



The Margin for Error

Quote of the Month: When way ahead, think defense *first*, but don't play defensively.

This month I am going to introduce a very useful concept, "The Margin for Error." This will help address the definition of being "way ahead" and consequently improve the reader's "technique" – the ability to win a won game.

"Early in a game, about how far ahead does one side have to be before we would consider that side winning?" When I was working at the second Kasparov-Deep Blue match in New York in 1997, I asked several chess programmers this question (not the Deep Blue ones – they were busy!). They unanimously agreed the cutoff was roughly one pawn. In other words, if the program's evaluation indicated that it *was ahead by one pawn or more, then they expected win*; otherwise they did not consider the position to be winning.

Does that mean whenever you win a pawn (not a gambit one) in the opening you are winning?

No, because in most cases it costs you something to win the pawn. Either:

- You had to spend up to three tempi to capture the pawn and return the capturing piece to a good square (tempos are roughly worth a third of a pawn early in the game),
- The opponent foresaw the loss of a pawn and played the line that cost the least, like to sacrifice it to mess up your pawn structure or get a similar benefit, and/or
- When the opponent loses a pawn he automatically gains an extra semi-open file for his rooks. *This is especially helpful if it is the only semi-open (or open) file on the board*, since that likely makes his rooks stronger than yours.

This means that when one player wins a pawn, the evaluation is often something a little less than a pawn ahead and, by the above definition, you are not quite winning yet.

But suppose you can win a pawn and your opponent has absolutely no compensation; even better, your extra pawn may cover key squares, so that you judge yourself ahead by slightly more than a pawn. *If a proper evaluation of an early game position shows you are ahead by the equivalent of a pawn or more, then you are winning.*

Technically, the correct definition of winning is when, if both sides play perfectly, one side would win. However, the "one pawn or more" statement shows approximately *how much ahead* one needs to be for that theoretical win.

This definition only applies early in the game because late in the game the concept of minimum mating material (plus the changing value of pieces to pawns) becomes paramount. In the deep endgame you could be ahead an entire piece and not be winning; alternatively, you might be up only a pawn and be easily winning. The possibilities of promotion, plus the fact that you can't win with only a knight, a bishop, or two knights left on the board skews what it takes to win in the late endgame. So the phrase "early in the game" has a wide scope, meaning before the late endgame.

Now that we have a value for "winning" we can define "margin of error."

In general, a player who is winning has a margin for error equivalent to how much evaluation he can lose (or the value of any mistakes he can make) and still be winning. Translating this into a formula, the margin for error to *win* is:

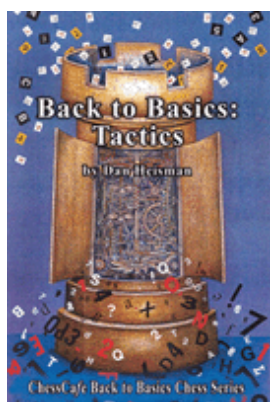
$$\text{Margin for error/win} = \text{A player's evaluated advantage (in pawns)} - 1$$

Example: Early in a game a computer evaluates your position as better by 3.5 pawns. In

COLUMNISTS

Novice Nook

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this situation you have a 2.5 pawn margin for error while attempting to win. If you thereafter lose a pawn for no compensation, then you are still ahead 2.5 pawns, and your 1.5 pawn margin for error means you are still likely winning easily.

Similarly, we can make a definition for the margin for error for drawing, since *your opponent* needs to be a pawn or more ahead early in the game to win:

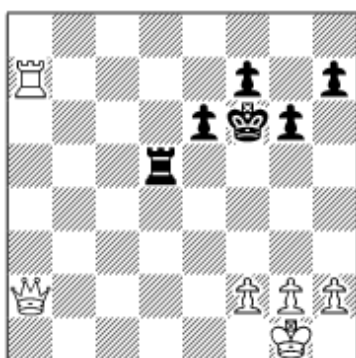
Margin for error/draw = A player's evaluated advantage (in pawns) + 1

Example: You feel you have a slight advantage, about half a pawn. However, your position is lifeless and, if played correctly, is likely to only draw. Therefore, you want to take a risk in order to win. How much leeway do you have in making a move that could harm your position, but which is tricky and might allow your opponent to go wrong? The answer is $0.5 + 1 = 1.5$ pawns. So long as the evaluation stays above minus one (-1) you are likely still drawing.

