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## A Twist on Whist

In many trick-taking games, such as whist, spades, and bridge, the play tends to be deterministic. I picked up quickly, after learning the rules, the basic strategies that dictate what the correct card is to play, and there are very few instances where it is ambiguous. Although they are games of imperfect information, using J. Mark Thompson's definition (S&Z 204), an experienced player can deduce most, if not all, of the cards in the other players' hands. For many people, I feel, this ends up being extremely boring, since post-bidding, there does not exist much variation. My overall goal was to see how I could introduce uncertainty into the game. The general approach was to first attempt to introduce more uncertainty in the bidding process, where uncertainty already exists and see if it could influence the play of the game, and then, try to add twists that would introduce uncertainty directly into the playing phase of the game itself.

The basic rules of bid whist are similar to bridge; there is a bidding round and then a playing round. The deal gives twelve cards to each player with four cards set aside, known as the kitty. The playing is equivalent to almost any trick-taking game. The primary rule is to follow suit, i.e. if a player has a card of the suit led, they must play a card of that suit. The other aspect of playing is that there is a trump suit, which beats all other cards except for higher cards of the trump suit. The bidding process is more complicated. Starting with the left of the dealer, the player declares how many tricks beyond six tricks that they can take with their partner, as well as the trump suit, and uptown/downtown, which signals whether high or low cards will win a trick, respectively. For example, if the player declares 4-hearts downtown, this means the player and his partner are attempting to make 10 tricks with hearts as the trump suit and the low cards winning. Aces serve as the high card in both uptown and downtown declarations. For bidding purposes, there is also a natural suit ranking: clubs, diamonds, hearts, spades, and no trump, and one can outbid another player in the current level if the bid changes to a higher suit. Once the bid is determined, the player can take to the kitty into his hand and then discard any four cards from the combined set. Then the playing phase begins, with the kitty automatically counting as a free trick for winning team. The scoring for the original bid whist is simple: the partnership either gains a point for every trick beyond six or loses the level of the contract, i.e. if the players cannot make a 4-heart bid, they lose 4 points.

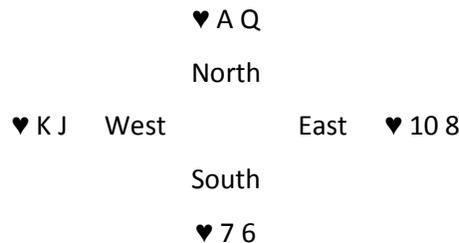
Bidding conventions are an important facet in bid whist and bridge and are not present in most other trick-taking games. Since there is no communication between partners other than the bids, the partners have to rely on the bidding to transfer information to each other by assigning meanings to bids. Applying Salen and Zimmerman's information theory, the game of bid whist is a system of information where the signals are the bids made by the players (S&Z 195). The two partners set the conventions they are going to use beforehand and the conventions function as secret signals, helping the process of communication along. There is significant noise in the system since the conversions from hands to bids are not perfect, and many interesting behaviors emerge from that restriction, akin to the Charades example by Salen and Zimmerman (S&Z 197). This noise adds fun for many players and is one of the reasons why I like bid whist.

Therefore, in my first iteration, I tried to focus on the bidding, since it is the most interesting part of bridge and bid whist, and the phase that I know uncertainty plays a large role in the outcome. I introduced a hearts-like aspect to the bidding, where right before each player makes his first bid, he places three cards face down to pass to another player. The direction of passing is the same as in hearts: the first game involves passing cards to the left, and subsequent games involve passing to the right, passing across, and then no passing. The players only pick up the cards after the bidding is over, and the winning bidder still swaps his cards with the kitty if he wants to. Since there is no obligation to choose the cards until just before the bid, players should wait and try to react to earlier bids. The basis for this change is the notion that the lusory attitude seeks out inefficiencies in the game, and those inefficiencies are what players perceive as challenging and fun (S&Z 197). Bidding in whist is an attempt to deduce knowledge of the cards from what the players declare; by having to pass three cards around, a quarter of the hand is unknown until bidding is over.

In playtesting sessions, this hearts rule quickly changed the conventions used. Many conventions changed and became indirect. For example, my initial bid, which used to indicate in bridge my preferred strong suit and whether I had a hand to capture majority tricks, now indicated something different. It was a false indication of the suit that I wanted to be in as well as the opposite of the uptown/downtown that I wanted, although my partner would understand it from a convention agreement. I did not have to state my suit preference explicitly. Since the opponents could react to any earlier bid and place their cards to pass accordingly, we wanted to fool them into giving useful cards. A major criticism of the hearts rule after the first few playthroughs was that the first bidder could not use any information gained from any of the other players' bids, and this put him at a significant disadvantage. I changed it so that there are a maximum of three turns of placing one card down to

pass, instead of all three cards at once. The first player, before he bids, places one card down, and then bids. The second player does the same, and so forth until the bidding is complete. At the end of bidding, whoever has not selected their three cards to pass around chooses the remainder to pass. Playtesting of this minor change confirmed that it was much fairer for all the players, since players can constantly respond to other bids, and there is rough equality of information.

