



Evaluation Criteria

Quote of the Month: *"The primary reason lower rated players beat other lower rated players is superior analysis and tactics; a primary reason higher rated players beat lower rated players is superior evaluation."*

In the Novice Nook *Analysis and Evaluation* I discussed the definition, location in the thinking process, and importance of evaluation as a key part of a player's skills. In this month's column we will examine the major criteria/components of evaluation and how to apply them.

COLUMNISTS

Novice Nook

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It is important to differentiate the four criteria discussed in this column from the elements I introduced in *Elements of Positional Evaluation*. In that article the seven elements were mobility, flexibility, speed, coordination, vulnerability, board topology, and time. The difference is that those elements were primarily used to build up a system to examine the intrinsic worth of the pieces, at most a small sets of pieces. For example, coordination was used to help explain the strength of doubled rooks or the bishop pair. That is why the subtitle was *How Chess Pieces Get Their Power*.

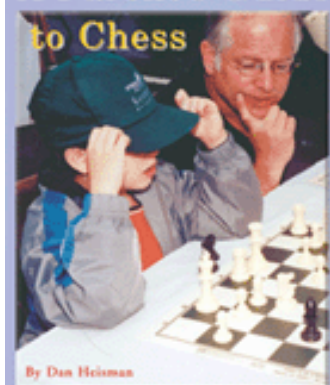
But this column will discuss the evaluation of *positions*, not pieces or moves. *When someone says "Evaluate move A" they really mean "Evaluate the position that occurs after you have made move A."* So when choosing between two moves, you are basing your decision on the evaluations of the position(s) resulting from one move versus the other. I define the output of an evaluation as:

1. Which side is better?
2. How much better?
3. Why are is it better? (What are the comparative strengths and weaknesses?)

For example, one might say, "White is a little better because he has fewer pawn islands." Or "Black is close to winning due to the bishop pair and safer King."

The first of the outputs is self-explanatory, but not the other two. When measuring "How much one side is better" there are really only three mathematically correct answers, as always assuming best play: White is winning, Black is winning, or it is a draw. However, humans are not able to calculate this level of certainty for most positions, except for easily won positions and endgames. Therefore we have invented other ways of figuring out how to say how much better one side is than another.

A Parent's Guide to Chess



Originally we used a system like “=” for equal positions, “±” to mean White is distinctly better, “∞” to mean unclear, etc. These symbols are still used in most chess books.

However, with the growing advent of computers and internet-only players, this is not the kind of evaluation one sees when watching international games live on-line. In that case one most often sees computer-analysis evaluation, like “White is +0.32 pawns at 12 ply” meaning that the computer is looking six full moves ahead for both sides and thinks White is better by about a third of a pawn, where a pawn advantage or more is likely winning. These evaluations are augmented by GM evaluation, with their traditional “I don’t think White is winning yet, but I would be very happy with his position” kind of dialog.

The third output, “Why?”, is primarily based upon the criteria I will introduce shortly.

Before doing so, it should be noted that we are primarily dealing with *static* evaluation. Static evaluation is done on a position as it stands; *dynamic* evaluation is done via analyzing moves to see what is possible. Except for speculative sacrifices, dynamic evaluation is best performed only after analyzing a position until quiescence, that is, no more affecting checks, captures, or threats. For example, it does not make sense to analyze a position where you capture a Rook with your Queen and think you are a Rook ahead if your opponent can just recapture your Queen!

I believe that the following are the four dominant criteria for evaluation of positions:

1. Material
2. King Safety
3. Total Army Activity/Mobility
4. Pawn Structure

It is interesting to compare these criteria to the ones presented in various books on this subject, like GM Larry Evans’ classic *New Ideas in Chess* or GM Dorfman’s recent *The Method in Chess*. Any comparison will immediately bring up questions about the commonly-used criteria “time” and “space”. With these pseudo-elements, the key is to understand that what really matters is whether these provide your army extra mobility/activity: *Space is not useful if it does not provide you with more activity than your opponent and, similarly, extra tempos are not good if they are not used to make your army more menacing – so these are really just means to the ends* of more mobility and activity (as well as coordination or flexibility). To a lesser extent, this explanation also holds with “center control”. And a “lead in development” is just well-spent time in the opening, again with the goal of creating superior piece activity. Suffice it to say that there are strong similarities in all our theories, since the major components of material and king safety are always included.

