PLAYER PSYCHOLOGY AND DECISION-MAKING IN THE CARD GAME *COUP*

Serena Yang, Yifan Shi, & Xuhong Han

Abstract

Deception has been a cornerstone of card games throughout human history, but what underlying patterns drive player behavior in social deduction games? This study explores player psychology and decision-making in the card game *COUP* using self-collected telemetry data from eight gameplay sessions. We identify key patterns shaped by risk sensitivity, uncertainty aversion, and emotional responses such as revenge. Despite being permitted and seemingly central to victory, in our small sample study, we discovered that lying was far less common than expected. Most players avoided bluffing whenever possible, and when they did bluff, they failed more often than they succeeded. Instead of pure strategic calculation, we found gameplay driven by emotional grudges, revenge spirals, and what we came to call the "hatred meter": players targeting opponents who had wronged them, even when it defied optimal strategy. And we found meta-gaming patterns emerging across sessions, where players developed implicit tactical rules that never appeared in the official rulebook but spread through experiential learning. Our findings reveal how *COUP* serves as a compelling window into human decision-making, where risk aversion, cognitive load, perceived scarcity, and emotional dynamics could override rational strategic calculation in socially dynamic, competitive environments.

Keywords

card games, social deduction games, player psychology, player choice, telemetry analysis, data analysis, risk, uncertainty, bluffing, strategic deception, affect, revenge

1. INTRODUCTION

In the 2009 film *The Invention of Lying,*[1] the first person to discover deception gains an almost supernatural advantage in a world where everyone tells the truth. In competitive card games like poker, skilled bluffers are celebrated for their strategic intelligence rather than condemned for moral

[1] *The Invention of Lying*, directed by Ricky Gervais and Matthew Robinson (Warner Bros., 2009).

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failings. In these games, deception becomes a mark of mastery, not a character flaw. But is lying really a superpower? In other words, when average players lie in games, how effective are their strategies? The cognitive reality of lying is far more complex as maintaining a false narrative demands mental resources, monitoring reactions, and managing the anxiety of potential discovery.[2] This paper examines how well people lie or bluff when given permission to playfully deceive, and how the mere awareness of others' possible deception changes behavior in socially dynamic, competitive environments. These questions sit at the heart of social deduction games, where bluffing is widely believed to be essential to victory.

COUP, a fast-paced social deduction card game,[3] offers a great laboratory for examining this tension. It rewards deception while simultaneously punishing failed bluffs with immediate, visible consequences of losing a character card. When players lose both character cards that they started the game with, they are eliminated from the game. The last player standing wins. This means that players must weigh the cognitive demands of lying against its strategic benefits, all within a high-pressure social environment where opponents remember your betrayals.

This paper argues that *COUP* reveals something broader about human decision-making under uncertainty: we are far more risk-averse, emotionally driven, and cognitively constrained than game theory might predict. Through close analysis of telemetry data from eight *COUP* sessions, we identify patterns that challenge assumptions about rational play in competitive games. Players don't just make suboptimal choices; they make systematically emotional ones as they carry grudges across rounds, or avoid cognitively demanding bluffs even when beneficial, or treat coin accumulation as psychological security rather than spending them to gain advantages. We identify the existence of what we call the "hatred meter" where players target opponents who had wronged them in previous rounds.

In fact, meta-gaming, the strategic use of information from previous rounds and knowledge of opponents' tendencies, emerges naturally when playing multiple rounds among the same cohort.[4] Unlike computer bots that reset between matches, human players carry social memory, grudges, and pattern recognition across rounds. In *COUP*, this manifests as players learning that certain opponents bluff more frequently, that late-game card exchanges yield diminishing returns, or that aggressive players invite early retaliation. Gameplay thus becomes a dynamic social process where psychological responses evolve in real-time alongside strategic calculations, with each round informing and constraining the next.

All the above-mentioned behaviors reveal about how uncertainty, threat perception, and social dynamics override strategic optimization, offering insights relevant not just to game studies but to broader questions of behavioral economics, social psychology, and the nature of human cooperation and revenge in competitive contexts.

[2] Wolfgang Steinel, Erik W. Altmann, Maria Kangas, and David C. Markowitz, "A Metascientific Empirical Review of Cognitive Load and Deception," Collabra: Psychology 8, no. 1 (2022): 57508.
[3] Coup, designed by Rikki Tahta (Indie Boards & Cards, 2012).
[4] Dustin H. Tingley and Barbara F. Walter, "The Effect of Repeated Play on Reputation Building: An Experimental Approach," International Organization 65, no. 2 (2011): 343–65.

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Figure 1: COUP Card Game. Photo by authors. Used for analysis purposes only.

2. BACKGROUND

2.1 *COUP* - Mechanics and Significance

COUP was selected for this project because it provides a rich environment for studying player behaviors where observations, logical deduction, and deception work in collaboration to maximize personal advantage in gaming. Players have a multitude of variables to consider at any given moment, which results in plenty of diversity in playstyles and strategies worthy of examination. Card games like COUP offer particularly rich environments for studying cognitive processes under social pressure. Recent scholarship has demonstrated how commercially designed card games can serve as empirical tools for psychological research, revealing insights about featural processing, visual search, and task switching that extend beyond the games themselves.[5]

In *COUP*, every player begins with two face-down influence cards drawn from a deck containing five distinct character types (three copies of each, totaling fifteen cards). Each role grants unique abilities for players to use, although as a bluffing game, *COUP* allows players to claim any role's abilities without actually possessing them. However, deception carries risks. If a player is challenged and

[5] Benjamin James Dyson and Leo Baik, "The Scientification of Games: Analyzing Ghost Blitz through the Lens of Cognitive Psychology," *Analog Game Studies* 12, no. 1 (January 2024), https://analoggamestudies.org/2024/01/the-scientification-of-games-analyzing-the-card-game-ghost-blitz-through-the-lens-of-cognitive-psychology/.

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caught bluffing, they lose a card, which essentially represents a life in this game. Conversely, if a challenger incorrectly accuses an honest player of bluffing, the challenger loses a card instead. The game's objective is to be the last player standing, achieved by eliminating all opponents through various actions: assassination, coup, or challenge.

A typical game lasts between 15 and 20 minutes. In each round, players choose actions they believe will maximize their long-term advantage. Some actions—such as Income (take 1 coin from the treasury, the shared coin pool), Foreign Aid (take 2 coins), and Coup (eliminate a player's card guaranteed)—are available to all players, regardless of the character cards they hold. Other actions, however, depend on the unique abilities of specific character roles. The game's characters and their associated actions are summarized below, based on the official rulebook.

1. **Duke**: *Tax* – Take 3 coins from the treasury. This action cannot be blocked. May *Block* any player's attempt to collect Foreign Aid.
2. **Assassin**: *Assassinate* - Pay 3 coins to the treasury to eliminate one of another player's character cards. This action can be *Blocked* by the victim if they claim to have Contessa.
3. **Ambassador**: *Exchange* - Draw two cards from the court deck, choose which one to keep (from both the drawn cards and original hand), and return two cards to the deck. Players may bluff by pretending to have swapped cards. The Ambassador may also *Block Stealing* attempts by other players.
4. **Captain**: *Steal* - Take 2 coins from another player. This action can be *Blocked* by a player claiming to be Captain or Ambassador.
5. **Contessa**: *Block* assassination.

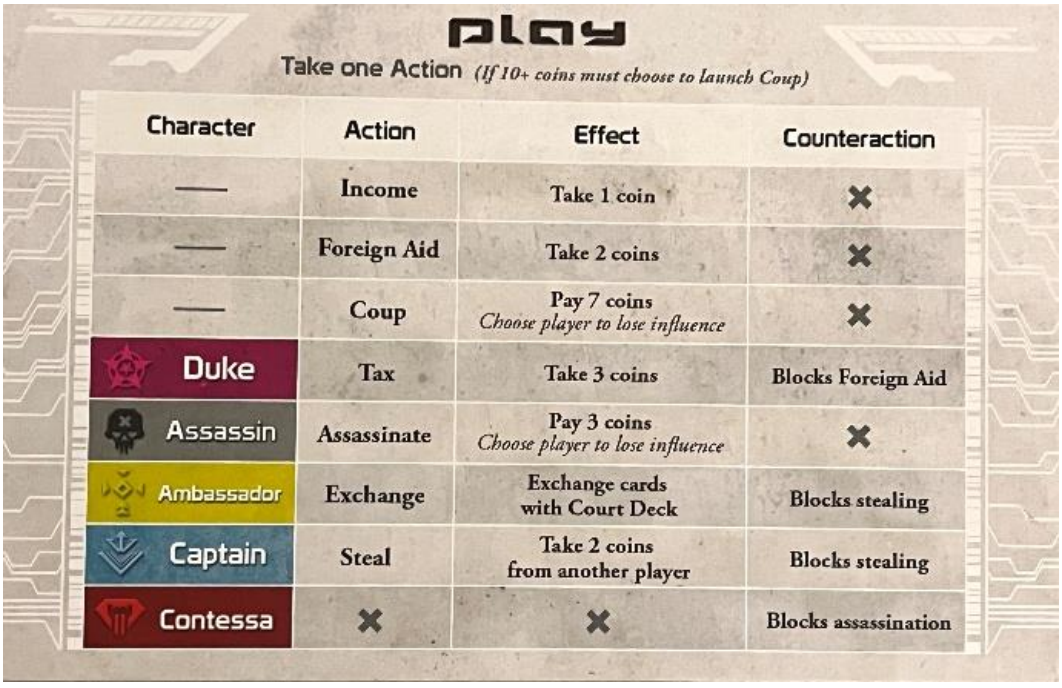

Figure 2: COUP Roles and Abilities. Photo by authors. Used for analysis purposes only.