After working in a change to the bidding, I still thought that the whist variant felt too deterministic during the playing phase. It was fun during the bidding, but the play did not change much. For the most part, the bidding did not affect the playing, except for some beginning tricks, where the earlier bidding indicated better cards to lead. Compared to regular bid whist, though, there was less of integration between bidding and playing, since the passing around of cards led to obfuscation of the information gained from bidding. In the second major revision, I added in the ability for the winner of a trick to be able to switch the direction of play, i.e. he could choose counterclockwise or clockwise. I tried this change, since I knew from bridge experience that direction of play is critical for finesses. Finesses are methods of capturing specific cards from the opponents using trapping. For example, taking the following diagram:



Assume the game is uptown. If South leads, West is in a bad position, since if he plays the king, the ace will overtake it, and if he plays the jack, then the queen will take the trick instead. In this case, the North-South partnership has finessed the king, having it trapped between the ace and jack. If, for some reason, play was counterclockwise instead, West would play lower if North played the ace, and higher if North played the queen.

In the many rounds that we played afterwards, the direction of play rule was invoked only in one game. The problem with using the rule is that it often depends on knowledge of other people's cards; with the bidding providing even less information than it did before, there are not many opportunities for known finesses. In addition, finesses are more common in bridge, where the partner's hand is known to all the players, i.e. there is a dummy, and less common in bid whist, where all hands are hidden. In the one instance that this rule was useful, both partnerships used the rule extensively to finesse trumps from the opponent. The feedback from the end of that game was that being able to

change the direction definitely introduces a useful and interesting dynamic, but there specific times during a game that a player would use it. There was general agreement that, if we established many more conventions, it would come into more use. It was amusing, though, to redirect the directions at whim, just to see if the players could pull off finesses.

In the final major revision, I attempted to change the dynamics of play almost entirely through the introduction of the notion of going solo. Whist variants are usually partnership-based games. I thought it would be interesting to note the change in dynamic if players were given the option to betray their partner and play for themselves. This essentially converted bid whist into a game where every player plays for himself, although players can form partnerships with the person sitting on the opposite side of the table in order. A player could declare, at any point between tricks, he wants to go solo for the rest of the game. The rest of the players form a partnership at that point, and all tricks won up to that point are noted. The solo player then takes on the contract of the winning bidder, and the other three now have the goal of setting, or making the solo player lose the contract. If the solo player makes it, he gains a bonus multiplier on the contract tricks bid, i.e. a 4 bid means 10 contract tricks bid, subtract the number of tricks played so far. For example, assume the tricks needed to make bid is ten and eight tricks have been played so far. Then the solo player would get a bonus multiplier on the two additional tricks he must make in order to satisfy the contract of ten. His partner would still get the points from what they made so far; in this case, it would be based on taking eight tricks. If the solo player does not make the contract, then all other three players get points based on the number of tricks the solo player was set by. There is a prisoner's dilemma facet to this, in that partners can either cooperate to get points, defect to get more points, but if they both defect, then they end up losing overall.

Early in this revision, I decided to first test the playability of the option, and ignored scoring altogether. What I later discovered was that the attractiveness of going solo is entirely dependent on the risk/rewards from the scoring system. If a penalty did not exist, there was no reason not to go solo (and it was fun to attempt to screw over partners). Therefore, through many playthroughs, I tweaked the scoring system a bit at a time. Many of the changes and tweaks to the scoring system were due to abuses of the previous iteration's system. I started with a scoring system similar to bridge, where the players got 3 points for every trick beyond six they took, plus a bonus point for bidding no trump. The penalty for missing would be 5 points per trick under the contract level. I geared my initial setup around the ideas that if a solo call is made on the last trick, there should be virtually no change, and if a solo call is made stupidly, then it should be penalized heavily. Tweaks were mainly on how the partner should be

scored when a solo call is made, since there is no reason to penalize the partner for helping get initial tricks and how large the bonus multiplier should be. I summarize the final scoring and rules in the appendix of the paper.

