

Oscar's Grind Betting at Roulette¹

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Abstract

Oscar's Grind is a positive-progression betting system often perceived as a low-risk alternative to strategies such as the Martingale, owing to its conservative rules: the wager increases by only one unit after a win and remains unchanged after a loss. This paper critically evaluates the mathematical viability and long-term performance of Oscar's Grind for even-money roulette bets, using analytical arguments and extensive Monte Carlo simulation. Results demonstrate that, despite frequent small wins and gradual progress, the system cannot overcome the house edge: long-term expected losses remain negative, and the probability of a loss after multiple sessions approaches certainty. Oscar's Grind thus provides psychological appeal but no mathematical advantage, illustrating that gradual, conservative bets reduce short-term fluctuations but do not alter the long-term expected loss and the gambler's fallacy.

Keywords: Oscar's Grind, Roulette, Betting systems, Monte Carlo simulation, Gambler's fallacy, House edge

1 Description of Oscar's Grind Strategy

Oscar's Grind is a "positive progression" betting system introduced by Allan Wilson (1965); for details, see Ethier (2010, p. 314). It is often marketed as a safer alternative to other strategies, such as Martingale, due to its perceived gradual and controlled nature. The strategy is simple: after each win, the bet is increased by one unit; after each loss, the bet remains the same. The system is based on the assumption that wins will eventually outnumber losses, allowing the player to recover from losses while still enjoying a modest gain.

To play Oscar's Grind on even money bets, the player will choose a bankroll K . The bet size for each play or spin is one unit, which is equal to the winning goal of 1.

The algorithm proceeds as follows:

- **Step 1:** Start with a bet of one unit.
- **Step 2:** If the play (or spin) results in a win, increase the bet by one unit.
- **Step 3:** If the play (or spin) results in a loss, maintain the same bet size.

A **round** or **session** consists of n plays (or spins). Each round or session begins with a bet of one unit and ends either with a total gain of 1 (the winning goal) or a total loss of K ; see Appendix Table 14 for an illustrative example of a losing session.

While this strategy may feel safe due to its slow progression and emphasis on cautious betting, its long-term effectiveness is fundamentally flawed. The main psychological appeal of Oscar's Grind lies in the illusion of control and the perceived safety in betting only small amounts. However, this false sense of security does not change the underlying mathematics, which reveal the same inevitable long-term losses as any other betting system.

The Oscar's Grind system can be mathematically described by a simple two-point distribution for the win G in a round:

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Table 1: Oscar’s Grind Session Statistics for $K = 250$ (Source: Shackleford, 2024)

	European Roulette	American Roulette
Probability winning goal reached	99.28%	98.81%
Average number of bets	6.789	7.646
Average units bet	29.545	37.824
Expected win per session	-0.799	-1.991
Ratio money lost to money bet	2.70%	5.26%

$$G = \begin{cases} -K & \text{with probability } p = 0.0119 \text{ (for American Roulette), } K = 250, \\ +1 & \text{with probability } 1 - p = 0.9881. \end{cases}$$

Where:

- K is the loss amount, chosen as 250 units for this analysis. The loss and win probabilities are dependent on the value of K , as shown by Shackleford (2024), who found that different values of K result in different probabilities for wins and losses.
- The loss probability $p = 0.0119$ for American Roulette (and $p = 0.0072$ for European Roulette) was determined through simulations by Shackleford (2024) with over 45 billion trials.
- The expected value $E(G)$ and variance $\text{Var}(G)$ for a single round are:

$$E(G) = -1.9869, \quad \text{Var}(G) = 740.79.$$

Note. Exact success probabilities can also be derived using a Markov-chain approach. Ethier (2010, pp. 286–289) models Oscar’s Grind as a system that moves between a fixed number of states, each describing how many units are still needed to reach the goal and what the next bet will be. By imposing a house limit of $M = 500$ and solving the resulting Markov-chain system, he obtains the exact success probability $Q(1, 1) \approx 0.99974$ for a win probability $p_{\text{win}} = 244/495$. Ethier adopts this value because it corresponds to the pass-line bet in craps (house edge $E(g) = -7/495 \approx -1.414\%$). This probability is also very close to European roulette with the *partage* or *en prison* rule, making his analytical results highly relevant for understanding betting systems in near-fair environments.

2 Time Series Visualization

Figure 1 illustrates simulated trajectories or runs that show the varying paths a player’s bankroll can take under the Oscar’s Grind strategy. Note that a single run typically consists of multiple individual sessions. While some runs appear to demonstrate steady progress, others experience significant setbacks due to the inevitable losses that punctuate the strategy. The minimum number of spins observed in a run was 69, while the maximum was 5917, with the average number of spins per run being 860.95. Notably, each run, as shown in Figure 1, ends with a total loss of the initial bankroll of 250 units. Simulations of 10,000 spins reveal characteristic patterns in the bankroll trajectory, such as prolonged periods of linear growth followed by sudden catastrophic drops. These fluctuations create the illusion of steady progress, where small gains accumulate over time, only to be erased by a significant loss. The key observations are as follows:

- **Linear Growth:** During winning streaks, the bankroll increases by one unit per round.
- **Sudden Losses:** Catastrophic drops occur when a series of losses wipes out several rounds of gains.
- **The "Grind" Illusion:** This feeling of gradual progress misleads players into believing they are mastering the system, even though the long-term expected value remains negative.