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There exists a shared dynamic risk-taking relationship between skeptics and liars, where both face significant losses and wins with each bluff or challenge. Mastering *COUP* requires making critical decisions when the potential gain justifies the risk, which largely depends on gathering sufficient information to make educated guesses about opponents' cards and who are less likely to lie, depending on the circumstances.

Other factors, such as the number of remaining players, the size of opponents' coin repositories (used to assassinate or initiate a coup), and the possible counteractions they can take (e.g., certain cards block stealing or assassination), all heavily influence player decisions during gameplay. So, despite the limited types and numbers of actions a player can take during each round, *COUP* holds an elaborate interaction system where numerous elements continuously affect one another in shifting game statuses.

2.2 Information Collection in Gameplay

As in any social deduction game, effective information collection and analysis are crucial. Below, we outline six primary methods players can use to gather evidence to make game choices in *COUP*, each providing insights for making strategic decisions.

1. **Dead cards**: When a card is eliminated through assassination, coup, or challenge, it is revealed and placed up for everyone on the table to see.
2. **Temporarily revealed cards**: During a challenge, if a player successfully proves they possess the claimed card, they reveal it briefly before shuffling it back into the deck and drawing a new one.
3. **Inconsistent behaviors**: Players may contradict their previous acts by asserting different roles at different points in the game.
4. **Probability Assessment**: With three copies of each role in the deck, players can calculate the likelihood of opponents holding claimed cards by accounting for their own hand and visible cards. (Note: The court deck's presence as an exchange pool introduces additional uncertainty to these calculations.)
5. **Observing Player Behaviors**: Subtle behavioral cues can provide critical information. For example, a player who typically plays honestly or hesitates slightly when lying may inadvertently reveal their intentions.
6. **Coin amounts**: Keeping track of how many coins each player possesses at any given time is essential, as it determines their capacity to initiate high-impact actions like assassination or a coup.

During gameplay, a skilled *COUP* player continuously gathers information using these methods to inform optimal decision-making. Research on social deduction games has shown that players prioritize different types of information, including visible cards, behavioral cues, and probability calculations, when making strategic decisions, with successful players adapting their information-gathering strategies based on game context.[6] It is worth noting that without sufficient training, most

[6] Sarah Wiseman and Kevin Lewis, "What Data Do Players Rely on in Social Deduction Games?," *Proceedings of the Annual Symposium on Computer-Human Interaction in Play (CHI PLAY), 22–25 Oct. 2019*, Barcelona, Spain, ACM, 2019, https://dl.acm.org/doi/10.1145/3341215.3356272.

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players won't achieve algorithmic levels of optimization,[7] and mistakes will occur. Nevertheless, in competitive environments, players typically iteratively refine their strategies in pursuit of victory.

3. DATA SOURCES

To examine how these theoretical dynamics play out in practice, we conducted a series of controlled gameplay sessions with relatively novice players (to ensure everyone starts with a similar level of skills), tracking their decisions across multiple games to identify patterns in risk-taking, deception, and strategic adaptation.

Ten participants were recruited to play eight *COUP* sessions across two configurations: four-player and six-player games. All players have not played the game before, but they have at least a few sessions of prior card gaming experience. Our preliminary tests revealed that games with three or fewer players resulted in limited interpersonal interactions and insufficient information for meaningful deduction, as too many cards remained hidden in the common deck. Additionally, player dynamics in smaller groups tended to be less engaging or surprising—two players could easily team up to eliminate the third, leading to a predictable "dual" situation. Therefore, we established a four-player minimum for our experiments to ensure robust player interactions and sufficient information revelation, allowing participants to make reasonably confident inferences.

We were also interested in studying gameplay at the maximum player count allowed by the game, where dynamics become the most complex and information flow is the richest. With six players, substantially more information is revealed at each game stage, while the increased number of potential targets creates a more intricate decision space for action selection.

All participants are above the legal age of 18 and signed waivers consenting to video recording. The footage used for subsequent analysis is deleted once the research is over, and participants' identities remain anonymous.

To statistically capture player trends and behaviors, we developed a telemetry system that assigns a unique ID to each in-game action. Each game session was broken down into sequential rounds, with all actions (e.g., steal, tax, coup, etc.) recorded and cataloged. Additionally, players' hands and coin counts were updated in real time to reflect the evolving game state.

This dual approach—combining video recordings with structured telemetry data—allowed us to analyze player decisions holistically and systematically, providing both qualitative and quantitative insights into their behaviors and strategic choices.

Finally, each participant completed a gaming background survey. This is to understand how much previous gaming experience they have with card games, which could potentially influence their decision-making processes in *COUP*. We deliberately avoided playing the game with individuals who have previously played *COUP* to ensure that everyone starts the game fresh. In our case, all participants have some prior experience with card games, but none are enthusiasts or frequent players. On average, each person plays no more than six card game sessions per year. As a result, the playing field is relatively level at the start of the game.

[7] Filipe Fortes, "Coup Agents: Agents That Play a Deception Game." *Thesis*, Instituto Superior Técnico, University of Lisbon, 2015.

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4. METHODS & RESULTS

Our analysis organized the telemetry data into multiple categories corresponding to different in-game actions, enabling us to track game patterns and player tendencies. Given *COUP*'s dynamic gameplay where each decision influences subsequent ones, we structured our analysis along three key dimensions: 1) Overall game trends; 2) Core game actions analysis; and 3) Players' non-strategic behaviors and irrational inclinations.

4.1 Overall Game Trends

The graph below illustrates the frequency of each action taken per round, combining data from both 4-player and 6-player games. Note that rounds 11 to 13 include only data from 6-player games, as the 4-player sessions did not extend beyond 10 rounds in our collected data.

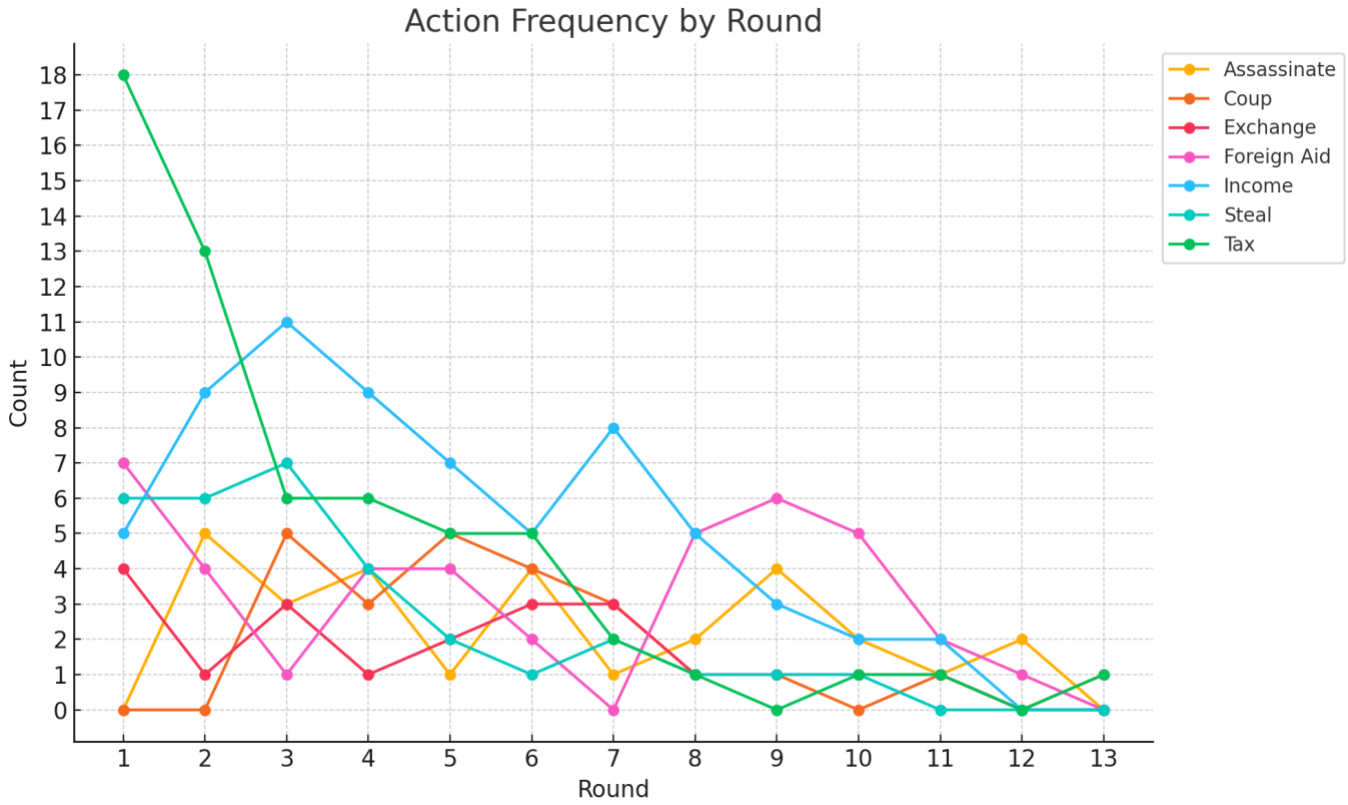

Figure 3: Overall Action Frequency by Round.

As players begin the game with 2 coins each, Round 1 exclusively features resource-gathering or card-exchanging actions with no direct attacks (Assassinate or Coup). Players must first accumulate additional coins before executing these offensive moves. From a psychological perspective, acquiring resources provides players with a sense of security and future agency, as coins are required for two of the three elimination actions in the game. Section 4.2 will explore the psychology of wealth accumulation and mental security in greater depth, particularly regarding Tax and Foreign Aid actions, where the latter is used in less rational ways.

