It still seems that black has hope in these extremely unfair variants of chess

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Jim McCann, in italics ...... oh! .... nervous laughter .... no, that's not part of the name still. I stopped sa

1 April 2014

Abstract

CHECKMATE.

Introduction

Chess is an old-timey game that you already know. One problem with Chess is that it is hard; both players may struggle mightily in a game, expending their brain-sugars, and it is not clear who the winner will be. Another problem with Chess is that it isn't other games, and we're pretty much over it. In this paper we attempt to address both problems, with limited success. We show how to combine Chess with several other board games, in order to make it more predictable.

As usual for a Tom 7 SIGBOVIK joint, the results herein are real. The source code that was used to solve the games or prove that no winning strategy exists up to some depth can be found on the inter-net.[1]

1   Chesstego

Chesstego is a combination of the games Chess and Stratego. You already should know that every game in this paper is a combination of Chess and something, but I wanted to emphasize the portmanteau. All of the games will be named with portmanteau, and some of the names will be achingly bad.

In Stratego, each player begins the game by arranging his or her Stratego-pieces in a secret fashion on the board. In the world of Stratego, civilization is ruled by a leader known as Flag. The player's goal is to assassinate the opponent Flag, using a member of his or her army. However, which piece represents Flag is unknown!

There are many ways we might apply the Stratego system of governance to Chess.

Chesstego variation I. In this variation, each player decides in secret, before the game begins, which of his or her pieces is the actual King, that is, Flag. If this piece is checkmated, the game is lost. There are two sub-variations: *I(a)*, where a player must announce *Check!* when Flag is under attack, and all of the normal rules about moving into (or castling through) check must be obeyed. In subvariation *I(b)*, which I prefer, the piece that is Flag may slip silently into and out of check, and the game only ends when that piece is captured.[2]

Chesstego variation I is a reasonable if slightly silly game, and it is difficult. It may even be more difficult than Chess due to the psychological mind-games that are possible. It can be hard to tell which player is winning, let alone which player will win. In this paper we are interested in variants of Chess that both *are other games* and *are predictable*. We'd like to give one of the players a clear strategy for winning.

Chesstego variation II. In this variation, each player decides in secret, before the game, which of her *opponent's* pieces is Flag. Same as before, if this piece is captured, the game ends instantly. But now, players don't even know which of their own pieces is their glorious ruler, Flag. This can be very exciting or titillating.

Unfortunately, there is no known winning strategy for White, and there are no winning strategies with fewer than 6 moves. This was proved by computer program. In fact, it was proved for a stronger case:

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[1]In the Subversion repository at: https://sourceforge.net/p/tom7misc/svn/HEAD/tree/trunk/chesstego/

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[2]In Chess proper, these formulations are nearly equivalent—except for rules like castling through check and some corner cases—but it is deemed important for movie drama that players be able to announce *Check!* and *Checkmate!* at times.

Chesstego variation III. In this variation, the first player, known as White, chooses in secret both the identity of Flag for his own populace, as well as the identity of Flag for his opponent. Even in this very unfair setup, Black can always survive for at least 6 moves.

This will not do! Black just has so many options with all those pieces. Perhaps if he were handicapped somewhat?

Chesstego variation IV. In this variation, White chooses the identity of both Flags again, in secret without telling her opponent, and also Black does not get any good pieces, just pawns. Like this:
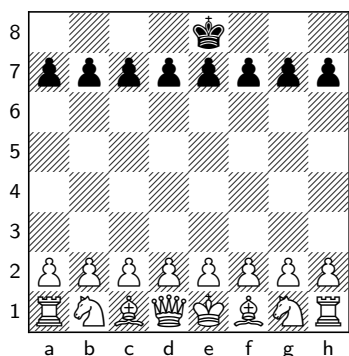
Lo! This version is finally satisfactory. In this version we need not equivocate over who shall win. White picks one of her very safe pieces (e.g., one of the rooks) as Flag, and chooses Black's b7 pawn as Black Flag. White's winning move is c2c4 and then Qb3, with Black Flag unable to escape the B file (Figure 1). Choosing the f7 pawn works as well.