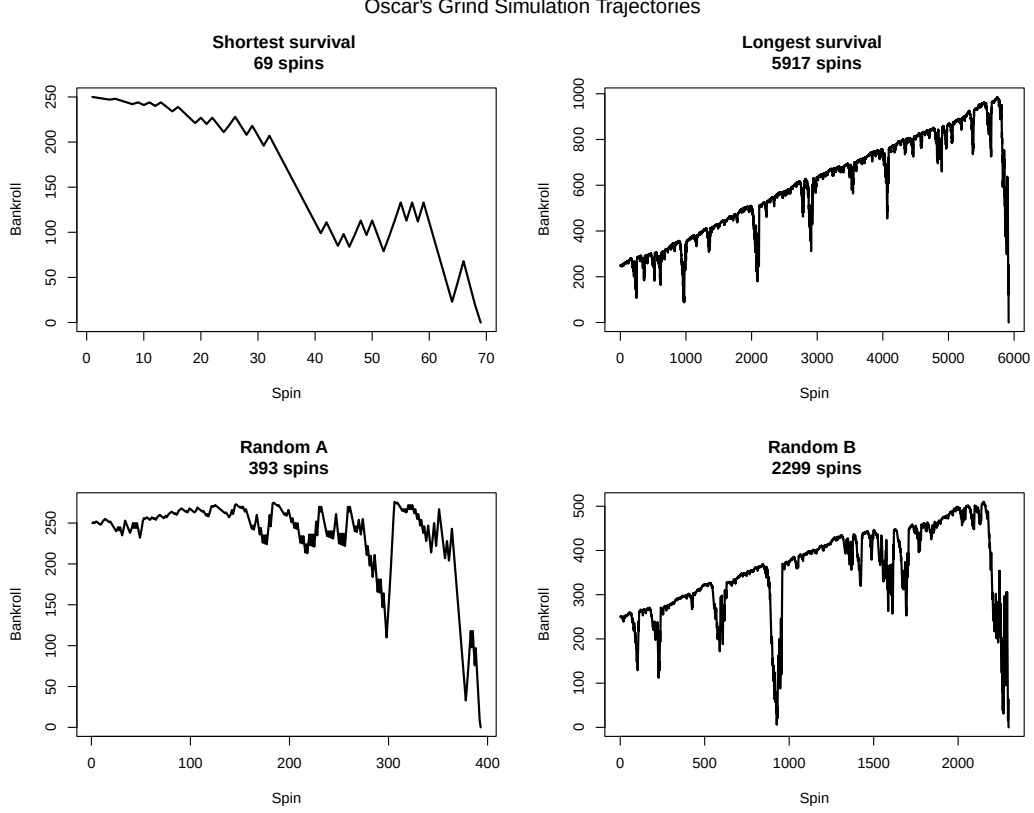


Figure 1: Simulated Oscar's Grind Trajectories or Runs

3 100 Rounds of Oscar's Grind

Using a two-point distribution with probabilities $p = 0.0119$ for losses and $1 - p = 0.9881$ for wins, we analytically computed the total gain for 100 rounds of Oscar's Grind (OG). Each round results in either a large loss (-250 units) or a small gain ($+1$ unit). The value of $K = 250$ was chosen to align with Martingale's maximum loss of 255 units, ensuring a comparable level of risk exposure between the strategies.

Analytical Method. The total gain over $M = 100$ rounds was computed analytically using the properties of a binomial distribution. Each round is represented as a two-point random variable G with possible outcomes $-K$ and $+1$, and probabilities p and $1 - p$, respectively. The sum of M independent rounds can be expressed as the sum of M independent two-point variables, which is a scaled binomial distribution.

The expected total gain and variance were calculated as

$$E(W) = M \cdot E(G), \quad \text{Var}(W) = M \cdot \text{Var}(G),$$

using the known mean and variance of the single-round gain. The probabilities of the individual outcomes of W were obtained from the binomial formula, allowing the construction of the distribution table for the nine most probable total gains, reported in Table 2. A graphical representation of this distribution is provided in Appendix Figure 4.

Analytical Results:

- **Mean Total Gain:** $E(W) = -198.69$ units

- **Standard Deviation of Total Gain:** $SD(W) = 272.17$ units
- **Probability of Loss:** approximately 69.9%, computed from 0.9881^{100}
- **Maximum Total Gain:** 100 units
- **Minimum Total Gain:** -1,908 units (based on the 9 most probable outcomes)

Table 2: Total Gain Distribution (Top 9 Outcomes)

No.	Total Gain	Probability
1	100	0.30206
2	-151	0.36378
3	-402	0.21686
4	-653	0.08532
5	-904	0.02492
6	-1,155	0.00576
7	-1,406	0.00110
8	-1,657	0.00018
9	-1,908	0.000025

These results demonstrate a fundamental feature of the Oscar’s Grind system: despite the high probability of small gains (98.81% per round), the cumulative risk over many rounds becomes substantial. As shown in Appendix Tables 15 and 16, the probability of achieving a positive total gain is close to 89% for $M = 10$, but it declines to roughly 55% for $M = 50$, and in the example with $M = 100$ it falls further to about 30%. The corresponding distributions are illustrated in Appendix Figures 5 and 6. This clearly demonstrates how the likelihood and magnitude of losses increase rapidly with the number of rounds.

4 Comparative Performance of Betting Systems

Two Legitimate Bases for Comparison

Before presenting the numerical comparisons, it is useful to distinguish two fundamentally different questions a player might ask. Table 3 summarises these perspectives. Both are valid; they simply address different practical objectives.

Table 3: Two Legitimate Bases for Comparing Betting Systems.

Basis	Question answered	Natural for . . .
Same number of spins	If I play for exactly N bets, which system gives me better chances?	A player who values a fixed amount of time at the table.
Same loss (expected)	If I am willing to lose L units on average, which system gives more play or lower risk?	A player who budgets a fixed expected cost and wants to maximise entertainment or minimise risk.

In the following two subsections we apply each framework once. Subsection 4.1 compares Oscar’s Grind with the capped Martingale using the **same expected number of spins**; Subsection 4.2 compares Oscar’s Grind with even-money flat betting using the **same expected loss**. The reader is invited to repeat either comparison using the opposite criterion – the required formulas are provided throughout.

4.1 Oscar's Grind vs. Capped Martingale

We compare Oscar's Grind (OG) with a loss limit of $K = 250$ per session to a capped Martingale (M) with $n = 8$ allowed consecutive plays (corresponding to a maximum loss of $2^8 - 1 = 255$) on American roulette. Both systems are modelled as independent two-point rounds—sessions for OG and rounds for M. Key parameters for each system are summarised in Table 4, based on Shackleford (2024) for OG and Pflaumer (2019) for M:

Table 4: Key Parameters for Oscar's Grind (OG) and a capped Martingale (M) on American roulette.

	Oscar's Grind	Martingale
Win probability per session/round	0.9881	0.9941
Loss amount	-250	-255
Expected gain $E(G)$	-1.9869	-0.5073
Variance $\text{Var}(G)$	740.79	383.61
Average spins per session/round μ	7.646	2.098

Matching the expected total number of spins

To compare the systems under approximately the same playing time, we fix the expected total spins. For $n_{\text{OG}} = 1000$ OG sessions the expected total spins are

$$S = n_{\text{OG}} \cdot \mu_{\text{OG}} = 1000 \cdot 7.646 = 7646.$$

The number of Martingale rounds required to obtain the same expected spin count is

$$n_{\text{M}} = \frac{S}{\mu_{\text{M}}} = \frac{7646}{2.098} \approx 3643.$$

Thus we compare **1000 OG sessions** with **3643 Martingale rounds**. For such large numbers, the law of large numbers guarantees that the actual total spins are tightly concentrated around these expectations, making the approximation excellent.

