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Six Degrees of Idiocy

In both poker and finance an individual's strategic idiocy can be quantified and analyzed

One of the classic works of poker, and risk management, is Herbert Yardley's 1957 best-seller, *The Education of a Poker Player, Including Where and How One Learns to Win*. Yardley is an important transitional figure. 19th century poker was forged in self-organized frontier societies such as mining camps, farm settlements and transshipment points. During the first half of the 20th century, it evolved into a game of extraordinary mathematical and psychological subtlety. Yardley learned his poker from a genuine old west gambler with deep 19th century roots. He later applied his talents to codebreaking, running the US efforts during World War I and after. That experience imbues his poker analysis with 20th century applied mathematics and proto-game theory.

David Kahn wrote an excellent biography last year, *The Reader of Gentlemen's Mail: Herbert O. Yardley and the Birth of American Codebreaking*. The title refers to an incident in 1929. Secretary of State Henry Stimson shut down Yardley's code-breaking operation with comment, "Gentlemen do not read each other's mail." Yardley responded by writing a 1931 bestseller *The Black Chamber* about his career, which led to accusations of treason for revealing secrets. Kahn concludes, however, that Yardley "was a rotter, not a traitor." Yardley spent his remaining 28 years working as a spy, freelance cryptographer, real estate developer, restaurant owner and anything else that



caught his fancy in between writing bestsellers and playing poker.

Complete idiots, degrees and parity

One of the most important concepts that Yardley learned from his mentor was degree of complete idiocy. A complete idiot in poker will sit back with a big smile when he gets good cards, and bet high. With bad cards he will look unhappy and bet only reluctantly. His transparency makes him easy to beat.

Someone one degree removed from a complete idiot will do the opposite. She will think how other people will interpret her actions if they assume she is a complete idiot. When she gets a good hand she will grimace and pretend to be pained while putting money in the pot. With a bad hand, she'll laugh and ostentatiously count her chips as if determining how much money she can make.

There aren't many complete idiots, at least not ones with enough money left to buy in to a poker game. Most players are one degree

removed. If someone is acting strong, they're most likely weak, and vice versa. This rule is pretty reliable outside of poker as well.

Making one more reversal, so you act strong when you're strong hoping other people will think you're weak but acting strong to fool them into thinking you're strong, is not two degrees removed from a complete idiot. That just changes the parity of your idiocy, not its degree. However many flip-flops you do, you are still giving away complete information about your hand.

Someone two degrees removed from a complete idiot understands that other people are trying to decode his reactions. This is the degree at which real poker begins. Zero degree (honesty) and first degree (reflexive deception) are natural human instincts, common to many games and non-game situations. The second degree requires thought.

One way to be two degrees removed from a complete idiot is to maintain a poker face, to act the same with strong hands and weak. Another way favored by game theorists is to randomize your play. In either case, you give away nothing by your actions.

This idea translates naturally to finance. The complete idiot always goes for the money: the bond with the highest yield, the mutual fund with the best historical return, the stock of the best company. Of course, I'm using "complete idiot" in the technical sense. These people are not necessarily stupid. Grabbing money as fast as you can is sometimes a good strategy. In other cases, these people are victims of unscrupulous financial marketers. The point is they look only at the most obvious criterion and don't ask themselves why the investment looks so good.

A person one degree removed from a complete idiot does just the reverse. He looks for the bond that trades flat, the mutual fund with a one-star Morningstar rating, the stock in the company in headlines for incompetence and scandal. He reasons that everyone else shuns these investments, thus they are underpriced.

The simplest way for an investor to be two degrees removed from a complete idiot is to buy a low cost, well-diversified index fund. There are more sophisticated second-degree strategies like Black-Litterman or Markowitz optimization that attempt to integrate a variety of factors in a consistent theoretical framework. This is the lowest degree at which we are practicing finance.

A complete idiot does not consider other people, someone one degree removed from a complete idiot considers other people, but assumes

other people are thinking at the same level you are. Second-degree solutions are equilibrium solutions. Moving to the third or higher degree, in poker as well as finance, requires consideration of non-equilibrium factors in other people, such as learning.

You gotta know when to hold 'em

Let's see if we can apply these concepts to the poker game of Texas hold 'em in a way that makes sense in finance. In this poker game, play-

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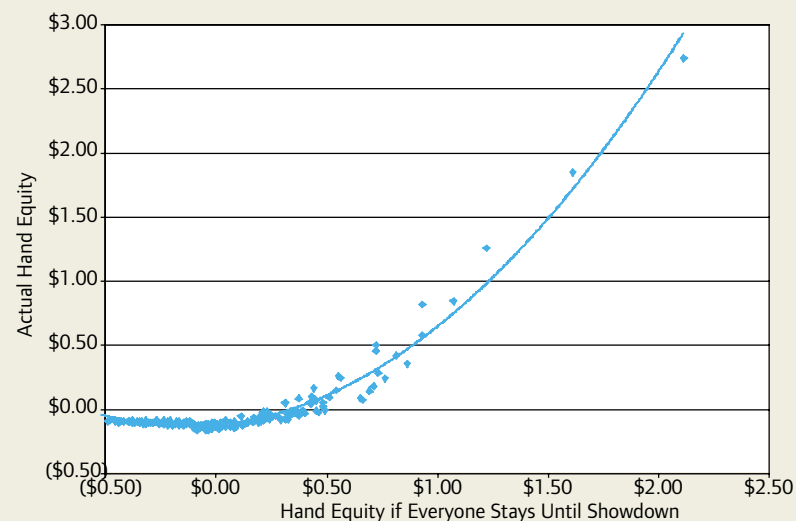
those other people are all complete idiots. To be two degrees removed from a complete idiot you not only have to consider the reactions of complete idiots and one-degree thinkers, you have to make the conceptual leap that at least some