OK, we have made definitions, but how can this theory help you become a better player? The answer is quite a bit! If you know your margin of error, this tells you how much leeway you have in:

- Finding the best move,
- Forcing trades, and
- Trading to simplify into an even easier winning position.

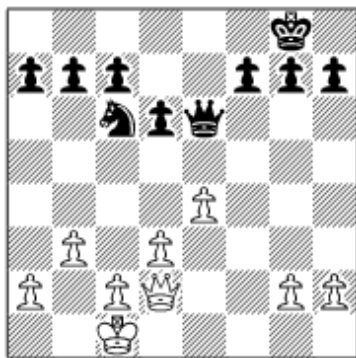
I have used positions such as the following as an example of simplification:



White to Play

White has many ways of stopping the threatened mate (1.Kf1, 1.f4, and 1.h4 come to mind), but the enormous margin for error suggests eliminating most threats with **1.Qxd5!**? After 1... exd5, the only way Black could ever form another threat would be to try to promote the d-pawn. Realizing this, White should activate his last piece with 2.Kf1! and, after establishing the king on the d-file, White cannot help but win easily. **1.Qxd5!**? is not a move a computer would play nor “best,” but it is an easy way to permanently eliminate the possibility of further

error, and results in a trivial win.



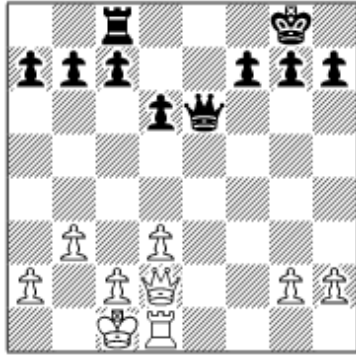
Black to Play

In this position Black is ahead a knight, so his margin for error is equivalent to a little more than two pawns. Therefore, it is prudent to force the trade of queens with **1...Qh6!** when the resulting doubled and isolated pawns after **2.Qxh6 gxh6** represent only a small fraction of his margin for error. However, the reduced material and diminished possibility for active play by White make the win much easier than if the queens had remained on the board.

The position after the queen trade is still an easy win for Black, assuming he remembers to activate his most powerful piece – the king! *The king is worth about four pawns of fighting power*, so if Black refuses to use his king for the remainder of the game, then instead of being ahead about 2 pawns, Black is down about 2 and White should win! Don't believe me? Make the queen trade and then play the game out with the condition that Black cannot make any king moves.

In the above two examples, there is enormous margin for error. Therefore, if we apply one of the principles on how to play when way ahead, “Don't worry about the little things” (see [When You're Winning It's Whole Different Game](#) and [Novice Nook's Chess Lists](#)), we can define “little” as “a small percentage of the margin for error.” In the second

example, Black's margin for error was more than two, so to isolate the f-pawn and double and isolate the h-pawns is relatively minor compared to trading off the queens. But suppose Black was only ahead a pawn instead of a piece:



Black to Play

In this position Black is only ahead one pawn, and thus has no margin for error. Therefore, to pay the enormous price of wrecking his pawn majority with 1...Qh6? 2.Qxh6 gxh6 just to trade queens would seriously jeopardize Black's winning chances. Instead, Black should retain control of the only open file with 1...Re8, and perhaps soon thereafter create *luft* with a move such as ...f5, activating the potential passed pawn, and retaining excellent winning chances.

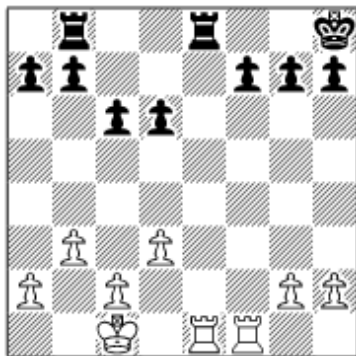
Understanding the difference between the previous two diagrams – and thus the principles involved with margin for error – means you have gone a long way toward developing good technique, or the ability to win a won game.