Expected loss, variance and risk

The total gain after n_{OG} OG sessions and after n_{M} Martingale rounds has the following characteristics:

$$\begin{aligned} E(W_{\text{OG}}) &= n_{\text{OG}} \cdot E(G_{\text{OG}}) = 1000 \cdot (-1.9869) = -1986.9, \\ \text{Var}(W_{\text{OG}}) &= n_{\text{OG}} \cdot \text{Var}(G_{\text{OG}}) = 1000 \cdot 740.79 = 740\,790, \quad \sigma_{\text{OG}} = 860.7; \\ E(W_{\text{M}}) &= n_{\text{M}} \cdot E(G_{\text{M}}) = 3643 \cdot (-0.5073) = -1848.2, \\ \text{Var}(W_{\text{M}}) &= n_{\text{M}} \cdot \text{Var}(G_{\text{M}}) = 3643 \cdot 383.61 = 1\,397\,480, \quad \sigma_{\text{M}} = 1182. \end{aligned}$$

Using the normal approximation (excellent for these sample sizes), the probability of finishing with a net loss is

$$\begin{aligned} P(W_{\text{OG}} < 0) &\approx \Phi\left(\frac{0 + 1986.9}{860.7}\right) = \Phi(2.309) = 0.9895, \\ P(W_{\text{M}} < 0) &\approx \Phi\left(\frac{0 + 1848.2}{1182}\right) = \Phi(1.564) = 0.9410. \end{aligned}$$

Oscar's Grind exhibits a substantially higher loss probability over the same playing time, despite its superficially "gentle" progression. The Martingale, while still very likely to lose, offers a 6% better chance of breaking even or profiting – at the cost of much larger variance and occasional catastrophic losses.

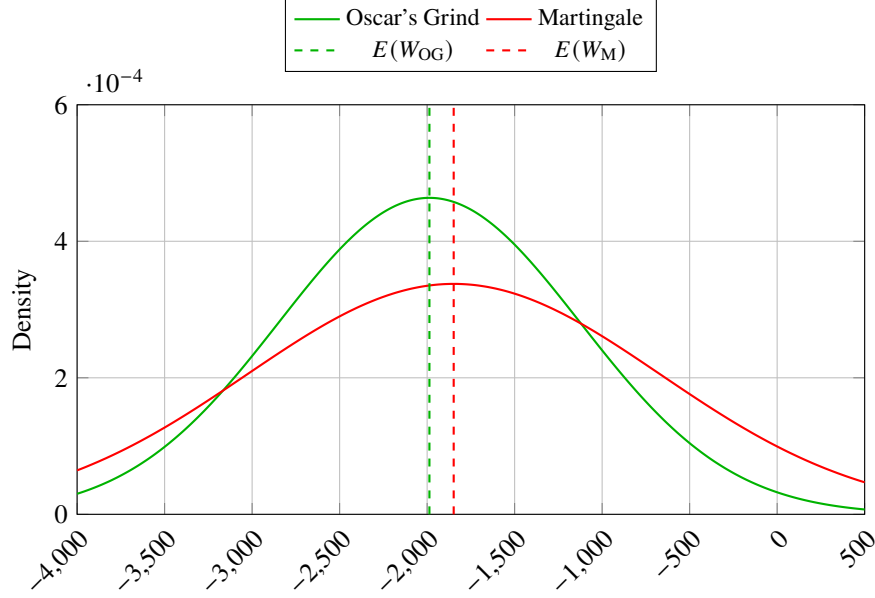


Figure 2: Normal approximations of total gain for 1000 Oscar's Grind sessions (green) and 3643 Martingale rounds (red). Dashed lines indicate the expected total gains.

Alternative viewpoint – same expected loss. Had we instead fixed the expected loss to, say, $L = 200$ units, the required number of sessions would be

$$n_{OG} = \frac{L}{|E(G_{OG})|} \approx 101, \quad n_M = \frac{L}{|E(G_M)|} \approx 394.$$

The expected total spins then become $101 \cdot 7.646 \approx 772$ for OG and $394 \cdot 2.098 \approx 827$ for M. Thus, for the same expected cost, Martingale delivers about 7% more playing time – a different but equally valid perspective. The reader can easily repeat the calculations for any other value of L .

4.2 Oscar's Grind vs. Even-Money Flat Betting

We now compare Oscar's Grind (OG) with a simple even-money flat betting strategy (EC) on American roulette. To ensure a fair comparison, we adjust the constant stake per spin so that **the expected total loss is the same** for both systems over the same number of spins. We again take $n_{OG} = 1000$ OG sessions, corresponding to an expected total of 7646 spins.

Even-money flat betting

For a constant stake b per spin, the per-spin gain has expectation $E(g) = -1/19$ and variance $\text{Var}(g) = 0.9972$ (American roulette). Over $N = 7646$ spins, the total gain W_{EC} satisfies

$$E(W_{EC}) = b \cdot N \cdot E(g), \quad \text{Var}(W_{EC}) = b^2 \cdot N \cdot \text{Var}(g).$$

We choose b so that $E(W_{EC})$ matches the OG expected loss of -1986.9 :

$$b = \frac{1986.9}{7646 \cdot (1/19)} \approx 4.937.$$

For simplicity, we use $b = 4.95$; the resulting expected loss is then

$$E(W_{EC}) = 4.95 \cdot 7646 \cdot \left(-\frac{1}{19}\right) \approx -1992,$$

which differs from the OG value by only 0.25% – negligible for comparative purposes.

Variance and standard deviation

$$\text{Var}(W_{\text{EC}}) = (4.95)^2 \cdot 0.9972 \cdot 7646 \approx 1.868 \cdot 10^5, \quad \sigma_{\text{EC}} = \sqrt{1.868 \cdot 10^5} \approx 432.2.$$

For Oscar's Grind, the total variance over 1000 sessions is

$$\text{Var}(W_{\text{OG}}) = n_{\text{OG}} \cdot \text{Var}(G_{\text{OG}}) = 1000 \cdot 740.79 = 740\,790, \quad \sigma_{\text{OG}} = \sqrt{740\,790} \approx 860.7.$$

Thus

$$\frac{\sigma_{\text{OG}}}{\sigma_{\text{EC}}} \approx 2.0,$$

showing that Oscar's Grind exhibits twice the volatility of flat betting for the same expected loss.