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As the game progresses, Assassination can occur as early as round 2, once players accumulate the required 3 coins. Coup actions typically begin appearing by round 3, when players have amassed 7 coins, with round 3 showing the highest frequency of Coups in our data. This could be due to players' sense of urgency to eliminate other players as fast as possible. But also, because as player numbers drop over time as they lost their cards, the total number of coup actions drop. That said, there are noticeable spikes of coup action throughout the game, indicating players repeated attempts to eliminate other players' cards with guaranteed success (since coup cannot be blocked as assassination can be). This once again shows that in uncertain and competitive environments, players will take every opportunity to kick opponents out of the game as soon as possible to ensure personal gaming advantages.

Both Assassinate and Coup drastically change the dynamics of the game as players begin revealing more dead cards, hence showing more information to help assist future decision-making. Further, players being attacked tend to enter defensive and revenge mode, which will be further discussed in section 4.3.

Midway through the game, all actions become accessible to at least some players, resulting in the most diverse types of gameplay choices. However, as the game nears its conclusion and more players are eliminated, the frequency of all actions declines, eventually dropping to fewer than two per round until reaching zero.

There are a few notable patterns in this graph. Tax begins at its highest at the start and decreases dramatically as bluffing is exposed or players shift to more aggressive attacks after accumulating sufficient wealth. Then, Tax maintains a consistent frequency for several rounds before declining again. This decrease occurs for two primary reasons: the progressive elimination of players from the game and the fact that during late-game stages, generally, only genuine Dukes continue to Tax. In our data, only two Tax bluffs were made past round 8 of the game.

Foreign Aid sharply declines as Income increases—a direct result of players being blocked by Dukes, causing them to switch to the safer alternative with guaranteed but lower coin gain. This creates a visible negative correlation between Foreign Aid and Income. Interestingly, Foreign Aid significantly increases in later rounds (starting at round 8) as players gain confidence about how many Dukes remain in play, if any, making them more willing to take 2 coins without fear of being blocked.

Overall, a typical game of *COUP* follows a recognizable progression: players begin by accumulating coins over the first 2-3 rounds, followed by initiating Assassinate or Coup. This leads into a mid-game phase where players continue to build wealth while actively targeting others. As eliminations progress and the number of remaining cards drops below 50% of the original count, the game shifts into a high-stakes endgame focused on strategic elimination. This trajectory continues until only one player remains to claim the final victory. These gameplay trends are clearly supported in the action-specific patterns presented in the figures below for both 4-player and 6-player games.

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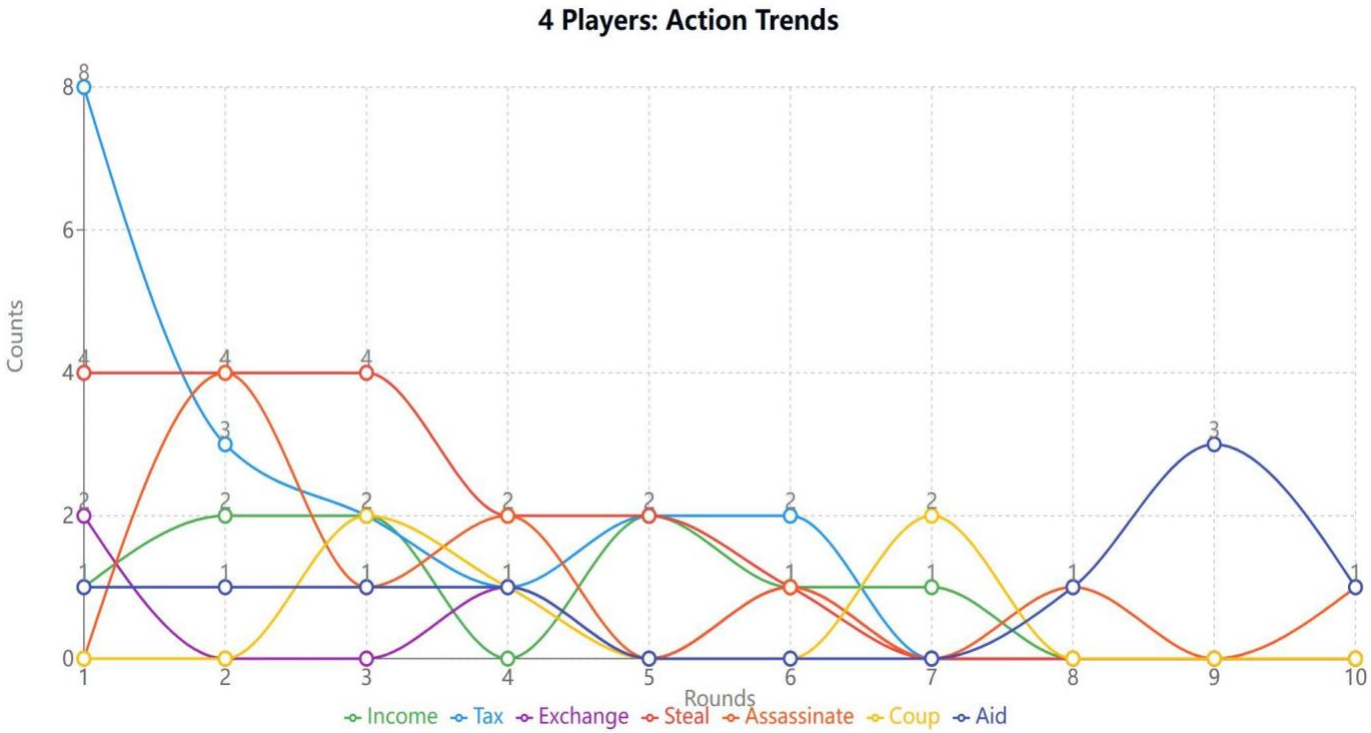

Figure 4: 4-Player Action Frequency by Round.

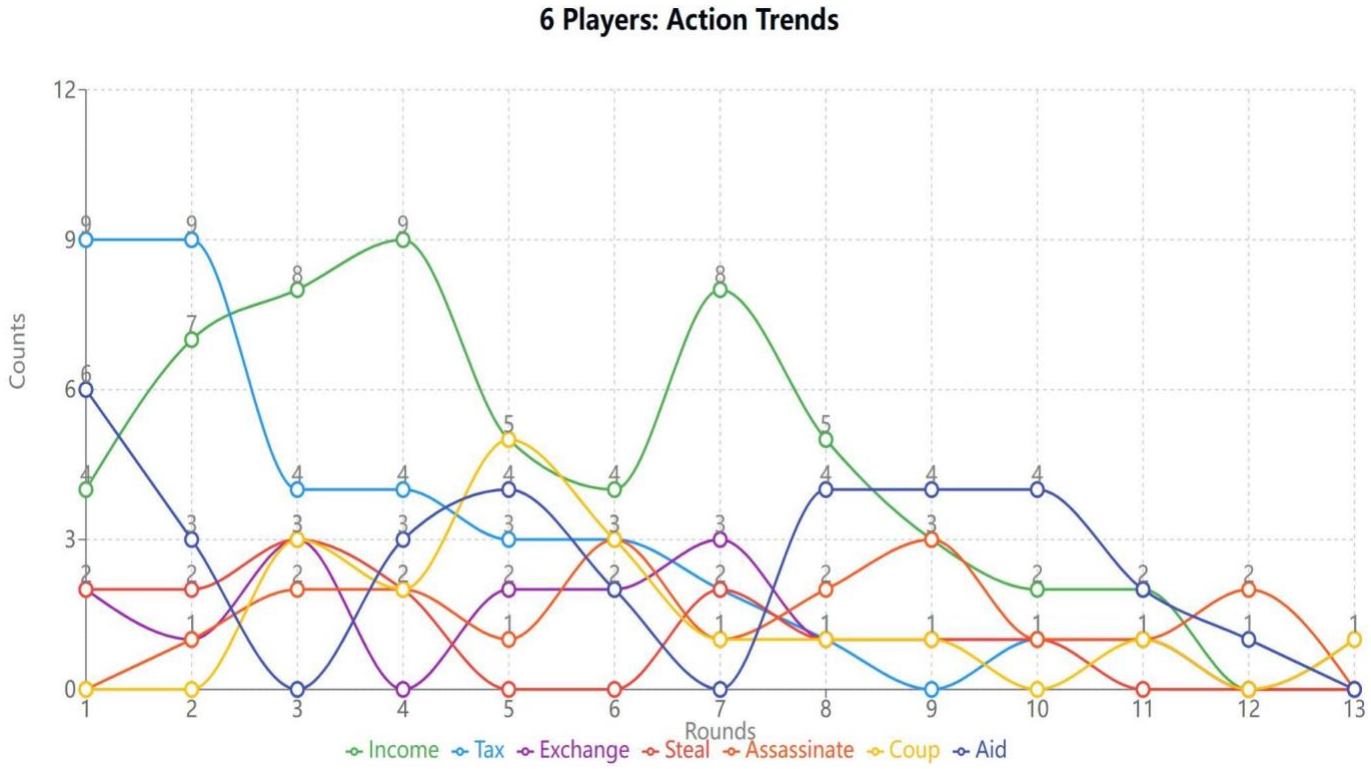

Figure 5: 6-Player Action Frequency by Round.

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The pattern of resource accumulation followed by strategic aggression arises from a combination of game design and player psychology. While *COUP*'s rules mandate initiating a Coup upon reaching 10 coins at the start of one's turn, preventing indefinite gaming, our data reveals a more nuanced reality. Of the 24 Coups executed across our observed games, only a single instance involved a player accumulating 11 coins and being compelled to act by this rule. In contrast, players typically launch Coups once reaching 7-8 coins, well before the mandatory threshold. This consistent early expenditure suggests players actively prefer deploying resources as soon as sufficient quantities are amassed, rather than maximizing their potential. Such behavior likely reflects psychological responses to *perceived scarcity* and *future uncertainty* within the game's competitive environment.