The larger your margin for error, the more you are willing to sacrifice. In the first example, White was ahead a queen, so the sacrifice of the queen for the rook was well within the margin for error tolerance for preserving an easy win.

Since ahead one pawn constitutes no margin for error, we can postulate a corollary to our principles for how to play when way ahead:

If you are ahead exactly one pawn (early in the game), then to "sacrifice" little positional edges in order to trade pieces is usually incorrect.

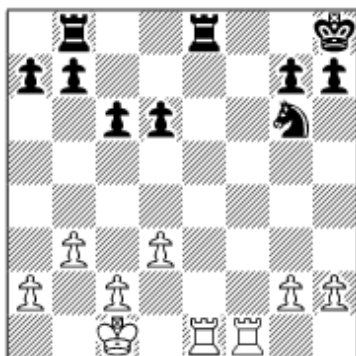
For example, one would not give up control of a file just to trade rooks when ahead a pawn:



Black to Play

In this position Black is only ahead a pawn, so, although Black may conclude that 1...Rxe1? both trades rooks and removes the attacker for f7, giving up the file without being able to contest it is very dangerous. After 2.Rxe1, white's rook can penetrate to the seventh rank and make Black's life miserable. Stating that Black's move jeopardizes his winning chances is an understatement, yet I see this misconception quite frequently. Instead, Black should activate his king by 1...Kg8, or play 1...f6 with solid chances to play for the win.

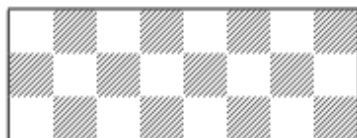
On the other hand, suppose we replace the extra pawn on f7 with a knight on g6:



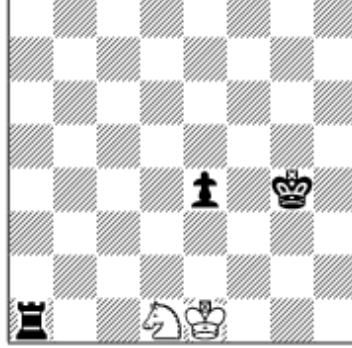
Black to Play

Here, while 1...Rxe1 may not be the best move, since Black cannot quickly contest the file with ...Re8, the magnitude of the mistake is of no real consequence, as the much larger margin for error allows for such relatively minor inconveniences.

Below is another example of a sufficient margin for error to allow a "sacrifice" to simplify:



Black to Play

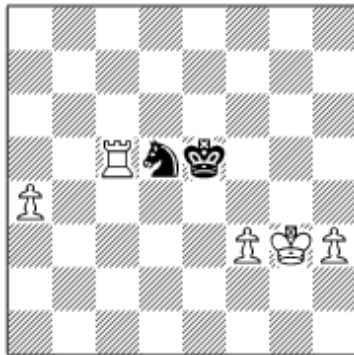


In this position Black has several ways to win, but a very easy way is the

“sacrifice” **1...Rxd1+ 2.Kxd1 Kf3** with a quick and easy tic-tac-toe win (see [King + Pawn vs. King](#)), e.g. **3.Ke1** If **3.Kd2 Kf2**. Instead, White needs to allow Black to go wrong. **3...Ke3!** It is not too late to get sloppy and play **3...e3?? 4.Kf1** with a draw. **4.Kd1 Kf2** and Black shepherds in the pawn to promote. Black should never play a move like **1...Rxd1+** unless he understands all of the above analysis! Otherwise, he should just play safe and win with the extra exchange.