Probability of loss

For flat betting the probability of a net loss after 7646 spins is essentially 1; the normal approximation gives

$$P(W_{\text{EC}} < 0) \approx \Phi\left(\frac{0 + 1992}{432.2}\right) = \Phi(4.609) = 0.999998.$$

For Oscar's Grind the normal approximation yields $P(W_{\text{OG}} < 0) \approx 0.9895$. Because the OG session outcomes are binomial, the exact probability of profit can be computed directly: a profit occurs only if the number of losing sessions X satisfies $-250X + (1000 - X) > 0$, i.e. $X < 1000/251 \approx 3.98$. Hence

$$P(\text{profit}) = \sum_{k=0}^3 \binom{1000}{k} (0.0119)^k (0.9881)^{1000-k} \approx 0.0106,$$

so $P(W_{\text{OG}} < 0) = 1 - 0.0106 = 0.9894$, in perfect agreement with the normal approximation.

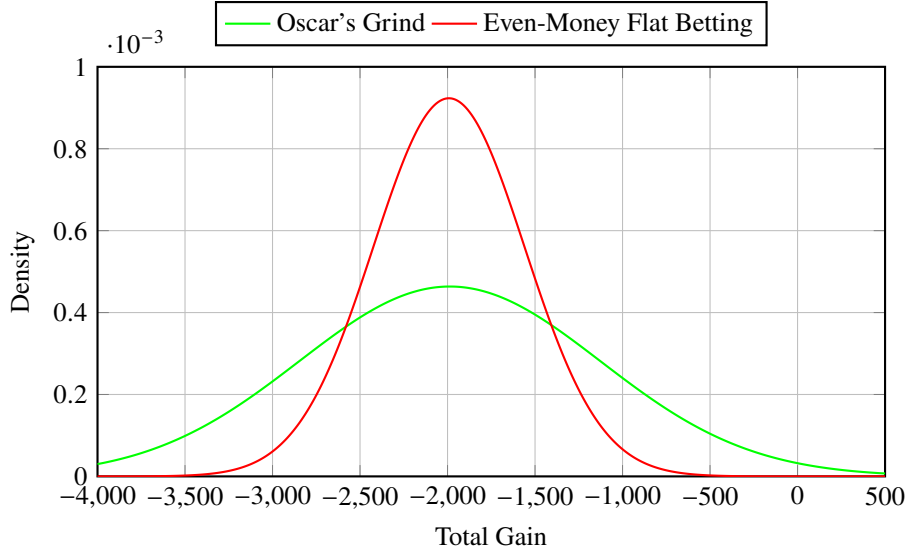


Figure 3: Comparison of Normal Approximations for the Total Gain Distributions of 1000 OG sessions (green) and Even-Money Flat Betting (red) with the Same Expected Loss.

Alternative viewpoint – same number of spins. One could instead fix the total spins to, say, $N = 7646$ and ask what constant stake would give flat betting the same variance as OG. Solving $b^2 N \text{Var}(g) = 740\,790$ gives $b \approx 9.85$ – nearly twice the stake used here. Conversely, one could determine the OG bankroll K that would yield the same variance as flat betting with a given stake. Such exercises highlight the fundamental trade-off: systems like Oscar’s Grind merely repackage the negative expectation into a more volatile, but superficially “safer”, ride.

4.3 A Third Perspective: Exact Fixed-Spins Simulation

The two comparisons presented above each rely on a first-order approximation: OG vs. Martingale matches the *expected* total spins, while OG vs. even-money holds the *expected* loss constant. Both are perfectly valid for large numbers of sessions, where randomness in total spins or actual loss is negligible relative to the expectation.

A third, more direct approach avoids these approximations altogether. One simply **fixes the exact number of spins** N (e.g., $N = 10\,000$) and simulates each system bet-by-bet from start to finish, resetting sessions as required. This yields the exact distribution of total gain after exactly N spins, with no need to convert sessions via average spins or to adjust stakes. The comparison is then purely empirical, and any difference in performance arises solely from the structure of the betting rules.

While analytically more challenging, such fixed-spins simulations are straightforward to implement and provide the cleanest answer to the question: *“If I play exactly N spins, which system leaves me better off?”* The interested reader is encouraged to run these simulations for various N and compare the resulting distributions – an instructive exercise that confirms the conclusions drawn from the approximate methods above.

4.4 Key Takeaways

The three perspectives presented above are not competing but complementary. The **same- expected-spins** comparison (**OG vs. Martingale**) answers the **time-conscious player’s** question; the **same-expected-loss** comparison (**OG vs. even-money**) addresses the **budget-conscious player**; and the **fixed-spins simulation** offers an **exact, assumption-free benchmark**.

All three lead to the same fundamental conclusion: **Oscar’s Grind does not overcome the house edge**. Its progressive structure merely redistributes risk – increasing variance and the probability of loss over long play, while offering only a slender chance of a modest profit. Whether measured by spins, expected loss, or exact simulation, the system’s apparent safety is an illusion created by the very volatility it conceals.

5 Simulation Analysis of 1 Million Oscar’s Grind Sessions

To assess the statistical properties of the Oscar’s Grind system, we conducted 1,000,000 simulated sessions for a session bankroll of $K = 250$. Each session was simulated according to the standard rules of American Roulette, tracking key metrics such as total wagered, maximum bet, final profit, spin count, and session outcome. These simulations provide not only expected values but also a detailed view of distributional characteristics, rare events, and variability across sessions. The results closely align with the extensive *Wizard of Odds* data based on 45 billion spins. Our simulated win probability is 98.8438 %, which is very close to the 98.81 % reported in Table 1.

During the simulation, occasional overshooting of the planned bankroll occurred. According to the Wizard of Odds (WOO) rules, if winning the next bet would cause the player to overshoot their winning goal, they should reduce the bet to the difference between their winning goal and the current session profit. In our simulation, we allowed overshooting because, in practice, many players do not strictly follow this WOO rule and may continue to bet beyond their available funds in the hope of reaching the session target of +1. Key statistics for the 1,000,000 sessions are:

- Approximately 1.08% of sessions exceeded the planned bankroll $K = 250$.
- The largest overshoot observed was –296 units, 46 units beyond the planned limit.

- The median overshoot among affected sessions was 12 units.
- The average overshoot among affected sessions was about 13 units.

These rare overshoots slightly reduce the expected gain per session, but the impact on $E(g)$ (gain per-unit wagered) is negligible, as it is normalized by the total amount wagered.

