

Blackjack Threat Analysis

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Blackjack continues to be one of the most popular games played in casinos. One of the primary reasons for this popularity is the widely known fact that knowledgeable and disciplined players can beat the game. There are numerous published works describing methods for playing a winning strategy, and a significant proportion of players apply these methods in casinos with varying levels of success.

There are three broad methods for 'beating the dealer' at Blackjack: card counting, shuffle tracking, and cheating. Of these, card counting is the easiest and therefore the most common. Shuffle tracking requires a level of skill and discipline much greater than card counting alone, and can be virtually eliminated through the use of effective (often time-consuming) shuffles, or shuffling machines. Cheating may involve any method from dealer collusion to the use of covert hardware such as cameras, computers and radio equipment.

Card counting systems make use of two facts: that once a card has been played from the shoe it ends up in the discard tray and is no longer available for play; and that different valued cards have different relative strengths. It is mathematically proven and well documented that low cards favour the dealer and high cards favour the player. Therefore, as the shoe is played and becomes more depleted, the advantage tends to fluctuate from the player (when the shoe is relatively rich in high cards) to the house (when the shoe is relatively poor in high cards). This is in contrast to most other casino games where the casino's advantage (the "house edge") is fixed and doesn't fluctuate from game to game. The house edge for blackjack (typically around 0.5%) varies depending upon several factors: the rules used by the house (for example, whether players can double after splitting, or whether surrender is offered), and the skill level of the player. For each set of rules there is an "optimal playing strategy" known as basic strategy, which determines the best decision (hit, stand, and so on) for every situation based upon the value of the dealer's up card and the cards held by the player. It is important to note that, for Blackjack, "house edge" refers to the advantage the casino holds at the start of each shoe if all players adhere to basic strategy and do not employ advanced methods such as counting or tracking. In fact, a large proportion of players play somewhat worse than basic strategy, and therefore the actual house edge for Blackjack is usually higher than the so-called "house edge".

Card counters (and shuffle trackers) maintain a mental running count which corresponds to the fluctuating advantage. The card counter can utilise this knowledge in two ways:

1. To determine the optimal wager size. By placing large bets when the advantage is to the player, and small bets (or no bets) when the advantage is to the house, card counters can boost their advantage by around 1% - *thereby swinging the "house edge" to a "player edge"*. At this point, the player is making around 0.5% of turnover from the casino!
Shuffle trackers have the additional ability to place large bets when slugs of high cards are actually being dealt from the shoe, typically giving themselves an additional 1% over card counters - *an advantage over the casino of a staggering 1.5% of turnover*.
2. To modify the playing strategy for the current round of cards. By using the fluctuating count to make "intelligent" deviations from basic strategy, players can boost their advantage by around 0.1%. Note that, unlike bet variations, there is no known optimal mathematical strategy for varying the playing strategy. It is highly subjective, so that what one counting system may rate as an "intelligent deviation", another may rate as a "basic strategy error".

It is important to note that varying the playing strategy according to the count does not have a large impact on the player's expectation: by making "intelligent" deviations from basic strategy, a player can decrease the house edge by around 0.1%. Consider a card counter who does not vary his bet size, but modifies his playing strategy according to the count - he can expect to lose around 0.4% (-0.5% + 0.1%) of turnover. Contrast this with another card counter who plays strictly according to basic strategy, but varies her bet in accordance with the count - she can expect to make around 0.5% (-0.5% + 1%) of turnover. She can make around 0.6% of turnover by additionally making intelligent deviations from basic strategy.

A key issue here is that so-called "intelligent" deviations have been calculated from computer simulations *based upon a full shoe*. In fact, as the shoe becomes depleted, the "intelligent" deviations change rapidly and are no longer known! To know what the strategy table (ie. intelligent deviations) would be for a half-depleted shoe, millions of computer simulations would have to be run *against the cards present in that particular depleted shoe*. This table would apply only to that particular partial shoe. As that shoe became even more depleted, the deviations just calculated would no longer be accurate - a fresh table would need to be calculated, using the cards remaining in the shoe. In this respect, it should be realised that trying to win at Blackjack by modifying the playing strategy is akin to trying to win at Baccarat by card counting - that is, practically impossible ("The Theory of Blackjack" by Peter Griffin, Ch. 13).

Therefore, when considering any potential threat to the casino's bankroll, it should be realised that a player's betting strategy is far more important than their playing strategy. By varying the bet according to the count, and playing to basic strategy, a player can do real damage to the casino - even taking into account a degree of playing errors (that is, "unintelligent" deviations from basic strategy). Most players' deviations from basic strategy are errors and are the reason that casinos make more than the stated house edge from their Blackjack tables. Primarily, the only deviations worth noting (from the threat perspective) are those that result in the player making a better hand than if basic strategy had been employed. An abnormally high value of such "winning deviations" is an indicator of cheating. A player who shows a high degree of accuracy to basic strategy is a good player, not a cheat - it takes a betting strategy analysis to reveal whether the player is a threat to the property's bankroll.