There exists one other major evaluation criterion – although this one is not position dependent. It is remaining clock time per move. For example, if you playing a sudden death time control and have a dynamically equal position against an equally strong opponent, then if you have 15 minutes remaining to your opponent's 5, there is no doubt that you are a big favorite. I would say a 15 to 5 minute advantage without time delay is equivalent to about 200 rating points, or about a 3 to 1 favorite.

Material

Watch any two little kids playing and ask them “Who’s winning?” They will almost always answer just on the basis of material. In the Novice Nook *A Counting Primer* I discussed IM Larry Kaufman’s scientifically derived average piece values:

- Bishop \approx Knight $\sim 3\frac{1}{4}$ pawns
- Rook ~ 5 pawns
- Queen $\sim 9\frac{3}{4}$ pawns
- Advantage of the bishop pair $\sim \frac{1}{2}$ pawn bonus

...and I might add the King’s *fighting power* is about 4 pawns – its *trading value* of course is “infinite”. At the start of a game a tempo is worth about \bullet pawn (for a pawn gambit you like to get three tempos), but that quickly escalates in most positions. In fact, in most complicated positions an extra tempo can be worth a Queen or mate. Just try giving someone odds of an extra move anywhere in the game if you don’t believe me.

The base unit is always pawns – calling the base unit “points” is incorrect for two reasons:

1. Since a pawn is by definition worth one “point”, then a pawn must be the unit; Using points instead is like saying a foot is worth one hoobley and measuring everyone’s height in hoobleys, and
2. Using points makes evaluation more difficult to comprehend since using an abstraction (points) instead of an equivalent tangible (pawns) always forces the brain to do more work.

Again, it is worth emphasizing that the above values are *averages*; *there are no absolutes*. The numbers vary greatly with position. For example, even though pawns are the measure, not all pawns are worth the average. Kaufman noted that rook pawns (on average!) were only worth about 85% of an ordinary non-rook pawn. Similarly, a pawn that can unstoppable promote to a Queen next move is worth a Queen minus a tempo, and two connected passed pawns on the sixth beat a Rook, etc. Kaufman also stated that of all the pieces, the Queen’s value varies the most from its average. In my opinion a Bishop or a Knight is probably worth closer to four pawns in the opening and might not even be worth one in the late endgame.

When evaluating material, don’t count up all the pieces and convert to total

equivalent pawns. No one does that! Just look at the differences. For example:

- If you have an extra Rook and your opponent has an extra Bishop or Knight, you are “up the exchange”.
- If you have one extra Rook and an extra pawn and your opponent has an extra Bishop *and* an extra Knight, he has “two pieces for a Rook and pawn.”
- If you have an extra Knight and he has two extra pawns, you are “up a piece for two pawns”.
- If you have the only Queen but he has two Rooks for it, you have “a Queen for two Rooks”.

Usually (except in the late endgame) if you have the extra material, you are better off. For example, you have a nice advantage if in you have the bishop pair or, even slightly better, two pieces for a rook and a pawn. Both are worth about ½ pawn, but the latter is usually almost winning before the endgame as the two pieces can be used to win additional pawns, if obtained early enough.

King Safety

King safety, of course, is sometimes more important than material, especially if someone is about to get mated! But in most positions the safety of both Kings is either similar, or else the difference is more long-term. For example, if you are castled on opposite sides with Queens on the board, then whoever’s attack can get to the opposing King first is likely winning, despite small material imbalances, so in this case king safety is very important. Similarly, if one side sacrifices material to expose the enemy King while there is still enough material around to form a likely mating attack, then king safety becomes an enormous evaluation criteria.

For very weak players, material and king safety are about all they know. Ask them who is winning when the material is even and both Kings are safe and they may say “the game is even”, no matter what the value of the third and fourth criteria.

Total Piece Activity

The third criterion is your total “army” activity of all your pieces. This is distinctly underrated by lower-level tournament and on-line players, who instead consider that pawn structure is more important. I know this because I have tested hundreds of adults in thinking process tests, and weaker players are much more likely to say that White is better because Black has an isolated d-pawn than they are to say Black is better (in the same position) because his pieces are much more active. Yet strong players almost always get this correct, so obviously our beginner books have done a poor job of selling the dynamic possibilities of piece play versus the “easier-to-categorize” properties of static strengths and weaknesses. In my opinion Garry Kasparov is the best player ever at evaluating and using total piece activity; he often pitches a pawn or even the exchange to make sure his army is the one with all the play. In fact, he has occasionally stated something to the effect of “your pieces’ activity is what chess is all about.”