ers are each dealt two cards face down. These are known as hole or pocket cards. There is a round of betting, after which five community cards are dealt face up (with some intervening betting which we will ignore). Of the players remaining

the pot until showdown, the one who can make the best five-card poker hand out of the seven available to her (her two pocket cards plus the five community cards) wins the pot. You do not need a detailed understanding of poker betting or hand rankings for this article.

The most important decision in limit hold 'em is which starting hands to play. A pair of Aces is the strongest possible starting hand, it will be the strongest hand 31 per cent of the time when playing against nine other players. Seven/Two of different suits is the weakest possible starting hand against nine other players, it will win less than 5 per cent of the time (against only one other player, Three/Two of different suits is a weak-

FIGURE 1: WHICH HANDS ARE WORTH PLAYING?





The quickest way to improve the game of a bad or average player is to have him play fewer hands. Moreover, the disciplined complete idiot strategy is quite effective against more optimistic complete idiots

er hand). Clearly there is an advantage to starting with stronger cards, but the question is exactly which hands are worth playing and which should be folded at the start?

The graph in Figure 1 offers some helpful information for analyzing this question. Each of the points are one of the 169 possible starting hands (13 pairs, 78 non-pair combinations of the same suit and 78 non-pair combinations of different suits). The X-axis shows the value of the hand if every player bets \$1 and stays in until showdown. For example, the hand at the upper right is Ace/Ace. Under the assumptions, it will win \$9 31 per cent of the time and lose \$1 69 per cent of the time for an expected value of \$2.10. The value on the Y-axis is the actual average winning over a very large sample of hands played at the online poker site PokerRoom.com (scaled to a constant \$1 betting limit). The solid line is a quadratic least squares fit to the data.

The first point is that actual poker winnings go up with the square of hand strength. At the weak end, this is because you lose no more folding the weakest possible hand as an average hand. Notice that average hands, with \$0 equity if everyone stays until showdown, have negative actual expectation. At the strong end, this is because you lose the most when you have the second strongest hand at the table, so slightly better hands are worth considerably more money.

The complete idiot will look at this and decide to play only the hands with positive actual equity. Those hands are any pair 8 or higher, any two cards Ten or above of the same suit except Queen/Ten and Jack/Ten; and if the suits do not

match, Ace/King, Ace/Queen, Ace/Jack and King/Queen. These represent 122 of the 1,326 possible sets of pocket cards, meaning you will play in 9 per cent of the hands and fold immediately the other 91 per cent of the time.

This is the advice you will find in most beginner's poker books, although it might differ slightly in the precise hand recommendations. Also, the advice typically allows you to play more hands if you act later in the hand, because the set of other players is effectively reduced.

Why would a poker book recommend playing like a complete idiot? The advice is only strategically idiotic; it is based on sound statistical principles. An informed idiot, who has a terrible strategy but calibrates and executes it properly, is much better than the average player. The quickest way to improve the game of a bad or average player is to have him play fewer hands. Moreover, the disciplined complete idiot strategy is quite effective against more optimistic complete idiots.

Someone one degree removed from a complete idiot assumes everyone else acts like a complete idiot. That makes most of the hands above unplayable. Unsuit Ace/Jack, for example, is the weakest of the hands. If you play it, you know everyone else in the pot has better cards. Moreover, suppose three players enter the pot with Ace/King, Ace/Queen and King/Queen, while you have a humble hand like Five/Four of different suits. You are the favorite to win. You have the same chance of pairing your cards as the other players do, but they will compete with each other for the top cards while you will enjoy the low cards by yourself.

Therefore, the player one degree removed from a complete idiot will look for hands that play well against the top hands. These are pairs and suited connectors (two cards of the same suit and adjacent ranks) of Jack or below. Of course, she'll play higher pairs and suited connectors as well, because these are so strong they're good even against similar hands, but she'll throw away unsuited and unpaired hands regardless of how high the cards are.