Chesstego variation V. This variation is just like *IV* but White gets super good pieces everywhere instead of having some dumb ones, and Black still gets bupkiss:
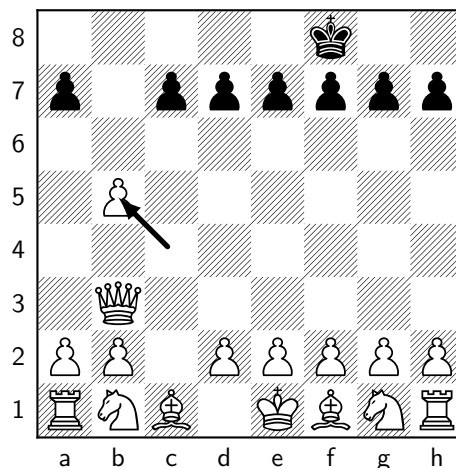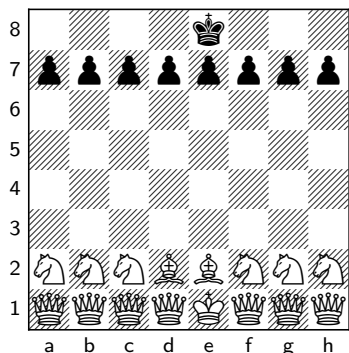
Figure 1: Example hopeless match: 1. c4 Kf8 2. Qb3 b5 3. xb5 1–0

Now there are many more winning strategies, but the one from *IV* works as well.

Other variations. Incidentally, my on-line version of Chess called SICO[3]—where you just play a single move in a random game—has for about six years had variations called "center wall" and "barricades"[1] which were inspired by the layout of the Stratego board. However, these cannot be considered worthy of portmanteau, as the rules are basically just Chess rules.

2 Cluess

This game, known as *Chuessdo* in the United Kingdom, is a cross between Chess and *Clue*. In this version, the player called White is known as Mrs. White, and the player called Black is known as Professor Plum.

3 Chess Who?

The board game *Guess Who?* disappointed millions of children with its delightful television commercial that far outstripped the capabilities of the actual game. This required them to add a disclaimer to the commercial, "Game cards do not actually talk." In *Guess Who?*, players take turns trying to guess the identity of the opponent, among a fixed set of personalities with traits like curly hair, straight hair, brown hair, short hair,

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[3]On the internet at: http://snoot.org/toys/sico/

bangs, long hair, blonde hair, red hair, or glasses. One player asks, "Do you have curly hair?" and the other says "Yes" or "No" and then the first player can eliminate all the remaining personalities that don't have the trait. It's basically binary search, but for kids.

In *Chess Who?*, which is the chess version, players have two different options on each turn. They can either move a piece like normal, or ask a question of their opponent. The question must be about the physical characteristics of the pieces, for example, "Does your piece have curly hair?" No pieces have curly hair, so nothing happens. The opponent might ask a different question, on the next turn, like "Does your piece have straight hair?" No pieces have straight hair, so nothing happens. On the next turn, suppose the player asks, "Does your piece have brown hair?" No pieces have brown hair, nor any hair at all, and no pieces have any brown parts at all either. Stop asking. Next, Black asks, "Does your piece have crenellations?" Both of White's rooks have crenellations, so they are eliminated from the board (Figure 2).
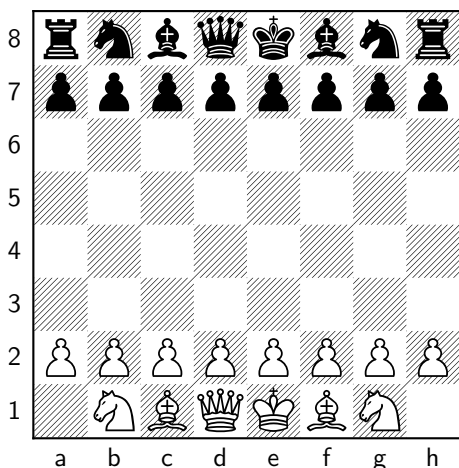

Figure 2: The board after 1. Does your piece have curly hair? . . . Does your piece have straight hair? 2. Does your piece have brown hair? . . . Does your piece have crenellations?

Next, White might ask, "Does your piece have a cross on his hat?" This matches both Bishops and the King, but Black responds "Check!" because it is illegal to ask a question that would eliminate the King.

This variation produces draws easily. An example Nash Equilibrium: White begins by asking, "Does your piece have three lobes like a truncated snowman, *or*

crenellations, *or* horse ears, *or* two weird long shoulder-ribbons that I don't know what they are, *or* five pointy tines on her crown?" This matches all of Black's pieces except his king, so he removes them all. But then Black asks: "Does your piece *not* have a lumpy crown?" which matches all of White's pieces except his king. So all we have left is the two kings, which is known to be a draw [2].

4   Chessy Crush Saga

Chessy Crush Saga is a hybrid of Chess and the popular and lucrative phone-game *Candy Crush Saga*. In this game, the regular moves of chess are allowed, but it is also possible to *crush* chess pieces into candies. *Chessy Crush v1* follows the rules of *Candy Crush* closely: When a piece moves such that three pieces of the same color are in a row (either horizontally or vertically), those pieces are all removed. Usually this is a tactical misstep in Chess, as three of one's own pieces are destroyed for nothing. However, as in *Candy Crush*, rewards are given when more than three like pieces are destroyed at once. The simplest is to award the player with a Candy Rook at the place where the moved piece ended up. A Candy Rook moves like a rook, but if it is crushed, it destroys all of the opponent's pieces on the file (column) it currently occupies.[4]

As another simplification, we remove all of the proper pieces from the black files, except for the King, in honor of the software company that makes *Candy Crush*, "King." A densely packed board with pieces that can move backward is dangerous, for it is easy to destroy one's own king by moving out of and then back into the back file, crushing the whole thing (Figure 3).