In social psychology, scarcity is defined as a state in which available resources are insufficient to meet demand.[8] Under conditions of heightened stress and potential loss, individuals often favor immediate gains over long-term planning—a tendency known as present-biased decision-making.[9] In *COUP*, this dynamic plays out vividly: at any moment, a player may be Assassinated, Couped, Challenged, or have their coins Stolen, especially if they lack the appropriate card to block a Steal. Holding a large number of coins over multiple rounds, therefore, becomes increasingly risky. To mitigate this vulnerability, players tend to launch a Coup as soon as they accumulate sufficient funds, thereby converting unstable wealth into strategic leverage.

4.2 Core Game Actions Analysis

We identified nine distinct actions in *COUP*: 1) Tax, 2) Foreign Aid, 3) Income, 4) Steal, 5) Assassinate, 6) Coup, 7) Exchange, 8) Challenge, and 9) Block.

Note that some roles in the game enable both offensive and defensive abilities. Specifically, Captain can both Steal and Block stealing, whereas Ambassador can Exchange and Block stealing. However, for the purpose of analytical clarity, we have separated Steal, Exchange, and Block into distinct action categories.

For the sake of clear vocabulary, we define three game stages as follows, characterized by specific game trends and player behaviors:

1. **Early game stage:** Rounds 1-3, initial coins build up (between 3 - 9 coins) until some players can execute their first Coups, fundamentally altering game dynamics and interpersonal strategies. Assassinations can occur as early as round 2, but unlike a Coup, which always succeeds, Assassination carries the risk of being blocked and is thus less deterministic in its impact. As a result, its influence on the overall game state is less consistent. To capture the more predictable and universally accessible gameplay dynamics, we define the early game phase as ending after round 3.
2. **Mid-game stage**: Rounds 4-8, characterized by diverse tactical choices, intense confrontations, systematic player elimination, and continued resource accumulation.
3. **Late game stage**: Round 9 (sometimes 8) and onward, where most participants have been eliminated, culminating in tense standoffs among the final 2-3 contenders.

[8] Jiaying Zhao and Brandon M. Tomm, "Psychological Responses to Scarcity," *Oxford Research Encyclopedia of Psychology* (Oxford University Press, February 26, 2018).
[9] Anthony J. Porcelli and Mauricio R. Delgado, "Stress and Decision Making: Effects on Valuation, Learning, and Risk-Taking," *Current Opinion in Behavioral Sciences* 14 (April 2017): 33–39.

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It is important to note that the following analysis is based on data collected during this specific study. As such, some event occurrences may be unique to our observations and could differ from those found in similar studies, given the inherent variability of each gameplay shaped by different player behaviors and randomized card distributions. The goal of this paper is to identify overarching trends and to explore potential explanations for the observed patterns.

4.2.1 Gaining Coins

Resource scarcity drives players toward early coin accumulation, revealing clear patterns in risk tolerance over time. There are four primary ways to gain coins in COUP: Tax, Foreign Aid, Income, and Steal. As previously discussed, Tax is frequently used in the first round due to its high profitability. However, another key reason for its early popularity is rooted in the game's information asymmetry at the start. During the opening round, players have minimal knowledge about which roles others hold. As a result, claiming Tax is a high-reward, low-risk bluff as players are unlikely to issue a challenge so early in the game based on the high penalty for an incorrect challenge (losing a card). This dynamic encourages opportunistic bluffing before clearer role patterns emerge through gameplay.

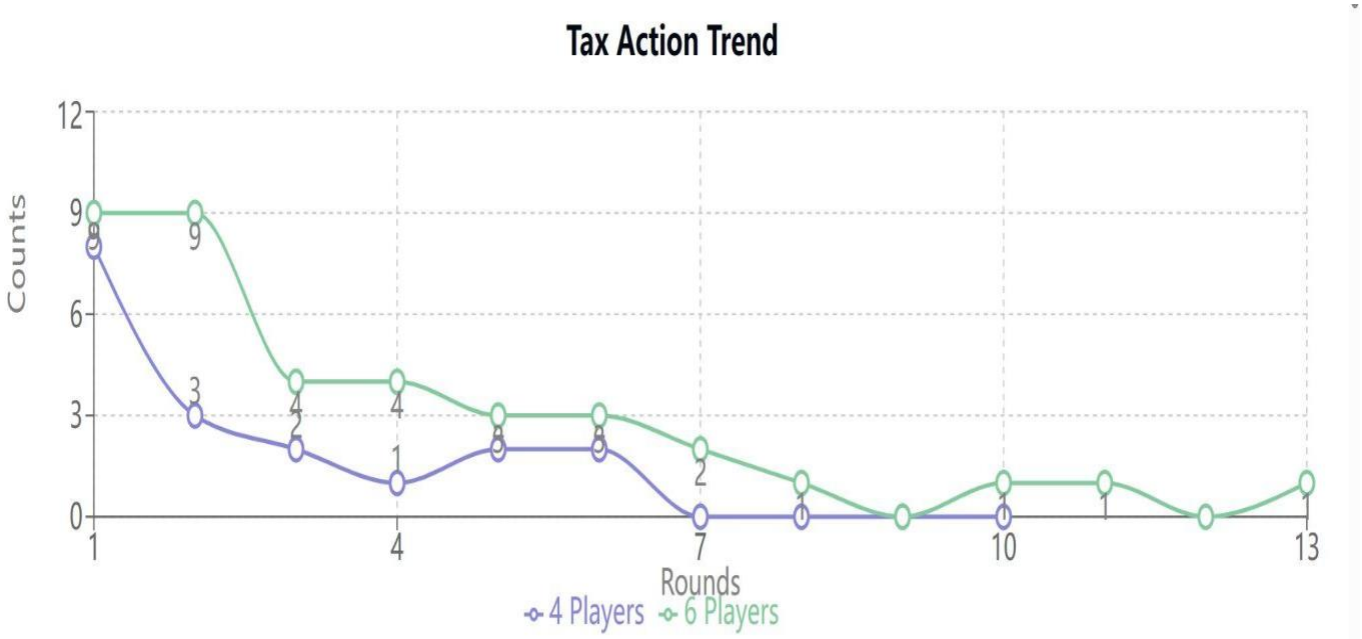

Figure 6: Action Trend: Tax.

Our data shows that during the *early game stage*, bluffing as Duke succeeds approximately 75% of the time, suggesting that most players are hesitant to challenge such claims when little information is available. This creates a window of opportunity where bluffing is both viable and advantageous. On the grand scheme, Tax action boasts a remarkably high success rate of 96.6% across all rounds, making it one of the most reliable and lucrative ways to gain coins, sometimes regardless of whether being backed by a genuine Duke or not, particularly so in the early game.

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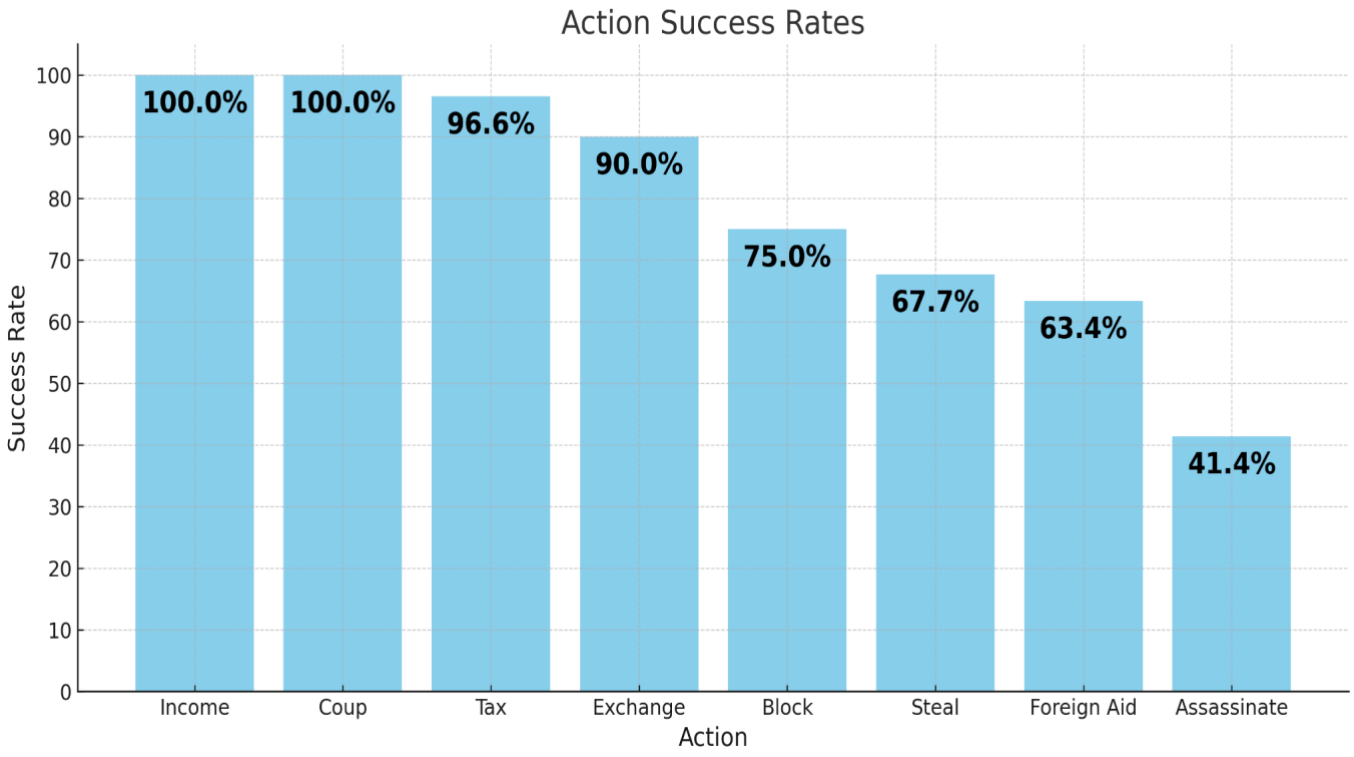

Figure 7: Action Success Rates.