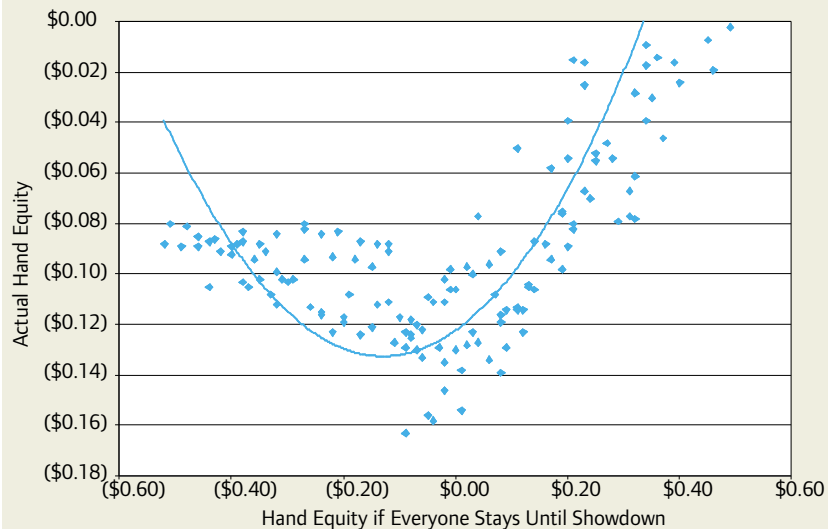
This can work well against disciplined complete idiots, especially if combined with good betting after the flop (the first three community cards, dealt all at once). However, it's not a good strategy in general, since you will rarely encounter a table full of disciplined complete idiots. If that were common, the hands you play would have positive equity. Most poker games contain either undisciplined complete idiots, who play both kinds of hands and more, or good players, or both.

In any case, it's not poker. At a minimum, in my opinion, true poker requires considering what happens if other people reason the same way you do. That opens the door to many complex and subtle strategies. In this article, I will consider only how a financial person could use the hand equity information to come up with a workable second-degree strategy.

Poker in the second degree

The graph below is just a close up of the first graph, showing the weakest hands. Notice that the most negative actual equity is for average hands, hands that win about 10 per cent of the

FIGURE 2: CLOSE UP OF FIGURE 1



time and would be near break-even if everyone stayed in until showdown. It doesn't make sense that an average hand could have less equity than a weak hand, after all you can fold either one with the same loss.

Those average hands with the most negative equity are all either Ace combined with a small card of another suit, or two cards of the same suit too far apart to form a straight and without an Ace or King. Why are these hands so bad? They win about 10 per cent of the time if everyone stays until showdown but they play very badly against the hands other people stay in with. Either no one else will stay in, and the player will not win much, or a player will stay in with a superior hand.

Unsuited Ace/Five, for example, is an above-average hand. But if someone has an Ace and any card higher than a Five, Ace/Five is a strong underdog. It wins only 25 per cent of the time against Ace/King, for example, or 30 per cent of the time against a pair of Eights.

On the other hand, we see some hands that are play much better than their strength would indicate. Among below-average hands, the three biggest overachievers are unsuited Seven/Five, Eight/Six and Nine/Seven. One reason these hands play well is that if you get a pair, you are not likely to share it with anyone else. Also, these

cards are high enough to beat a lot of other players' smaller card. But why do these one-gap hands play better than connectors (Seven/Six, Eight/Seven and Nine/Eight)? Because the chance of getting a straight is not that much less, but the straight will be far more unexpected, and thus will make you more money. Other hands that play better than their strength are medium two gapers (like Nine/Six), small pairs (below Eights)

and King/small.

As a second-degree player, we know we have to play the strongest hands, but also mix them up with some weaker hands. Otherwise we give away

This is the one with the strongest parallel to finance We can be greedy, and play the strongest hands, but we avoid the hands just a little bit worse. These hands are overplayed and have negative expectation

too much information, the other players will know exactly what to do against us. Since other players are also playing some weaker hands, we don't select only the weaker hands that play well against the strongest hands. Instead we pick the weaker hands that are most surprising, but still give us a good chance of winning. We don't pick the absolute weakest hands, like unsuited Seven/Two, but we also avoid the obvious weaker hands, like small suited connectors and unsuited Ace/small.

This is not enough to play winning poker

against good players, but it's enough insight to be well above average. But you can't plan your play based on large population averages, you have to figure out the individuals you are playing. If they are undisciplined complete idiots, it's enough to play only your strongest hands. If you are playing disciplined complete idiots, it's enough to play the hands that do well against the strongest hands. You have to recognize these players and adapt to them. If anyone at the table one degree removed from a complete idiot, you should note the type of weaker hands she favors, and play accordingly. That means favoring hands that play well against her favorites when you're playing her, and playing hands that will surprise people when you're playing others. Even pretty good players have habits, some like small pairs, some like suited connectors, some like suited high card/low card combinations. Remember, you're not looking for the hands that play best against the table as a whole, but the hands that play best against the players who happen to be in this hand.

There are other second-degree poker strate-

gies, but this is the one with the strongest parallel to finance. We can be greedy, and play the strongest hands, but we avoid the hands just a little bit worse. These hands are overplayed and have negative expectation, even though they win more than 10 per cent of the time in a table of ten players. Unless we're playing undisciplined complete idiots, we'll mix in some weaker hands. We'll choose those hands carefully to balance some degree of strength (two middle cards, one high card or a pair) with good playing qualities against the likely other hands, and surprise value.