Table 5: Results of 1,000,000 Simulated Oscar's Grind Sessions ($K = 250$)

Variable	Mean	SD	IQR	Min	Q_1	Median	Max
Total wagered B	38.52	173.45	8	1	1	3	4659
Max bet $B_{\max}$	2.10	3.65	1	1	1	1	53
Final profit G	-2.04	28.15	0	-296	1	1	1
Spin count N	7.63	14.71	6	1	1	3	260
Outcome W	0.988	0.107	0	0	1	1	1

Interpretation:

Table 5 summarizes key metrics from 1,000,000 simulated Oscar's Grind sessions with a session bankroll of $K = 250$.

- **Total wagered B :** On average, 38.52 units were wagered per session, with a highly skewed distribution (max 4,659 units) due to occasional long winning streaks.
- **Maximum bet $B_{\max}$:** Most sessions required only small bets (median 1 unit), but some sessions escalated to a maximum of 53 units.
- **Final profit G :** The mean loss per session was -2.04 units, reflecting the house edge. Extreme losses occurred rarely (down to -296 units) due to uncapped final bets.
- **Spin count N :** Sessions were typically short (median 3 spins), though some extended up to 260 spins in rare cases.
- **Outcome W :** Most sessions ended in a win of 1 unit (mean 0.988), consistent with the high per-round win probability of 98.8% for American Roulette.

These statistics illustrate the asymmetric and highly skewed nature of Oscar's Grind: frequent small wins occur, but rare extreme losses drive the mean slightly negative. An illustrative example of a complete losing session, showing 59 spins and the evolution of bets, session profit, and bankroll, is provided in Table 14 in the Appendix. Players should be aware that, despite the appearance of frequent small wins, such extreme losses are possible and highlight the underlying risk of the system.

Table 6: Top 10 Frequencies of Round Lengths N (per 1 million sessions)

Value	Frequency	Percent	Cumulative Percent
1	474,065	47.41	47.41
3	118,321	11.83	59.24
4	61,830	6.18	65.42
6	46,202	4.62	70.04
5	29,336	2.93	72.98
8	27,759	2.78	75.75
7	23,699	2.37	78.12
9	20,056	2.01	80.13
10	17,136	1.71	81.84
11	16,495	1.65	83.49

The distribution of round lengths N in Table 6 (see also Figure 7 in the Appendix) shows that the most frequent round consists of a single spin, occurring in 47.41% of the 1 million simulated sessions. Round lengths of 3, 4, and 6 spins follow in frequency, while 2-spin rounds do not appear. This absence arises from the rules of Oscar's Grind: after a loss, the player increases the next bet by one unit, and after a win, the bet resets to 1 unit. Because of this progression, it is impossible for a round to terminate exactly after 2 spins, making 2-spin rounds structurally unattainable in the simulation.

Table 7: Top 10 Frequencies of Total Bets B (per 1 million sessions)

Value	Frequency	Percent	Cumulative Percent
1	474,065	47.41	47.41
3	118,321	11.83	59.24
5	91,166	9.12	68.36
7	38,020	3.80	72.16
9	37,041	3.70	75.86
11	24,984	2.50	78.36
13	20,312	2.03	80.39
17	15,144	1.51	81.91
19	12,026	1.20	83.11
15	11,562	1.16	84.26

Table 7 (see also Figure 8 in the Appendix) presents the top 10 frequencies of total bets B per 1 million simulated sessions. The most common total bet is 1 unit, appearing in 47.41% of sessions, followed by 3 units in 11.83% of sessions. Notably, these frequencies match exactly the most frequent round lengths N shown in Table 6, reflecting the one-to-one relationship between the number of spins and total bets in short rounds. Higher total bets occur less frequently, with 5 and 7 units appearing in 9.12% and 3.80% of sessions, respectively. The cumulative percentages indicate that the majority of sessions involve relatively few total bets, emphasizing the conservative nature of Oscar's Grind in most rounds.

Table 8: Top 10 Frequencies of Maximum Bets $B_{\max}$ (per 1 million sessions)

Value	Frequency	Percent	Cumulative Percent
1	694,883	69.49	69.49
2	159,686	15.97	85.46
3	50,133	5.01	90.47
4	26,321	2.63	93.10
5	16,000	1.60	94.70
6	9,457	0.95	95.65
7	6,870	0.69	96.34
8	4,762	0.48	96.81
9	3,630	0.36	97.17
10	2,697	0.27	97.44

Table 8 (see also Figure 9 in the Appendix) shows the top 10 frequencies of maximum bets $B_{\max}$ per 1 million simulated sessions. The most common maximum bet is 1 unit, occurring in 69.49% of sessions, reflecting the frequent early termination of rounds after small gains. Maximum bets of 2 and 3 units are considerably less frequent, appearing in 15.97% and 5.01% of sessions, respectively. The cumulative percentages indicate that the majority of sessions reach relatively low maximum bets, highlighting the conservative bet progression inherent in Oscar's Grind. Larger bets are rare, consistent with the system's design to increase stakes slowly and limit exposure.

6 Empirical Performance of Oscar’s Grind: Sensitivity to Rules and Bankroll

The following Tables 9, 10, and 11 present comprehensive simulation results for Oscar’s Grind under three distinct roulette conditions: American Roulette (house edge $-1/19 \approx -5.263\%$), European Roulette (edge $-1/37 \approx -2.703\%$), and European Roulette with the *partage* rule (effective edge $\approx -1.35\%$). Each simulation comprises $n = 10^6$ independent sessions, conducted for bankrolls K ranging from 100 to 500 units. Two implementation variants are compared: the standard *with overshoot* rule (where the final bet may exceed the remaining bankroll) and the conservative *without overshoot* rule (bets are capped to avoid exceeding the target profit or remaining bankroll).

Simulating the Partage Rule. The *partage* rule (losing only half the bet on zero) was simulated as an equivalent binary game with win probability $p_{win} = 73/148$. This preserves both the expected value $E(g) = -1/74$ and the variance of the original game, providing an exact representation while simplifying implementation.

Column abbreviations:

- **K:** initial bankroll.
- **Win (%):** proportion of sessions reaching the target gain.
- **E(G):** expected gain per session.
- **SD(G):** standard deviation of the gain per session.
- **OS %:** frequency of overshoots (only for *with overshoot* variant).