However, the second most popular round 1 action, Foreign Aid, appears strategically questionable when examined through probability. Foreign Aid gains two coins but can be blocked by any player with a Duke. In a 4-player game, the odds that at least one opponent holds a Duke from the start is 92.3%; in 6-player games, 99.8%—making Foreign Aid almost certain to fail. Income, by contrast, guarantees one coin with no risk of blocking. Rationally, a guaranteed gain should outweigh a near-certain loss, yet players frequently chose Foreign Aid anyway. This suggests that players either overestimated their chances (optimism bias)[10], prioritized the potential 2-coin reward over realistic probability, or simply hadn't calculated the odds. This reveals how psychological factors can override mathematical optimization even in strategic games.

The statistical picture reveals the scope of this miscalculation. Overall, Foreign Aid succeeded only 63.4% of the time, which is barely better than a coin flip, but these average masks dramatic variation by game stage. In early rounds, the success rate plummeted to just 16.7%, while late-game Foreign Aid (past round 8) achieved 100% success once Dukes were confirmed absent. From a strategic standpoint, Foreign Aid's primary early-game value lies in information gathering, using it once or twice to "test the waters" and encourage opponents to reveal Duke ownership through blocks can justify the probable coin loss. However, the frequency with which players chose Foreign Aid in early rounds suggests many were not using it as an occasional probe but rather treating it as a regular income source despite the 83.3% failure rate. This pattern indicates a persistent misjudgment about the action's reliability. Players appeared drawn to the potential 2-coin gain, consistently choosing it over the guaranteed 1-coin Income even when the odds overwhelmingly

[10] Neil D. Weinstein, "Unrealistic Optimism About Future Life Events," Journal of Personality and Social Psychology 39, no. 5 (1980): 806–20.

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favored the safer option. Rather than strategic information-gathering, this behavior suggests optimism bias and inadequate risk assessment in that players seemed to believe "it might work this time" despite the "bad statistical odds."

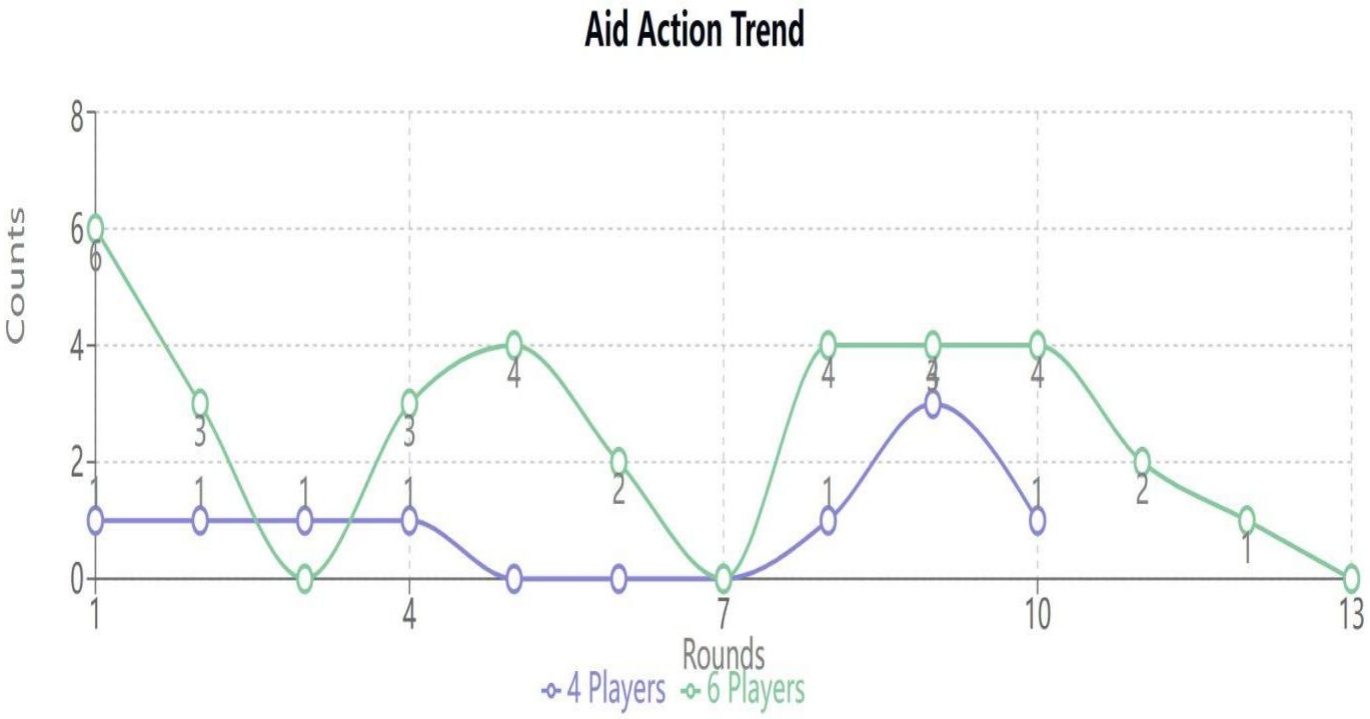

Figure 8: Action Trend: Foreign Aid.

Upon closer examination, there are many instances during gameplay of *COUP* where players make irrational decisions when it comes to gaining monetary advantages in stressful situations, in this case being threatened to be eliminated from the game the next immediate moment. According to the Conservation of Resources (COR) theory, a widely recognized psychological framework, individuals seek to preserve and accumulate resources to manage stress, navigate challenges, and enhance their overall well-being, particularly to provide a buffer for unexpected negative incidents. Such a phenomenon is common in job markets and other financially related situations.[11] Scarcity also makes people more willing to take risks in perceived danger and threats.[12]

We hypothesize that *COUP* players exhibit heightened sensitivity to in-game currency, driven by psychological rather than purely strategic factors. Research demonstrates that individuals imbue money with emotional significance, viewing it as "a way to achieve abstract intangible goals such as security, recognition, and status."[13] The act of amassing coins in *COUP* may unconsciously evoke these same associations: more coins mean more power, more control, and greater protection from elimination, mirroring real-world perceptions that wealth provides safety and agency. The underlying

[11] Evangelia Demerouti, "Job Demands-Resources and Conservation of Resources Theories: How Do They Help to Explain Employee Well-Being and Future Job Design?" *Journal of Business Research* 192 (2025): 115296.
[12] Shujing Liang, Ya Zheng, Yuehan Wang, and Yongyu Guo, "To Take a Risk or Not? The Effect of Perceived Scarcity on Risky Choices," *Behavioral Sciences* 13, no. 9 (September 6, 2023): 743.
[13] Massimiliano Luchini, Cristina Zogmaister, and Dino Ruta, "Understanding Individual Attitude to Money: A Systematic Scoping Review and Research Agenda," Collabra: Psychology 9, no. 1 (January 3, 2023): 77305.

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motivation appears to be achieving a state of psychological safety through resource abundance, rather than optimal strategic positioning. This cognitive bias helps explain why many players consistently choose the uncertain two-coin potential of Foreign Aid over guaranteed but slower income streams, despite the statistically questionable expected value of this approach.

Their seemingly irrational early-game Foreign Aid attempts further make us speculate that players experience acute resource scarcity anxiety. This prompts high-risk gambling behaviors in pursuit of accelerated coin accumulation, even against unfavorable odds.[14] The underlying motivation appears to be achieving a state of psychological safety through resource abundance, rather than optimal strategic positioning. This cognitive bias helps explain why many players consistently choose the uncertain two-coin potential of Foreign Aid over guaranteed but slower income streams, despite the statistically questionable expected value of this approach. Additionally, the action of Steal adds more mental insecurity to players' minds, further misleading some *COUP* players to "incorrectly" use Foreign Aid.

Expanding on the Steal action itself, it occurs relatively infrequently in actual gameplay. Our data features only 12 total Steal attempts across all games, with a 67.7% success rate, which exceeds random chances of fifty-fifty but not dramatically so. We speculate that the low frequency of Steal is due to its vulnerability: both the Captain and Ambassador roles can block it. As a result, players may be hesitant to attempt Steal unless they have strong reason to believe those cards are not in play, or unless they are willing to risk being blocked and potentially challenged.

Figure 9: Action Trend: Steal.

[14] Samantha Cappitelli and Michele Van Volkom, "The Effect of Stress on Individuals' Propensity toward Risky Decision-Making," *North American Journal of Psychology* 22, no. 2 (2020): 307–324.

https://doi.org/10.5070/V7.63992

Interestingly and perhaps unsurprisingly, players who successfully Steal from another player once are highly likely to target the same individual again in subsequent attempts. In our recorded games, stealers stole from the same player 100% of the time, should they choose to continue stealing. This targeting persistence demonstrates how players prioritize certainty in a game filled with uncertainty like *COUP*, creating predictable predator-prey dynamics that experienced players might exploit through deliberate displays of vulnerability followed by strategic countermeasures. The psychological comfort of returning to a "proven" target appears to outweigh the rational consideration that opponents might adapt their strategies after being successfully exploited. However, in our gameplay with rather inexperienced players, this did not happen.