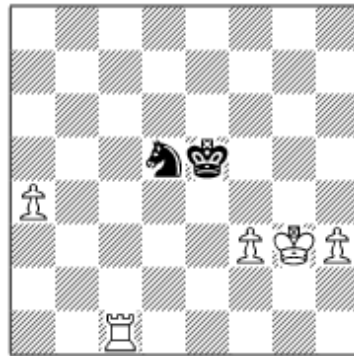
This again illustrates the principle: *when trading it is not so important to evaluate what is traded as what is left on the board*. In the endgame if your trade leaves you with a position that is easier to win, then you should do it no matter what the value of the traded pieces. The following position occurred in a practice game at our club:

White to Play



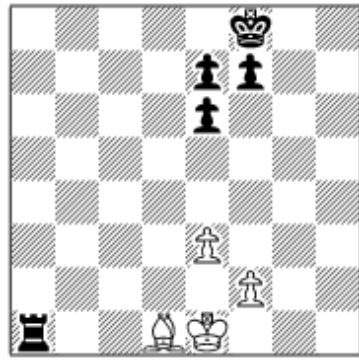
White wanted to follow the principle: *rooks belong behind passed pawns*, and played **1.Rc1** which, like almost any other safe move, wins. However, I kibitzed that White would have made life much easier with the simple **1.Rxd5+**, eliminating the last enemy defender and possibilities of leaving the rook *en prise* or future knight forks. Any time you can simplify into an easily won king and pawn endgame you should probably do so. Suppose the initial position was:

White to Play



The easiest idea is to pin the knight and take it off: **1. Rc5 Kd6 2.Rxd5+**.

On the other hand, if your trade/sacrifice makes the win harder, I call that a *Delen Sacrifice*. I named it after my son, who performed this dubious feat on several occasions. Here is an invented example:



Black to Play

Unlike the previous

examples, sacrificing the exchange here does *not* make the position quicker or easier to win. Therefore the Delen Sacrifice **1...Rxd1+?!** is dubious at best. It is much better to just activate the black king and then push the black pawns to create a more favorable situation. The opportunity should arise later to sacrifice into an easily winning king and pawn endgame, so you should be on the alert for that possibility. But to do it now is unnecessarily – and dangerously – premature.

“The more you are winning, the more you can play differently” has been discussed in several Novice Nooks: [The Six Common Chess States](#); [When You Are Winning It's A Whole Different Game](#); [Trading Pawns When Ahead](#); and [Don't Allow the Flooby](#). This principle can now be rephrased more precisely:

*When you are winning, the larger your **margin for error**, the more you can – and should – alter your normal play accordingly to make the win as easy and risk-free as possible.*

Let's use The Margin for Error to show how much better it is to win a piece (bishop or knight) than the exchange (rook for bishop or knight). A rook is worth about 5 pawns and a piece about 3.25 pawns (see [A Counting Primer](#)). Then the exchange is worth about 1.75 pawns. So if it takes one extra pawn to win, then the Margin for Error in winning a piece is $3.25 - 1 = 2.25$, while the Margin for Error in winning the exchange is only $1.75 - 1 = 0.75$. That means the Margin for Error in winning is about three (!) times as much if you win a piece than if you win the exchange.

Reader Question

You once described the difference between a lower rated and a high rated player as something along the lines of the analysis and evaluation skills being greater in the better the player. This inspired me to start compiling a list of skills that chess players at each class level should attain before they can move on to the next level. This exercise is sort of a standardization of knowledge that can help improving players set a roadmap towards their chess improvement goals. I would love to get your feedback and input on this idea.

Answer

It is true in general that analysis skill highlights the differences between lower rated players, but it is less so among higher rated players; at those levels subtle evaluation skills make a big difference.

I have about 500 de Groot “think out loud” exercises that highlight what each rating level knows and thinks (see [Learning from Dr. de Groot](#)), and I think these would make a fine book about the thought process at each level.

If you included all the skills (opening, endgame, tactics, thinking process), there are a couple of books that deal with the subject of how to move up a level: *How to Become a Candidate Master* by Alex Dunne (as well as *How to Become an “A” Player*), and Lev Albur's [Chess Training Pocket Book](#), which contains tactics/positions that are advertised to take you from 1600 to 1800.

Dan welcomes readers' questions; he is a full-time instructor on the ICC as Phillytutor.

[Yes, I have a question for Dan!](#)

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