Key observations. Several consistent patterns emerge across all scenarios:

1. **Fundamental disadvantage persists:** Expected gains $E(G)$ remain negative for all parameter combinations, confirming that Oscar’s Grind cannot overcome the house edge, regardless of bankroll size or rule variations.
2. **Bankroll–performance trade-off:** Larger bankrolls K increase session win probability but also amplify expected loss magnitude, as more capital is exposed to the negative expectation per-unit wagered.
3. **Conservative betting improves metrics:** The *without overshoot* variant consistently yields higher win rates, smaller expected losses, and lower standard deviations than the *with overshoot* variant, demonstrating that early profit-taking reduces exposure to the house edge.
4. **House edge dominates system performance:** Reducing the house edge (American $\rightarrow$ European $\rightarrow$ European with *partage*) systematically improves all performance metrics, highlighting that game parameters matter more than progression details.
5. **Convergence to theoretical limits:** Even under the most favorable simulated conditions (European with *partage*, $K = 500$, no overshoot), the win rate reaches 99.72%, still below Ethier’s (2010) theoretical value of 99.974% for a nearly fair game ($p = 244/495$, $M = 500$). The gap reflects differences in termination rules and stricter bet-limit enforcement in Ethier’s Markov-chain model.
6. **Differences in expectations and variances:** Both the variance and the magnitude of the expected loss are systematically larger in the *with overshoot* variant, driven by the larger bet sizes that occur when the progression overshoots the target. Importantly, however, the *per-unit* expectation remains unchanged at $E(g) = -0.0526$, since the underlying fair-game structure is unaffected: larger wagers increase total exposure but do not alter the expected loss per-unit staked.

Practical implications. These results quantify the intuitive but often overlooked fact that Oscar’s Grind merely reshapes the outcome distribution—increasing the frequency of small wins while occasionally producing large losses—without altering the long-run expected value. Players attracted by the system’s gradual progression should recognize that larger bankrolls improve short-term survival probabilities but also increase expected losses, illustrating the unavoidable trade-off between risk exposure and negative expectation in negative-edge games.

Table 9: Oscar’s Grind Simulation Results (American Roulette, $n = 10^6$) — With and Without Overshoots

K	With Overshoot				Without Overshoot		
	Win (%)	$E(G)$	SD(G)	OS %	Win (%)	$E(G)$	SD(G)
100	96.54	-1.74	19.99	3.08	98.00	-1.14	15.03
150	97.29	-2.26	26.29	2.48	98.50	-1.40	19.44
200	97.74	-2.64	31.81	2.09	98.78	-1.59	23.28
250	98.01	-3.06	37.15	1.87	98.92	-1.86	27.31
300	98.19	-3.47	42.35	1.71	99.05	-2.00	30.61
350	98.32	-3.92	47.54	1.60	99.10	-2.29	34.62
400	98.45	-4.21	52.09	1.48	99.18	-2.43	37.75
450	98.56	-4.45	56.35	1.38	99.24	-2.56	40.76
500	98.64	-4.75	60.74	1.31	99.29	-2.68	43.67

Table 10: Oscar’s Grind Simulation Results (European Roulette, $n = 10^6$) — With and Without Overshoots

K	With Overshoot				Without Overshoot		
	Win (%)	$E(G)$	SD(G)	OS %	Win (%)	$E(G)$	SD(G)
100	97.46	-0.78	17.24	2.27	98.60	-0.50	12.62
150	98.14	-0.94	21.89	1.70	99.01	-0.58	15.85
200	98.49	-1.12	26.18	1.41	99.21	-0.68	18.78
250	98.72	-1.25	29.93	1.20	99.32	-0.78	21.60
300	98.88	-1.38	33.55	1.06	99.43	-0.80	23.79
350	98.97	-1.61	37.44	0.99	99.50	-0.83	25.83
400	99.07	-1.69	40.57	0.89	99.53	-0.96	28.58
450	99.15	-1.76	43.43	0.81	99.57	-1.00	30.61
500	99.21	-1.87	46.49	0.76	99.62	-0.99	32.15

The minor discrepancies between the dedicated $K = 250$ simulation (Chapter 5) and the aggregated results (Table 9) are attributable to methodological differences in implementation (e.g., code structure, random number handling etc.) and the inherent Monte Carlo variability of 10^6 trials. Both estimates fall well within sampling error bounds and align closely with the definitive results from Shackleford’s (2024) massive simulation of over 45 billion trials.

Figure 10 (Appendix) illustrates the win rates of Oscar’s Grind as a function of the bankroll K for the three game variants. The top panel shows results for the *without overshoot* rule, while the bottom panel corresponds to the *with overshoot* rule. It highlights how win rates increase with bankroll and how the different roulette rules affect the system’s performance.

Table 11: Oscar’s Grind Simulation Results (European Roulette, Partage Rule, $n = 10^6$) — With and Without Overshoots

K	With Overshoot				Without Overshoot		
	Win (%)	$E(G)$	$SD(G)$	OS %	Win (%)	$E(G)$	$SD(G)$
100	97.88	-0.35	15.81	1.89	98.84	-0.24	11.51
150	98.47	-0.44	19.91	1.40	99.21	-0.26	14.15
200	98.80	-0.50	23.40	1.12	99.39	-0.30	16.54
250	98.99	-0.56	26.56	0.94	99.49	-0.35	18.83
300	99.13	-0.61	29.51	0.82	99.57	-0.36	20.68
350	99.23	-0.69	32.44	0.74	99.63	-0.34	22.16
400	99.30	-0.78	35.30	0.67	99.66	-0.43	24.43
450	99.36	-0.83	37.80	0.61	99.70	-0.43	25.90
500	99.43	-0.78	39.55	0.55	99.72	-0.46	27.58

7 Expected Value and Variance of the Per-Unit Return

In a session of Oscar’s Grind, both the total gain G and the total amount wagered S are random, and they are negatively correlated. The per-unit return $R = G/S$ is therefore a ratio of dependent random variables.

If the total wager S were deterministic (constant), the moments of R would follow directly from those of G :

$$E(R) = \frac{E(G)}{S}, \quad \text{Var}(R) = \frac{\text{Var}(G)}{S^2}.$$

However, in reality S is random and co-varies with G . Winning sessions ($G = +1$) tend to end quickly (small S), while losing sessions ($G = -K$) are longer (large S). This negative covariance means that the actual $E(R)$ and $\text{Var}(R)$ differ substantially from the constant- S benchmarks obtained by replacing S with $E(S)$.

In particular, the negative covariance reduces the variance of R compared to the naive “plug-in” value $\text{Var}(G)/(E(S))^2$, because larger losses are paired with larger denominators, stabilising the ratio.

This section presents simulation-based estimates of $E(R)$ and $\text{Var}(R)$ for Oscar’s Grind, examines the correlation structure that produces them, and compares them with corresponding values for the capped Martingale.