The goal of introducing the solo aspect was to see whether the game would be more fun with the added uncertainty of betrayal. As the scoring became clearer, I tended towards playing aggressively, attempting to go solo whenever possible, and hoarding my winners until the absolute end. Normally, most of the uncertainty in whist is gone halfway through the game, since trumps and high cards are usually played first. This variant keeps the anticipation throughout the entire game because those who lost the contract can still gain points from setting a solo call. In addition, a player needs to consider the possibility of his partner going solo at all times, and partners end up holding onto the more interesting cards until further in the game.

Through different variations, I explored how uncertainty can influence a trick-taking game like bid whist. I find that uncertainty in card games tends to be fun, and the whole appeal of cards is that there is hidden information. Even for experts in bid whist, who revel in calculating the probabilities of a card appearing in a certain hand, it is fun because the system is dependent on imperfect information and noise in order to work. When I playtested each revision, the game progressively became more fun and interesting, because I could no longer calculate everything, and I had to consider more possibilities, and strategize. Especially with the solo rule, a Mafia-esque aura surrounded the game, and I felt like it became one more dependent on deception than knowledge. For me, and for the other players as well, the mystique of the unknown and the fun of figuring out what could possibly happen in each situation, was more fun than just bidding and playing the cards alone.

## Works Cited

Salen, K., & Zimmerman, E. (2004). *Rules of Play: Game Design Fundamentals*. Cambridge: MIT Press.

## Appendix

### Deception Whist

#### *General Play*

Twelve cards are dealt to each player. The bidding is equivalent to bid whist, except the addition is that one card is placed before each bid for passing to another player. Passing occurs to the left for the first game, to the right for the second, and across for the third. There is no passing for the fourth game. All subsequent games follow the same pattern. Three cards are passed to another player so if at the end of the bidding round, a player has not chosen three cards to pass, he will place the remainder of the three cards to pass. The first trick is always clockwise, but subsequent tricks, the winner of the previous trick (the player who is leading) can choose to change directions. Remember that, regardless of partnerships used to further both players, in the end, this variation is an every-man-for-himself game.

#### *Going Solo*

At any point between tricks (but not while a trick is in the process of being played out), a player can declare to go solo. At that point, any tricks made up to that point by the solo player and his partner are considered to be made by both and the game becomes a three versus one, where the solo player attempts to make the contract set by the winning bidder. If the solo player makes the contract, then he gets the points from making contract as well as a bonus multiplier on the difference of the contract level and tricks played at the time of solo declaration. His partner gets the appropriate amount of contract points from the level at which the partnership was at just before the solo. For example, assume the solo player makes a contract of 5-level, i.e. took eleven tricks, and that declared to go solo after 8 tricks, and at that point, that partnership took 7 tricks. Then the solo player would get a bonus multiplier on three tricks ( $11 - 8$ ) as well as the contract bonus of 5-level. His partner gets points equivalent to taking seven tricks (which was the amount of tricks they took at the time of declaration), which is 1-level. The other two players do not get anything. However, if the solo player is set, then he loses points from the contract level and the three other players gain points from how many tricks the solo player missed contract. Taking the last example, assume the solo player missed the 5-level contract and only took nine tricks. He will lose points from the 5-level contract and other players will gain points from the two tricks ( $11 - 9$ ). Note that normally in bid whist, when set, the player only loses points from being set, but the other players do not gain. This, in a sense, discourages unnecessary solo calls, by doubly penalizing the solo player.

## *Scoring*

### Non-solo

For making a contract:

3 points for each trick over six tricks

If no trump was the suit, +1 additional point

For missing a contract:

-5 points for each undertrick

### Solo

For making a contract:

3 points for each trick over six tricks +  $3 * \text{difference of contract and tricks played at time of solo call to solo player}$

3 points for each trick over six tricks to the partner of solo player using number of tricks taken by the team at the time of solo call

For missing a contract:

$-3 * \text{contract level}$

All other players gain +5 for each undertrick by the solo player

For example, again assume the solo player makes a contract of 5-level, i.e. took eleven tricks, and that declared to go solo after 8 tricks, and at that point, that partnership took 7 tricks. Then the solo player would get  $5 * 3$  (making contract) +  $3 * 3$  (bonus multiplier) = 24 points. His partner gets equivalent to taking seven tricks, which is 3 points.

If the solo player is set by two undertricks (he took only nine tricks), say, he will lose  $3 * 5 = 15$  points from the 5-level contract and other players will gain  $5 * 2 = 10$  points from the two undertricks (11 – 9).

Notice that the bonus is higher the earlier the player declares solo, but it is harder for him to know for sure whether he can make it at that time.