With just pawns, it seems that the best way to gain advantage for White is to crush four pawns to create a Candy Rook before Black does, then menace Black with it. Unfortunately, moving four pawns into formation before black can interfere is not possible; Black can react to White's first move and advance one of his own pawns towards the construction (Figure 4). Moreover, if he does, and trades for one of White's pawns (or better, the resulting candy), then Black is probably in a superior position, White having crapified his pawn structure in pursuit of candy. Worse still, crushing a successful Candy Rook is not that menacing, since Black can sim-

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[4]In formal *Candy Crush*, this is the vertical striped candy, which is awarded when the piece was moved vertically. To keep this variant simple, we always award a "vertically striped" Candy Rook, since it seems with only pawns, only vertical moves are likely. (This later turns out to be a bad assumption.)
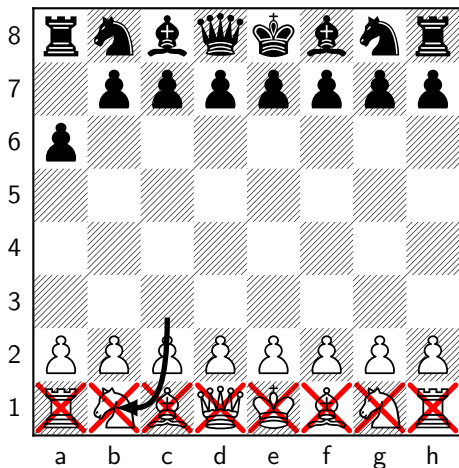
Figure 3: "Fool's Mate" in the rejected *Candy Crush v0*, played with normal pieces in the back ranks. White self-mates in two moves, crushing all his own pieces *e.g.* with: 1. Nc3 a6 2. Nb1 (??) 0–1

Figure 4: Black interfering with White's Omega Weapon main line: b3, d3, e3, c3 *(making candy)*, Rc2, Re2++. Black can progress pawns fast enough to capture White's. She can also move her King, making the candied rook less devastating. Ultimately, White's one-tempo advantage is not obviously winning.

ply move his king out of the way.

To correct these problems with balance (*i.e.*, that the game may be balanced), we simplify the candying rules: Any crush produces a Candy Rook, including ones of length 3. This allows White to create a Candy Rook before Blacks pawns can reach her. Furthermore, we stipulate that the kings cannot move (they don't have legs anyway, this is plain to see, so let's be realistic). In *v2*, the Candy Rook is extremely powerful, since not only does it destroy an entire file (the e file being the likely target, since it contains the immovable King), but when it is used (by crushing) it is also replaced, since a crush always yields candy. Therefore, White's most straightforward strategy is to quickly create a Candy Rook, then crush it in the e file, which wins. This should be a line where White's tempo advantage makes it mostly immune from interference, since even a check is answered by destroying the opponent's king.

The idea behind White's Omega Weapon is to create a triplet of pawns on rank 3, either c3–e3 or e3–g3. White begins by moving her king's pawn to e3. Black can interfere with one side of the triplet (Figure 5), but only one. After 1. e3, if . . . f5 or h5, then White will continue creating the triplet in c3–e3. Otherwise, she is safe to create it in e3–g3. Once the Omega Weapon is constructed, she need only move it to e2 (which is free due to the first move, and will be adjacent to at least two pawns). This destroys the Black king, which
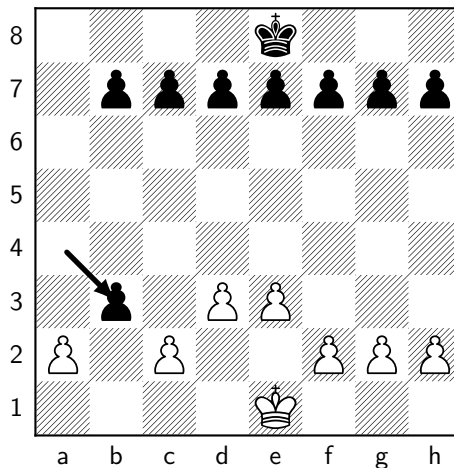
cannot have moved, due to the rules. Unfortunately, this strategy can be foiled by Black with a clever[5] mutual suicide, as shown in Figure 6. This strategy is not easily defended against, nor is it straightforward to fix the rules of the game,[6] so it seems *Chessy Crush Saga v2* also retains hope for Black, even though the odds initially seemed stacked against her.