7.1 Correlation Effects

The correlation between total gain G and total wager S in Oscar’s Grind is negative:

- Winning sessions ($G = +1$) typically end quickly, so S is small.
- Losing sessions ($G = -K$) tend to be longer, so S is larger.

This negative correlation has a direct consequence for the per-unit return $R = G/S$: because losing sessions (negative G) tend to have larger S , the negative covariance between G and S makes the actual variance $\text{Var}(R)$ smaller than the approximation $\text{Var}(G)/(E[S])^2$ that would hold if G and S were independent. In other words, the dependence stabilizes the per-unit return.

7.2 Simulation Analysis:

7.2.1 Overshooting

Using 1 million simulated OG sessions (American Roulette $K=250$, allowing overshooting, max bet = 50) are (see also Table 5):

- Contribution from profit variability: $\text{Var}(G)/\bar{S}^2 \approx 0.534$
- Mean per-unit profit: $E(g) \approx -0.0530$
- Correlation: $\text{Corr}(G, S) \approx -0.6739$

Underlying Simulation Statistics

$$\begin{aligned} E(G) &= -2.0424, & \text{Var}(G) &= 792.3825, \\ E(S) &= 38.5177, & \text{Var}(S) &= 30084.76, \\ \text{Cov}(G, S) &= -3290.344. \end{aligned}$$

7.2.2 No Overshooting

Using 1,000,000 simulated OG sessions (American Roulette, K=250, no overshooting, max bet = 50) are:

- Contribution from profit variability: $\text{Var}(G)/\bar{S}^2 \approx 0.537$
- Mean per-unit profit: $E(g) \approx -0.053178$
- Correlation: $\text{Corr}(G, S) \approx -0.6796$

Underlying Simulation Statistics

$$\begin{aligned} E(G) &= -2.0173, & \text{Var}(G) &= 748.232, \\ E(S) &= 37.9339, & \text{Var}(S) &= 28390.12, \\ \text{Cov}(G, S) &= -3132.389 \end{aligned}$$

Simulation Details Key statistics from 1,000,000 simulated OG sessions (no overshooting, max bet = 50):

Table 12: Summary Statistics of 1,000,000 OG Sessions: no overshooting, max bet 50. Overall win rate: 98.8%.

Variable	Mean	SD	Min	Max	P05	Median	P95
Spin Count	7.6517	14.7803	1	280	1	3	32
Total Wagered	37.934	168.494	1	5678	1	3	127
Final Profit	-2.0173	27.354	-250	1	1	1	1

Comment Restricting overshooting leads to a slight increase in the mean session gain $E(G)$ and a small decrease in the mean total wager $E(S)$. Both $\text{Var}(G)$ and $\text{Var}(S)$ decrease, compared to the variant allowing overshooting. The correlation between gains and wagers becomes slightly stronger, reflecting the more controlled betting strategy.

7.3 Interpretation of $E(G/S)$ and $\text{Var}(G/S)$

In variable-stake betting systems like Oscar's Grind, both the total gain G and total wager S are random variables. Thus, the per-unit return,

$$R = \frac{G}{S},$$

cannot be approximated by $E[G]/E[S]$; similarly,

$$\text{Var}(G/S) \neq \frac{\text{Var}(G)}{(E[S])^2},$$

because $\text{Cov}(G, S) \neq 0$ due to path-dependent stopping rules.

The No Overshooting simulation (1,000,000 sessions, American Roulette, $K = 250$, max bet = 50) yields:

$$E(G/S) \approx 0.547, \quad \text{Var}(G/S) \approx 0.194.$$

Most sessions end with a modest gain and limited total wager, while rare long sessions accumulate large wagers and losses, producing negative covariance between G and S and stabilizing the per-unit variance. Further methodological details are provided in Pflaumer (2026b).

Comparison with Martingale. Martingale betting exhibits a similar effect: most sessions terminate with a small win (limited S), while rare losing sequences generate very large wagers. Table 13 presents representative analytical results for different maximum levels n .

Table 13: Expected Return $E(G/S)$ and Variance $\text{Var}(G/S)$ for Martingale Betting (American Roulette). Values reflect session-level profitability, not long-run profitability.

n	$E(G/S)$	$\text{Var}(G/S)$
1	0.053	0.997
3	0.430	0.465
5	0.541	0.252
10	0.580	0.170
20	0.582	0.166

Role of Correlation. The negative correlation between total gain G and total wager S in Oscar’s Grind stabilizes per-unit returns: losing sessions tend to be longer (larger S) while winning sessions end quickly (smaller S), reducing variability of G/S and producing a bounded $\text{Var}(G/S)$ despite path dependence.

Interpretation. $E(G/S)$ captures session profitability: Oscar’s Grind and Martingale sessions typically end with a win, producing positive per-unit returns. The variance $\text{Var}(G/S)$ measures session-level risk and remains bounded even for large n .

Remarkably, despite linearly growing bets in Oscar’s Grind versus geometrically growing bets in Martingale, the session-level return per unit wager $E(G/S)$ and its variance are nearly identical.

8 Discussion and Analysis

Oscar’s Grind appears conservative and controlled, yet its enduring popularity is driven more by psychology than by mathematics. While the system produces frequent small wins, the long-term expectation remains negative, and no betting progression can overcome the house edge. This section analyzes the psychological mechanisms behind its appeal and highlights how online platforms amplify these effects.

8.1 Psychological Persistence Despite Mathematical Reality

The appeal of Oscar’s Grind system is grounded in several well-documented cognitive biases:

- **Illusion of Control:** The structured progression of bets gives players the impression that they can influence inherently random outcomes.
- **Near-Miss Effect:** A session win rate near 99% produces frequent reinforcement, while the rare catastrophic losses are mentally discounted as anomalies.
- **Sunk Cost Fallacy:** After investing time in a session, players persist, believing that losses can be gradually recovered.

- **Confirmation Bias:** Wins are remembered and shared, whereas losses are minimized or attributed to bad luck, perpetuating the system’s perceived effectiveness.

These psychological mechanisms explain why mathematical reasoning alone rarely deters play: the emotional satisfaction of incremental progress outweighs statistical reality.