I might add that total piece activity has an extremely high correlation with the sum

of the pieces' actual mobility, as defined in *Elements*. If you wish, you could even define them as the same, but there are more factors involved, such as the value of the real estate where the activity is present (e.g., more important around the enemy king and near the center), the flexibility of the army and its coordination, etc. In general, if your army has more activity, you usually have the initiative. The initiative can be roughly defined as "your opponent responding continuously to your threats instead of generating his own". If both sides' material, king safety, and activity are similar, but one side has pawn structure weaknesses, then the side with the better pawn structure often eventually develops the initiative just by attacking those weaknesses and forcing the opposing side to defend them, lest material be lost.

Similarly, if everything else is equal, the player who possesses a single advantage, with everything else being equal, can usually get the initiative by concentrating on that advantage. For example, if you have an extra pawn, you may be able to mobilize it into a passed pawn, which may at first cost the opponent flexibility (the pawn has to be watched and possibly later a piece (to prevent it becoming a Queen).

Pawn Structure

The final (and relatively least important) criterion is pawn structure. See my Novice Nook *A Positional Primer* – or any positional article – for more on these well-known features, such as weak squares, passed pawns, isolated pawns, open files, etc. Notice I did not say pawn structure was not important! If the other factors are roughly even or one side's pawns are sufficiently worse, this alone can easily be the cause of defeat.

These four are not the only criteria for evaluation, but they are the most important ones. Other criteria exist, or could be broken out from the above. For example, in Queen and pawn endgames one of the most important criterion is who has the most advanced passed pawn, or the best chance of getting one. You might consider this part of pawn structure, or a separate criterion. As another example, in positions where the players have castled on opposite sides with Queens on the board, the player who is likely to break through to his opponent's King first has a big advantage – this could be considered a function of king safety, pawn structure, and piece activity, or it could be its own factor.

Why is evaluation important? Without retracing *Analysis and Evaluation* too much, take the following case:

Suppose you are only considering two candidate moves, A and B. After move A you think your opponent will respond with move A' and then you will reply A'' leading to position A*. For simplicity, we will assume A* is quiescent – there are no serious checks, captures, or threats - and thus is capable of being evaluated. Let us use $E(A^*)$ to stand for your evaluation of A*. For move B, similarly define B', B'', B*, and $E(B^*)$. Then if a player thinks that $E(A^*)$ is better for him than $E(B^*)$ he will play move A; if not, he will play move B. But that means the player is depending upon three important skills:

1. His ability to isolate the candidate moves A and B as the two best,
2. His ability to use deductive logic to tell that the sequence A-A'-A'' is likely and that A* is worth evaluating (and similarly for B's), and
3. His ability to evaluate A* and B* and decide which is better.

Trading off the four criteria to do #3, make an overall evaluation, ranges from extremely easy (the opponent is mated or I am up two Queens!) to extremely difficult. It is easy to see that **if your evaluation skills are not good then, no matter how good your analytical skills, you may often play the wrong move!** This is a little known concept that is actually very important.

While studying students' thinking processes, I have often seen cases where a Grandmaster thinks "The position I can reach is great. I will play that!" but an "A" player (1800-2000), considering the same move and arriving at the same analytical position, concludes "That looks about equal – I will play another move I think is better". Therefore, it is easy to see that superior evaluation is a major reason a GM is better, even if the A player is comparably good at skills #1 and #2.

GM Andrew Soltis cites this reason in his excellent book *Grandmaster Secrets: Endgames* when he writes that a GM would never go into a king-and-pawn endgame against a 1900 player unless they are absolutely sure it is won. The reason is that GMs don't necessarily analyze better than 1900 players (they surely do on the average, but not as much as you might think), but they do know how to play many more positions without even thinking, and their evaluation skills are enormously superior. Unfortunately, in most king and pawn endgames, the evaluation is often finitely calculable as win, draw, or loss, and this negates the GM's large advantage.

Let us evaluate five positions using these four criteria. The first is White to play:



Rook/Queen battery. But this is all illusory since the c-file is closed, so White has an advantage.

