [no eval], meaning that the subject did not try to evaluate which side stood better, by how much, and why.

Protocol F-1 (de Groot A; adult; 750; 13 minutes):
1.♗h6 [no eval]. 1.♘d7 no good. 1.♘xf7. 1.♖fe1 doesn't help. 1.♗h6 to attack rook. 1.♘xd5 he can just recapture and get his rook open. 1.♗xd5: no, that doesn't work. 1.♘d7 attacks the rook but then 1...♘xd7 2.♗xe7 ♘xe7. The knight on e5 is safe. 1.♕a5 does not make much sense [?]. Hmm. 1.♘d7 then 1...♘xd7 or 1...♗xd7. 1.♘xg6 fxg6 → 2.♕h3 he takes my bishop. The knight on f6 guards h7, so I have to remove that knight with 3.♗xf6 ♗xf6. Doesn't work. 1.♕h3 with the idea of 2.♕h6. 1.♗xf6 ♗xf6 no good. 1.♗xf6 ♗xf6 2.♗xd5 exd5 3.♘xd5. Push clock.

Unlike many beginners, Subject F-1 did take his time, which is good. However, the density of his analysis per unit time is extremely low, indicating he was spending a lot of time just trying to figure out what might be possible. In the end, without verifying his analysis, he indicated a "principal variation" (his guess for best moves for both sides; PV) which involved trying to remove the guard. In his PV, he forgot about the bishop on c6:

de Groot A
Black to play after PV 1.♗xf6 ♗xf6 2.♗xd5 exd5 3.♘xd5?
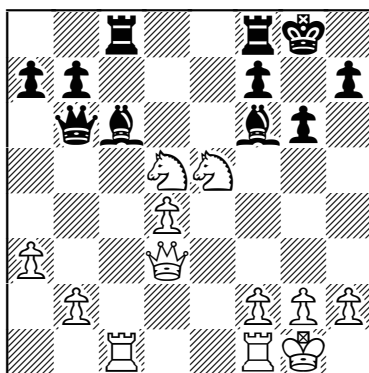
White's last move, the capture 3.♘xd5, is a visualization error since 3... ♗xd5 would win the knight.

Anyone can make this mistake in analysis. However, if you feel that you are winning material or giving checkmate, then this is a "red flag" indicating you should be extra careful. Whenever there is a "red flag" in your analysis, *you should verify that analysis before committing yourself to the first move of a critical sequence. If the sequence doesn't work, it can either cost you the game or just the opportunity to have played a much better move instead.*

In addition, if the subject were trying to get in ♘d7, then he is making the common mistake of sacrificing a piece to win the exchange, and that is not good, either. We will see this "give up a piece to win the exchange" mistake quite frequently among the de Groot A protocols of weaker players.

Protocol F-2 (de Groot A; adult; 800; 4.5 minutes)
1.♗h6 [no eval] 1...♘f4 attacks the queen, so better is 1.♕h3. Would like

> if you feel that you are winning material or giving checkmate, then this is a "red flag" indicating you should be extra careful. Whenever there is a "red flag" in your analysis, you should verify that analysis before committing yourself to the first move of a critical sequence. If the sequence doesn't work,
> it can either cost you the game or just the opportunity to have played a much better move instead.

the queen on h6. That leaves the pawn open on d4 for queen to capture so 1.♕h3 ♕xd4 not so great. How can I protect the d-pawn and make an offensive move at the same time? He could not do that [why?]. 1.♗h6 ♘f4 threatens queen then 2.♗xf4. So 1.♗h6 is decent. Still leaves pawn on d4 open − no it does not; ♕d3 stays. He has the bishop pair [sic]. So I could play 1.♘xc6 to win the bishop pair immediately and he could capture with the queen or rook. Let's see − game is tied [finally counts material]. OK. Pick off bishop pair with 1.♘xc6. Push clock.

This protocol contains some typical "beginner" thought process errors. The subject did not notice that Black was threatening 1...♕xb2 and did not consider all capturing sequences. At least the reason for the move − to win the bishop pair − is a lot better than those of many intermediate players! Notice that the subject's one big idea is to checkmate the black king on the dark squares. Therefore, he focuses on getting the queen and the bishop over there. Many weaker players go right for a checkmate pattern, no matter how hopeless or uncalled for by Steinitz's Rules, which require a player to have (or be able to generate) some advantage near the opponent's king before he can expect to successfully attack there. However, weaker players often get into bad habits of making otherwise counterproductive checkmate threats because their weak opponents sometimes allow such checkmates! At least in this case the subject properly saw that the checkmate attempt was hopeless. When the idea failed, his fallback − the bishop pair − was reasonable.

Protocol F-3 (de Groot A; age 11; 950; 2.5 minutes)
1.♗h6 [no eval] attacks the rook and then... or 1.♘xd5 exd5 2.♗xd5 ♗xd5 no good. 1.♗xf6 ♗xf6 something. 1.♖fe1 or something. 1.♘a4 to attack the queen. What other piece to move? 1.♘e4 ♘xe4 2.♕xe4 ♗xg5 not good. I think that's it [what's "it"?]. I think that's it. 1.♗h6. Push clock.

It's good that this subject considered the capture on d5. However, he rejected the capture simply because it did not win material. In other words, he treated the position as if it were a problem. This is a common error among players rated below ~1600.

The subject did not consider all of his opponent's recaptures after 1.♘xd5. But he is correct that, if you find one reply which does not suit you (as he did, although for the wrong reason), then you don't have to consider the others. That would be a waste of time.

As it turns out, the subject's chosen move − 1.♗h6 − forces the rook to a better position (d8). Therefore, unless there is a strong follow-up, this kind of threat should usually be eliminated quickly as a candidate move.

Protocol F-4 (de Groot A; adult; 900; 13 minutes)
Piece Safety − protected vs. adequately protected. Checks, captures. Knight takes pawn [?]. 1.♗xf6 ♗xf6. 1.♕xg6+ takes the pawn. 1.♘xd5. 1.♘e4 toward a knight fork. I had better make a move soon [7.5 minutes]. I can take the bishop on c6 [does not mention it wins the bishop pair]. I could play 1.♗h6. If I take the knight I am subject to a pawn fork [?]. Running out of things to think. I haven't come up with a good move. I am contemplating 1.♘e4. 1.♘e4 ♘xe4 2.♕xe4 ♘xc3 [sic] with discovered attack. I can't find the helpful move. I will play 1.♘e4.

The subject first looks at safety − good. Of course, counting the material would help, too! Then he considers checks and captures, again good. Unfortunately, he does not consider all captures and see how good each recapture is. This subject only had a few random thoughts in the first seven minutes and was, by far, the least verbal subject (per unit of time) in the book!

Protocol F-5 (de Groot A; adult; 850; several minutes)
1.♕xg6+ no good [no eval]. Captures: 1.♗xd5, 1.♗xf6 (lots of silence). 1.♖fe1 strengthens the center or 1.♖ce1 then 2.♘g6 ♖fe8. 1.♘e4 pressures f6 − protected. If 1...♘xe4 2.♕xe4 ♘xc3 [sic!].