4.2.2 Direct Attacks

As resource accumulation gives way to player elimination, attack patterns show how players balance aggression against the risk of retaliation. Assassinate maintains a consistent presence throughout gameplay, as previously noted in our trend analysis. Our data confirms this strategic advantage: in eight recorded games, Assassins survived to become one of the final two remaining cards in six instances (75%). This prevalence likely stems from multiple factors: Assassinate is more cost-effective when eliminating players compared to Coup. Assassins also generally expose themselves less frequently than Duke or other actively used roles, preserving their concealment while accumulating coins. In two documented endgame card exchanges, players deliberately retained Assassin over income-generating powerhouses like Duke or Captain, essentially sacrificing immediate coin accumulation for the Assassin's lethal efficiency against opponents lacking Contessa protection. This strategic prioritization demonstrates advanced players' recognition that endgame dynamics favor elimination potential over resource generation once sufficient coins have been secured.

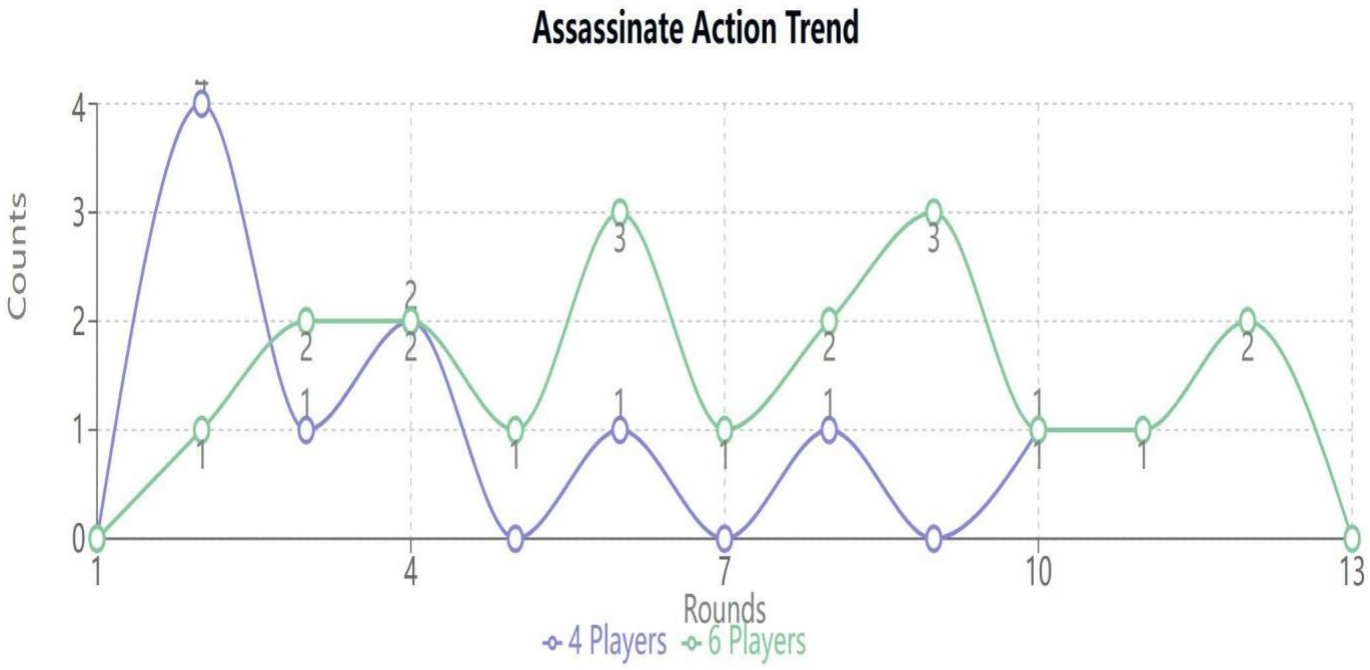

Figure 10: Action Trend: Assassinate.

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Coup actions follow predictable timing patterns, with the first elimination typically occurring between rounds 3-4 across all games. This consistent early-game elimination window likely reflects players' innate "uncertainty aversion"—a well-documented psychological tendency that manifests even in gaming contexts.[15] Players preemptively eliminate opponents to reduce future variables and establish greater control over remaining gameplay dynamics. This behavior demonstrates how fundamental cognitive models shape strategic decision-making, converting abstract psychological principles into observable gameplay patterns. The consistency of this elimination timing across different player groups reinforces how deeply uncertainty aversion influences human decision-making. For most people, mitigating uncertainty in unfavorable situations is the optimal action to take.

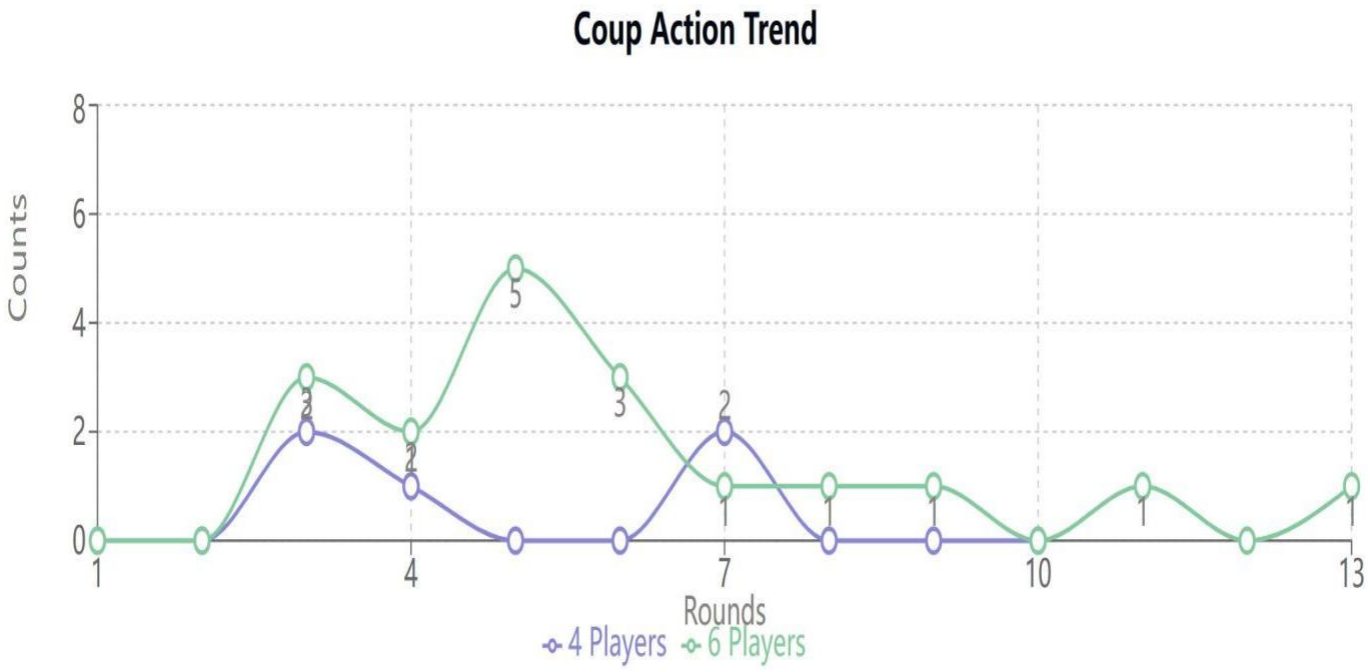

Figure 11: Action Trend: Coup.

4.2.3 Challenges and Bluffs

Deception lies at the heart of COUP's social dynamics, and our data reveals clear patterns in when players choose to bluff and when they choose to challenge. Challenges and bluffing are central to Coup's gameplay as a social deduction game. Players must closely monitor evolving game dynamics and make reasoned inferences about which roles are likely held by others. Across all sessions, we found that bluffing rates remained below 30% for all actions. Interestingly, as players gained more experience, they tended to bluff less frequently, favoring more honest play. Still, occasional bluffs involving a variety of roles still occurred, likely as calculated risks to disrupt expectations or test opponents' confidence.

Among all the roles, the Ambassador was the least likely to be bluffed with. One possible explanation lies in the nature of the Ambassador's abilities, Exchange and Block Stealing, which are

[15] Evan M. Calford, "Uncertainty Aversion in Game Theory: Experimental Evidence," *Journal of Economic Behavior & Organization* 176 (2020): 901–917.

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both indirect and non-aggressive. Psychologically, players may associate these low-risk abilities with low potential payoffs. In *COUP*, bluffing carries significant risk: if a bluff is challenged and fails, the player loses a card. Therefore, players tend to bluff only when the potential reward justifies the risk. Compared to roles like Assassin, Captain, or Duke, which offer direct and often high-impact actions such as attacking or rapidly accumulating coins, the Ambassador's functions may appear more passive or defensive. As a result, players may be less inclined to bluff as the Ambassador when more aggressive or rewarding roles are available.

Following the Ambassador, the second least likely to be bluffed was the Assassin. This may be caused by the high-stakes nature of the Assassination because when under attack, targeted players are more likely to issue a challenge. If players anticipate losing a card, players logically challenge the Assassin's claim rather than passively defending with Contessa, creating a chance to eliminate their attacker's card in return. The increased likelihood of being challenged likely deters players from falsely claiming Assassin, making it the riskiest role to bluff.