- *Piece Activity:* White has a distinct advantage with the better Bishop, Queen, and king's Rook. Both king's Rooks are not doing anything, but Black's is worse because it is not coordinated with the other Rook and is blocked by the Bishop, which in turn is blocked by the King (= lack of coordination). Also White's diagonal pieces (Queen and Bishop) have much better diagonals than Black's.
- *Pawn structure:* Roughly even.
- *Conclusion:* White is much better – actually winning - especially due to army activity and king safety, so White should try to open up the position and Black should want to close it, to provide time to untangle his kingside. So 1.d5?? would be an enormous mistake, the kind beginners make when they think “space” is an important consideration and that randomly advancing pawns give them space. In this case by playing 1.d5?? White would not only fail to gain much additional space (can you name any squares?), but White's biggest advantages would be negated.

Instead the game continued: **1.dxe5!** Properly opening the position to take advantage of his positive evaluation factors! **1...dxe5 2.Nd5+ Nxd5** Forced to save the Queen **3.Rxd5** Again, of course not the terrible 3.cxd5? “giving White a passed pawn” but blocking White's own pieces and allowing the Black c-pawn to advance, possibly unleashing Black's. **3...Kf7** The Black central pawns are goners. After 3...e4 4.Rhd1 (4.Rxf5 is of course OK, too) White is just dominating the position **4.Rxe5 Rd8 5.Rxf5+ Kg8 6.Qe4 h6 7.Qe6+ Kh7 8.Rf7** Black threw in the towel.

White to play:

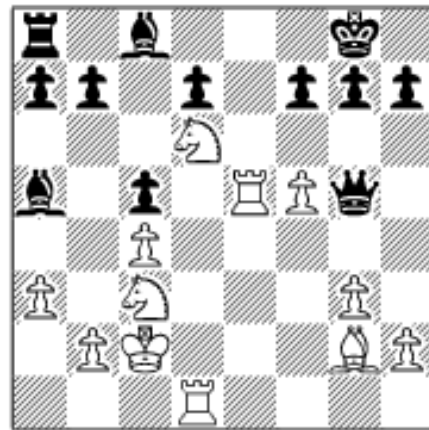


- *Material:* Absolutely even
- *King Safety:* It looks like that is roughly even since White has pushed the kingside pawns and Black is not castled. But of course *king safety* is not always independent of *army activity* when the enemy army is knocking down the doors of the king's barricades, as White is doing here to the Black monarch.
- *Piece Activity:* Black has dilly-dallied with moves like ...h6 and ...Qc8 and

a bunch of queen's Knight moves. In return, White has been much more efficient, with the finely posted Knight on e5 the only major piece moving more than once. Enormous advantage, White.

- *Pawn structure:* The structures are roughly even. White is slightly looser on the kingside, but this also provides a space advantage. Since pawns that advance are usually more vulnerable, having more space (a pseudo-element that may give more piece activity) and having more vulnerable pawns usually go hand-in-hand.
- *Conclusion:* White has a massive advantage and should not waste time. The game finished **1.d5!** Again, opening the position with a break move, to take advantage/accentuate of the big lead in activity. Closing the position with an “attacking” move like 1.c5 would be the wrong idea. **1...cxd5 2.cxd5 Be7?** Understandable, but allowing a further infiltration. However, White still has a winning advantage after the ugly 2...Rg8 3.dxe6 fxe6 4.Rc1 **3.dxe6 Qxe6 3...0-0** doesn't change anything anymore: 4.Nd7 Nde4 5.Nxf8 Qxf8 6.Rd4 **4.Nd4!** It's all over. **4...Qc8 4...Qxa2** is not the saving move due to 5.Ng6! Surprise! 5...Nd5 6.Nxh8 wins. **5.Ng6!** Threatening mate... how? **5...Nde4 6.Nxe7** White misses the pretty 6.Qb5+! Qd7 7.Nf5 fxg6 8.Nxg7+ Kf8 9.Rxd7 but still wins a piece. **6...Kxe7 7.f3 Qc5 8.fxe4 Rhd8 9.Be3 Kf8 10.Ne6+ 1-0**

Black to play:



If it were White's move, the evaluation would be trivial: without too much dynamic analysis one sees that there is a mate in one with 1.Re8#. But it is Black's move, and we have to evaluate the position assuming mate will be prevented.

- *Material:* White has a Rook and two Knights for a Queen, a Bishop (and the bishop pair) and a pawn. This part would normally represent a big advantage to Black, except dynamically it is easy to see that *Black cannot both stop mate and hold his bishop on c8*, which will change the static evaluation quite a bit as soon as this unstoppable dynamic feature is taken into account. Again, that is why non-quiet positions, such as the one above, are much harder to evaluate because you have to take any forced play into account. *Trying to evaluate without quiescence can be very dangerous to your game's health.* The exception is a speculative sacrifice,

which you usually evaluate on judgment, but using the same criteria, where you trade off material for the other factors.