5 Future work and conclusions

Many other games can be combined with Chess to ruin Chess. For example, consider *Chess Tac Toe*, *Chesslers of Catan*, *Chesstris*, and *Hungry Hungry Hipposchess*. Combining Chess and Sokoban is impossible, obviously. The combination of Chess and Battleship is *Battlechess*, published in 1988 by Interplay.

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[5]This strategy was discovered by computer, like most clever things these days.

[6]It seems perhaps we can eliminate Black's draw strategy by restoring the idea of horizontally striped Candy Rooks (see footnote above). I implemented this. Unfortunately, although the move that ends the game in a draw is a horizontal move, the move that creates the Candy Rook is a vertical one. Therefore, Black's Candy Rook is vertically striped, and can successfully destroy the White king (though it is then replaced with a horizontally striped Candy Rook to observe the empty thrones).
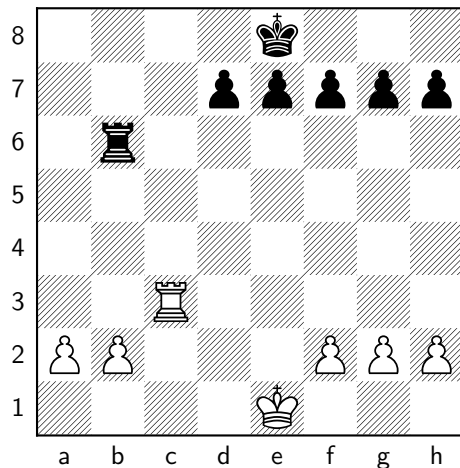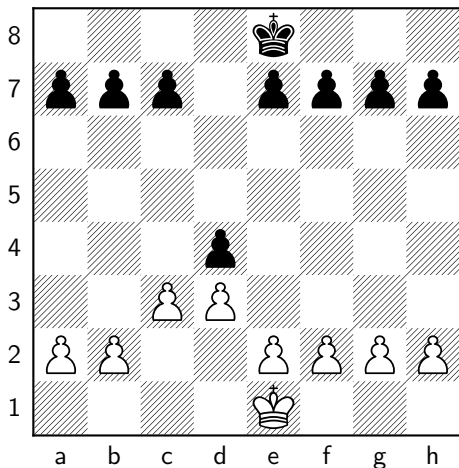
Figure 5: White may not use a fixed strategy to construct her Omega Weapon. The position shown is after 1. c3 d5 2. d3 d4. If 3. e3 *(making candy)* then . . . xe3, obviously. White can make candy with 3. b3, but now e2 is not clear to crush the Candy Rook here and destroy the Black king.

In conclusion, San Dimas High School Footchess rules!

References

[1] Tom Murphy, VII. SICO chess variations, April 2008. http://snoot.org/toys/sico/variations.html.

[2] John Nunn. *Secrets of pawnless endings*. Gambit publications, 2nd edition, May 2002.

(a)
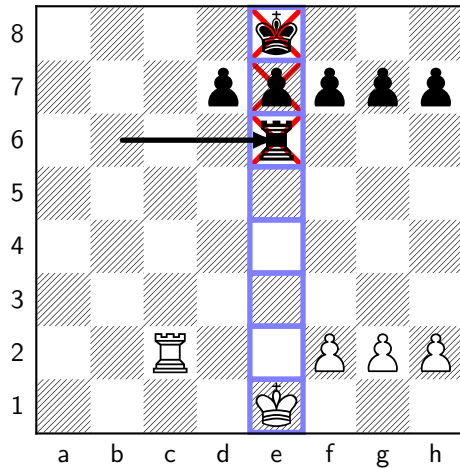
(b)

Figure 6: Black's surprising draw strategy in *Chessy Crush v2*. White begins her Omega Weapon: 1. e3 c6 2. d3 a6 3. c3 *(making candy)* b6 *(making candy)* we have the board in (a). It seems that Black is stuck after 4. Rc2 *(making candy)*, since 5. Re2 *(making candy)* will crush White's candy rook and destroy the entire e file, including Black's king. Black defending with 4. . . . Re6 initially seems pointless (White will destroy the rook as well so the check is irrelevant—this indeed refutes 4. . . . Rb1) but Re6 actually creates a *vertical* three-piece crush, sacrificing Black's king to destroy the e file first, which also destroys White's king! Such mutual destruction is not possible in traditional chess, but it seems appropriate to consider it a draw in Chessy Crush Saga v2. It appears that White can head off this line with 4. Rc8++, a totally vanilla back-rank mate, but this is not actually mate with the same 4. . . . Re6 *(making candy)* escaping to a draw.