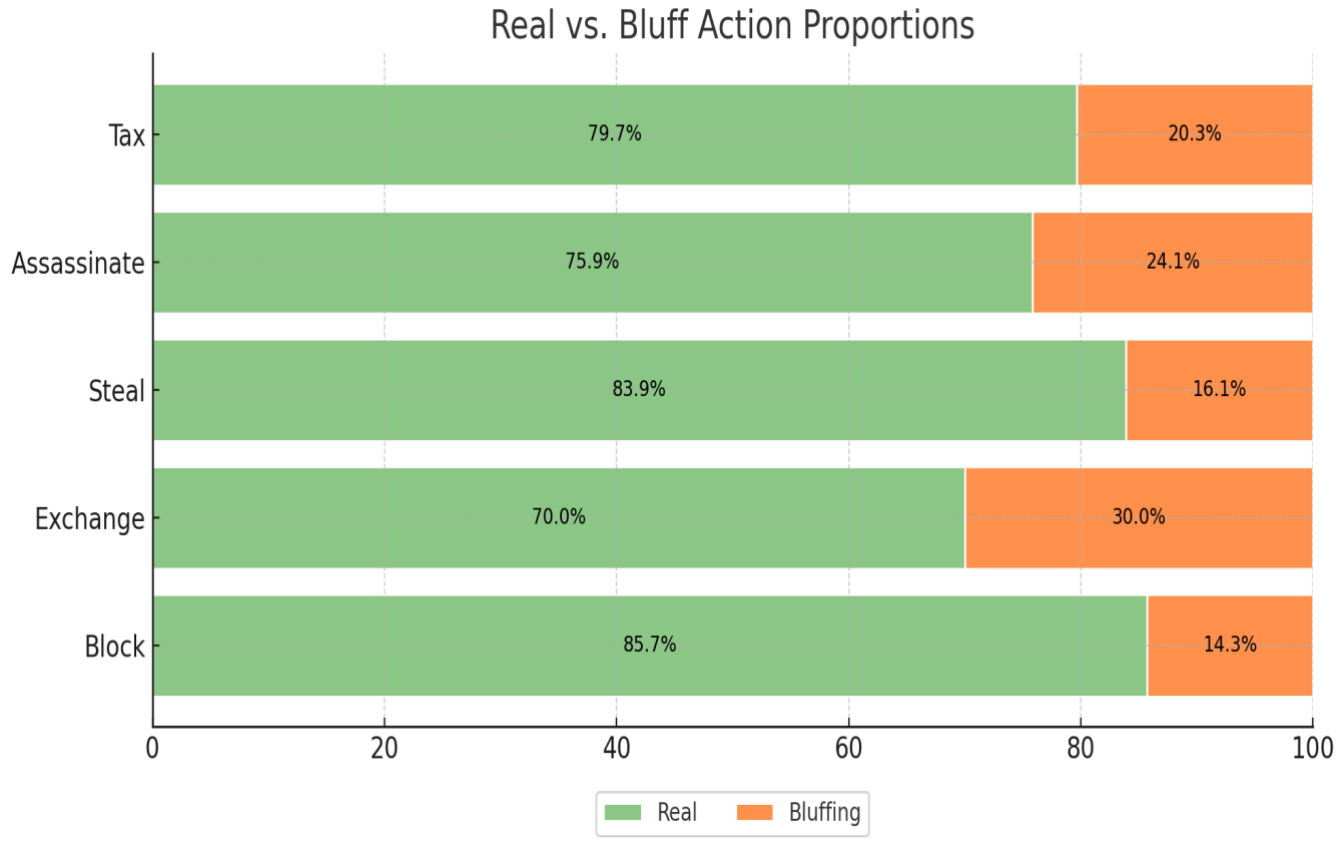

Figure 12: Real vs. Bluffs by Action.

Following the same logic—where the likelihood of being challenged correlates with the potential for direct harm—it is unsurprising that the most frequently bluffed role is the Ambassador, specifically for its Exchange ability. Since this action poses no immediate threat to other players, it is less likely to provoke a challenge, making it a safer and more appealing choice for bluffing.

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In general, bluffing success rates in our data were relatively modest, ranging from 25% to 50% across different actions, with most lying on the lower side. This suggests that, contrary to common assumptions about social deduction and deception-based games, players do not bluff as frequently, nor are they particularly effective when they do. The findings indicate that not only is deception less prevalent than expected, but the skill of bluffing itself may be less developed among average players.

Action	Total	Real	Bluff	Successful Bluff	Bluff Percentage
Tax	59	47	12	4	20.34
Assassinate	29	22	7	3	24.14
Steal	31	26	5	1	16.13
Exchange	20	14	6	3	30.0
Block	28	24	4	1	14.29

Figure 13: Breakdown of Bluffs.

This finding aligns with established research showing that for untrained individuals, daily deception imposes a cognitive burden and psychological stress.[16] Effective lying requires a complex mental process: suppressing truth, constructing plausible alternatives, maintaining narrative consistency, and continuously monitoring listener reactions.[17] In the context of *COUP*, these challenges intensify. Players often struggle with consistency when attempting to impersonate multiple roles. They sometimes claim three different characters despite only holding two cards. The constant threat of being challenged creates additional pressure, compounded by the need to track odds and monitor opponents' resources.

Given that *COUP* already demands considerable mental bandwidth, some players even strategically avoid unnecessary deception. This approach reduces cognitive load while still preserving viable paths to victory, explaining why bluffing occurs less frequently than one might expect in a game ostensibly built around deception.

Our analysis of all game winners revealed that 50% of them played relatively honestly in the sessions they won—bluffing no more than once throughout the entire game—yet still ended up as the last player standing. While it is important to acknowledge the limitations of our small sample size and the non-expert status of most participants, this trend reinforces the earlier observation that strategic honesty can be just as viable a path to victory as deception. Given the low success rates of bluffs across all actions, it is reasonable to conclude that while occasional and well-timed lies can provide a tactical edge, their overall advantage among average players may be less impactful than commonly assumed. In many cases, consistent and cautious play proves to be equally effective and cognitively less demanding.

[16] Wolfgang Steinel et al., "A Metascientific Empirical Review of Cognitive Load and Deception," *Collabra: Psychology* 8, no. 1 (2022): 57508.
[17] Maia Szalavitz, "Signs of Lying: Here's What Will and Will Not Help You Detect Lies," *Time*, April 11, 2014, https://time.com/77940/detect-lying/, accessed April 22, 2025.

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Additionally, we speculate that negativity bias may contribute to players' reluctance to bluff. For those who have played Coup only once or twice, it often becomes evident that deception is not strictly necessary to win. However, the cost of being caught bluffing, the immediate loss of a card, has a significant impact, bringing the player closer to elimination. According to well-established psychological research, negativity bias refers to the human tendency to give greater weight to negative experiences over equally intense positive ones.[18] Loss aversion is a cognitive bias in which losses feel psychologically more impactful than equivalent gains.[19] These biases are evolutionarily rooted, supported by neural mechanisms, observable from infancy, and evident across domains such as learning, memory, and decision-making.[20] [21] In the context of *COUP*, even a single failed bluff can leave a lasting impression. As players internalize the high cost of deception relative to its perceived benefits, their likelihood of bluffing may decrease over time, contributing to a more conservative, risk-averse style of play.

Another noteworthy observation from our study is that players who bluff early, particularly in their first gameplay, are significantly more likely to continue bluffing in subsequent sessions. Of the 34 total bluffs recorded across eight games, the two most frequent bluffers accounted for 20.6% and 11.8% of all bluff attempts, respectively. In contrast, the remaining players each contributed 5.9% or less, suggesting a steep behavioral drop-off beyond the most active deceivers.

This disparity may reflect underlying playstyles and personality traits. Some players appear to approach *COUP* with a strategic, outcome-driven mindset, while others may prioritize the psychological thrill of deception over consistent victory. Research mapping the Big Five personality dimensions to card game behaviors[22] provides theoretical support for this observation, suggesting that some players naturally gravitate toward strategic deception while others prioritize experiential enjoyment over competitive outcomes. In any case, a closer observation of repeated play often reveals consistent behavioral patterns. Players tend to exhibit recognizable tendencies based on personal preference, prior outcomes, and even their opening moves.

In one of our casual post-game conversations with two participants, one of whom bluffed consistently and the other only lied twice in four games, both players acknowledged that their decisions were intentional and aligned with their personal strategies. Despite their contrasting approaches, they expressed satisfaction with their respective outcomes.

4.2.4 Blocks and Exchange

Defensive actions reveal a distinct psychology: players avoid confrontation when the stakes feel ambiguous. Blocks in our gameplay demonstrated a surprisingly high success rate of 75%, with seven out of eight attempts going unchallenged. Only two blocks faced challenges from opponents. There appears to be a general reluctance among players to challenge blocks, likely due to the relatively low cost associated with the blocked actions, namely Foreign Aid, Assassinate, and Steal. Because these actions require minimal investment or none at all, in the case of Foreign Aid, players often opt not to risk losing a card by issuing a challenge. In such cases, absorbing the blocked

[18] Catherine J. Norris, "The Negativity Bias, Revisited: Evidence from Neuroscience Measures and an Individual Differences Approach," *Social Neuroscience* 16, no. 1 (2021): 68–82.
[19] Amos Tversky and Daniel Kahneman, "Loss Aversion in Riskless Choice: A Reference-Dependent Model," *The Quarterly Journal of Economics* 106, no. 4 (1991): 1039–1061.
[20] Roy F. Baumeister et al., "Bad Is Stronger than Good," *Review of General Psychology* 5, no. 4 (December 2001): 323–370.
[21] Tiffany A. Ito et al., "Negative Information Weighs More Heavily on the Brain: The Negativity Bias in Evaluative Categorizations," *Journal of Personality and Social Psychology* 75, no. 4 (1998): 887–900.
[22] Germano Vera Cruz et al., "Relationship between Gamer Profiles, Gaming Behavior, Personality Traits, and Sociodemographic Characteristics among French Law Students," *BMC Psychology* 11, no. 285 (2023).

https://doi.org/10.5070/V7.63992

outcome is perceived as a safer, more rational choice than gambling on a potentially costly challenge.