- *King Safety*: It looks as though white's King is exposed and, after black's King creates luft, it has better pawn cover. But this is an illusion since white's King has plenty of places to hide from Black's only two active pieces. Big advantage White.
- *Piece Activity*: Enormous advantage to White, who not only has more pieces in play, but they are also working toward their maximum capability, while Black's queenside Rook and Bishop are spectators.
- *Pawn structure*: This is not a big factor here. One of the reasons pawn structure is fourth in priority is that when the difference in any of the other criteria becomes great, it almost disappears as a factor.
- *Conclusion*: Big advantage to White, which should translate into a quick win. The game continued: **1...h5** As good as anything else. If **1...g6 2.Re8+ Kg7 3.Nce4 Qh5** Other moves get mated or lose the Queen immediately. **4.f6+ Kh6 5.Nxf7#** is pretty. **2.Re8+ Kh7 3.Rh8+** irresistible, but the computer-like **3.Rd5** is even better, as is the simple **3.Nxf7** because **3...Qxf5+** gets the Queen pinned with **4.Be4**. **3...Kxh8 4.Nxf7+ Kg8 5.Nxg5** and White won easily.

Now let's take an instructive one from the Novice Nook *A Counting Primer*: **1.e4 e5 2.Nf3 Nc6 3.Bc4 Bc5 4.O-O Nf6 5.Ng5?! O-O 6.Nxf7? Rxf7 7.Bxf7+ Kxf7**:

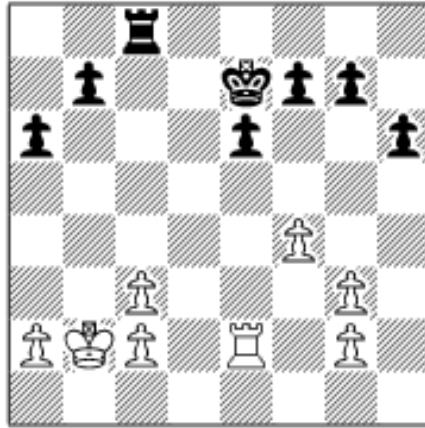


- *Material*: Using old "Reinfeld" values, it looks like Rook plus pawn vs. Bishop plus Knight is about even ("six pawns to six pawns") but long time Novice Nook readers know that this is not true – Bishops and Knights are worth closer to 3¼ pawns each. That puts Black ahead 6½-6, and also by IM Larry Kaufman's value system the bishop pair is worth a half pawn bonus, so that makes it 7-6.
- *King Safety*: It may look like black's King is more exposed, but this is largely an illusion since ...Kg8 is looming. Actually white's King is slightly *less* safe due to Black's piece activity, but we do not want to double-penalize him (see #3) so we will call it even.
- *Piece Activity*: Big advantage to Black. In the opening a pawn sacrifice is usually worth 2-3 tempos, so a (worthwhile!) tempo is worth about • pawn. Black is up 2-3 very well taken tempos, so that adds up to almost another

pawn lead in activity.

- *Pawn structure:* White's extra pawn gives him more solidity, but neither side has any pawn weaknesses.
- *Conclusion:* Normally it takes a greater than one pawn advantage to have a winning position, especially if it is early and there are no looming tactics. Here Black is ahead well over one pawn, so if this position occurred between two very strong players Black would expect to win. This is a far cry from the erroneous beginner evaluation of "Material is about even but black's King is exposed so White is better"!

Finally, a made-up position, with Black to play:



- *Material:* Absolutely even
- *King Safety:* Both perfectly safe – neither in any danger of being mated until a pawn promotes
- *Piece Activity:* Advantage to Black, especially because White's King is cut off guarding the c-pawn. In most endgame positions king activity is a big factor.
- *Pawn structure:* White's pawns are a mess. Besides the isolated kingside pawns, the doubled g-pawns will allow the black King to threaten inroads there as well.
- *Conclusion:* Big advantage for Black; it should be enough to win for most intermediate+ players.

Most of these positions were easy to evaluate, but hopefully you get the idea. With practice, you will successfully learn to evaluate with increasing skill and accuracy, and your move choices will correspondingly improve.

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



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