By similar logic, because Exchange proposes a low immediate threat, people tend to challenge Exchange less, allowing it to have a high 90% success rate.

Regarding Exchange, one interesting observation happened while playing with 6 players when too many participants exchanged cards frequently in the early to mid-game. It led to an unexpected problem that, since many players only exchange once to obtain their desired card while discarding the Ambassador, they used to initiate the action, later players often found themselves with a severely limited selection. In one extreme case, a player exchanged three times in a game towards the mid to late stage of the game but got no other card than Ambassador in every single attempt. This effectively "doomed" late-game exchangers as their exchanges offered them no effective cards in late-game stages.

In this context, the timing of Exchange becomes critical, particularly in larger player counts. It is advantageous to exchange earlier before the deck becomes saturated with undesirable returns. This observation reflects a level of meta-knowledge that typically only experienced players acquire over time.

4.3 Meta-Gaming and Emotional Tendencies

Strategic analysis alone cannot account for what we observed. Over time, players developed rough heuristics: exchange early in larger games, bluff Duke when the deck favors it, avoid relying on Foreign Aid as a main income source (some players learned the skill but not all), and challenge the Assassin when being assassinated rather than bluffing as Contessa. These patterns exemplify Meta-gaming, a broader layer of strategic thinking based on external factors or repetitive gameplay experiences.[23] We believe that as players engage in more sessions of *COUP*, they naturally develop personalized mental models and strategies that best complement their individual playstyles, resulting in continuously evolving competitive skills that reward both tactical innovation and psychological insight.

Beyond the strategic patterns discussed above, another often-overlooked dimension in bluffing games like *COUP* is the influence of emotional factors on player decision-making. While the game rewards logic, deduction, and probabilistic thinking, our observations reveal that emotion-driven behaviors more than often override optimal strategy. Game studies scholars have increasingly recognized that games function as "affective machines" that generate emotional experiences beyond their mechanical systems,[24] and COUP exemplifies this dynamic: players navigate not just probabilistic calculations but also feelings of vulnerability, vindictiveness, and security.

For instance, during one of our game sessions, a player made a surprising strategic choice when using the Coup action. Instead of eliminating a card from a player with two cards remaining (which would have been the optimal move to level the playing field—a strategy this player consistently

[23] Michael Hemmingsen, "What Is a Metagame?" *Sport, Ethics and Philosophy* 18 (2023): 452–467.
[24] Aubrey Anable, Playing with Feelings: Video Games and Affect (Minneapolis: University of Minnesota Press, 2018).

https://doi.org/10.5070/V7.63992

employed in past games), they instead targeted a player who was already vulnerable with just one card. Their motivation? The victim had stolen from them in two consecutive rounds.

Another instance of a possible emotionally-driven decision occurred at the very start of a new game, when a player issued two early challenges against the same opponent despite having no strong evidence to indicate that the individual was bluffing. This behavior appeared to be less about probability and more about personal history, as the challenger had lost to that same opponent in a tense two-player standoff during the final rounds of the previous game. The immediacy and repetition of these challenges hint at a targeted, retaliatory motive, highlighting how residual emotions from prior gameplay can carry over and influence future decisions, even when doing so may compromise optimal strategy.

Although one would like to believe that *COUP* is a game about strategic maneuvering, casual, average players appear to be heavily influenced by feud and vengeance, whether they realize it or not. There seems to exist a hidden metric in *COUP* that we call "the hatred meter" that players should take into consideration when attacking others. Research on competitive board games has documented similar revenge dynamics: in the game Catan, players who engaged in revenge-driven blocking reduced their winning chances by up to 43%, demonstrating that emotional retaliation consistently undermines optimal strategic play. [25]

Certainly, being a competitive game, players will inevitably sabotage one another eventually, but when and how these actions are performed should be part of the strategic calculation as well. Research has shown that emotions such as anger, fear, and envy can reliably influence decision-making, particularly under conditions of uncertainty and competition. This may help explain observations from our study, in which players occasionally disregarded strategically optimal moves in favor of actions that provided immediate emotional gratification, such as targeting opponents who had previously harmed them. Despite the fact that these choices may be less rewarding from a game-theoretic standpoint, they serve a psychological function, allowing players to restore a sense of balance or reassert control in a competitive social context.[26]

Coming from a subconscious psychological standpoint, players' tendencies to seek revenge could be traced back to our human nature of defending ourselves against dangers posed by other species and our own kind over the course of hundreds of thousands of years of evolution. In specific life situations, this vengeful response may have given our ancestors survival advantages. Some researchers propose that evolved cognitive mechanisms for revenge and forgiveness serve important adaptive functions: deterring future exploitation, restoring social equilibrium, and protecting against free-riders. These mechanisms are believed to have enhanced survival and reproductive fitness in ancestral environments by regulating cooperation and retaliation within groups.[27] Similar patterns emerge in our observed gameplay sessions, where emotional responses and innate social instincts continue to shape decision-making, often outside of players' conscious awareness. Even in modern card games like *COUP*, these deep-rooted tendencies influence strategic choices, revealing the enduring impact of our evolutionary psychology.

[25] Márton Attila Boda, "Avoiding Revenge Using Optimal Opponent Ranking Strategy in the Board Game Catan," International Journal of Gaming and Computer-Mediated Simulations 10, no. 2 (April 2018): 50.
[26] Jennifer S. Lerner et al., "Emotion and Decision Making," *Annual Review of Psychology* 66 (2015): 799–823.
[27] Michael E. McCullough, Robert Kurzban, and Benjamin A. Tabak, "Evolved Mechanisms for Revenge and Forgiveness," in *Cooperation and Its Evolution*, ed. Kim Sterelny, Richard Joyce, Brett Calcott, and Ben Fraser (Cambridge, MA: MIT Press, 2013), 201–220.

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Remarkably, sometimes the social and strategic sides of gameplay can overlap as players recognize these patterns in opponents' tendencies and manipulate them to their own advantage.

In one of our 6-player sessions, a particularly intriguing player behavior caught our attention. One participant deliberately chose the Income action in 76% of their turns across two consecutive games. While at first glance this might appear passive or non-strategic, their outcomes—finishing second last in the first game and first place in the second—tell a different story.

Closer analysis revealed that this player was not playing "lazy," but was instead employing a stealth strategy: deliberately minimizing their presence to avoid drawing aggression or becoming a perceived threat. By consistently choosing Income, which is considered the least provocative action by most players, they completely avoid drawing attention by choosing not to Tax, Coup, or Assassinate. Instead, they allowed more assertive players to eliminate each other, creating space for a late-game surge. When the dust settled, they suddenly revealed Duke and Assassin as their final two roles in the two games, respectively, demonstrating that their earlier passivity masked a powerful endgame setup.

The cases above highlight the surprising complexity of Coup: while the game is fundamentally grounded in bluffing and probabilistic reasoning, it is equally driven by social perception and emotional dynamics. Beneath its deductive surface lies a profoundly social experience—one shaped by human emotion, interpersonal history, and the subtle art of reading others.

5. CONCLUSION

Our comprehensive analysis of *COUP* gameplay reveals a complex interplay between strategic calculation and human psychology. Many patterns can be identified throughout gameplay, indicating that many games display similar trends of progression over time: coin accumulation, player elimination, more resource accumulation, and then final resolutions in standoffs.

Via close examination of telemetry data and behavioral observations, we found that players often display strong aversion to uncertainty, gravitate toward early coin accumulation, and exhibit risk-sensitive behaviors, particularly under conditions of perceived scarcity or imminent threat. While the bluffing mechanics of *COUP* are central to its design, our findings suggest that most players lie less frequently and with lower success rates than might be expected, reaffirming prior research that lying is cognitively demanding and not easily executed without practice.

Furthermore, player choices were influenced not only by in-game incentives but also by interpersonal dynamics and emotional memory, with patterns of revenge and "hatred meters" influencing future decisions in ways that override optimal strategy. Players also developed meta-gaming behaviors, gradually refining their approach based on implicit knowledge gained across sessions. These findings reinforce the idea that games like *COUP* are not just strategic systems, but rich social laboratories where cognitive limitations, emotional triggers, and social learning interact in complex ways. Ultimately, *COUP* serves as a powerful microcosm for studying human behavior, offering insights that may extend beyond the tabletop into broader domains of psychology, risk analysis, and behavioral decision-making.

6. FUTURE WORK

One of the primary limitations of this study is the relatively small sample size. While consistent behavioral patterns emerged across the sessions, a larger dataset would enhance the reliability and

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generalizability of the findings. Future research should aim to collect more extensive gameplay data to refine the trends observed in this initial exploration.

A longitudinal study tracking the same player group over extended periods would also provide valuable insights into strategy adaptation through meta-gaming experience. As players internalize implicit rules and game knowledge, their approaches likely evolve in sophistication. In addition, prior research suggests that deception is a skill that can be practiced and improved with experience.[28] Tracking how players refine their bluffing techniques and risk assessments over time may provide a deeper understanding of adaptive strategic behavior.

Last but not least, our participant pool consisted exclusively of individuals with prior card game experience. Recruiting from diverse backgrounds, such as professional poker players, who might employ probability-optimized strategies, or individuals with very limited gaming experience, who might rely more on interpersonal dynamics, would provide comparative perspectives on decision-making patterns.

7. ACKNOWLEDGEMENT

This project was originally conducted as a classroom-based educational activity. All participants provided informed consent to be recorded. No identifiable data was retained, and video footage was deleted after analysis. Based on the Common Rule (45 CFR 46) and consultation with our university's IRB office, this project does not meet the definition of human subject research and was therefore not subject to IRB review.

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■

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[28] B. Van Bockstaele et al., "Learning to Lie: Effects of Practice on the Cognitive Cost of Lying," *Frontiers in Psychology* 3 (November 30, 2012): 526.