8.2 Modern Online Casino Adaptations

Digital gambling platforms have adapted Oscar’s Grind to maximize engagement:

- **Automated Execution:** “Strategy bots” implement the system automatically, enabling extended sessions with minimal effort.
- **Progressive Jackpots:** Some platforms combine low-risk progressions with jackpot mechanics, reinforcing the illusion of attainable large wins.
- **Social Features:** Live-dealer roulette with chat functions provides community validation of “successful” sessions.
- **Micro-Betting:** Extremely low minimum wagers allow long sessions with seemingly minimal risk, though expected value remains unchanged.
- **Misleading Framing:** Many websites present Oscar’s Grind as a “money management strategy” rather than a betting system, emphasizing its conservative appearance while obscuring its mathematical futility.

Together, these adaptations explain how Oscar’s Grind continues to thrive in digital environments: technology and social reinforcement enhance its psychological appeal, even though the underlying expectation remains negative.

9 Conclusion

Oscar’s Grind makes losses feel smaller in the short term but cannot overcome the house edge. Its appeal is psychological rather than mathematical. Comparisons with Martingale show that both systems carry significant risks, although Martingale allows faster progression through more bets per session. As Victor Silberer (1897) already observed in his classical roulette book, betting progressions merely create an illusion of mathematical security, misleading the player into believing they can control chance. This insight also applies to Oscar’s Grind: “The struggle against the bank is at all times and under all circumstances a very unequal one.”

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Appendix

A: Figures

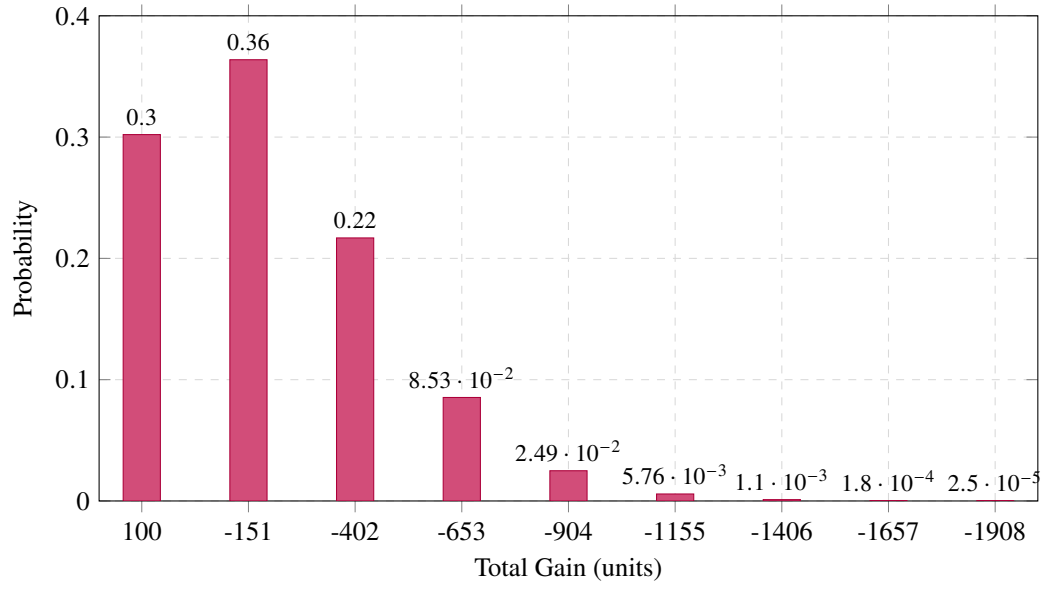


Figure 4: Total Gain Distribution for 100 Rounds of Oscar's Grind (Top 9 Outcomes). Probabilities computed analytically using the two-point model with $p = 0.0119$ and $K = 250$.

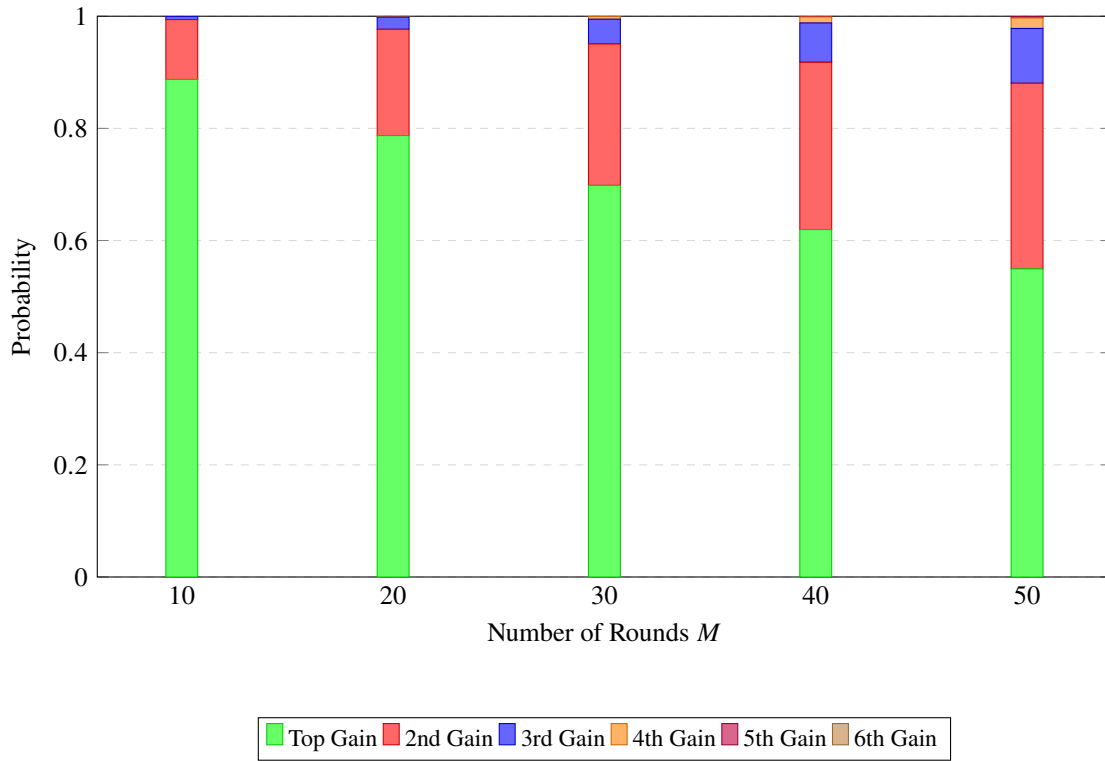


Figure 5: Probability Distributions of Total Gains W for Oscar's Grind with $M = 10$ – 50 rounds. Top gain ($W = M$) is positive (green); remaining outcomes are losses (red). The range of losses corresponds to the maximum losses shown in the table of most likely outcomes, from about -743 units ($M = 10$) to -1,205 units ($M = 50$).

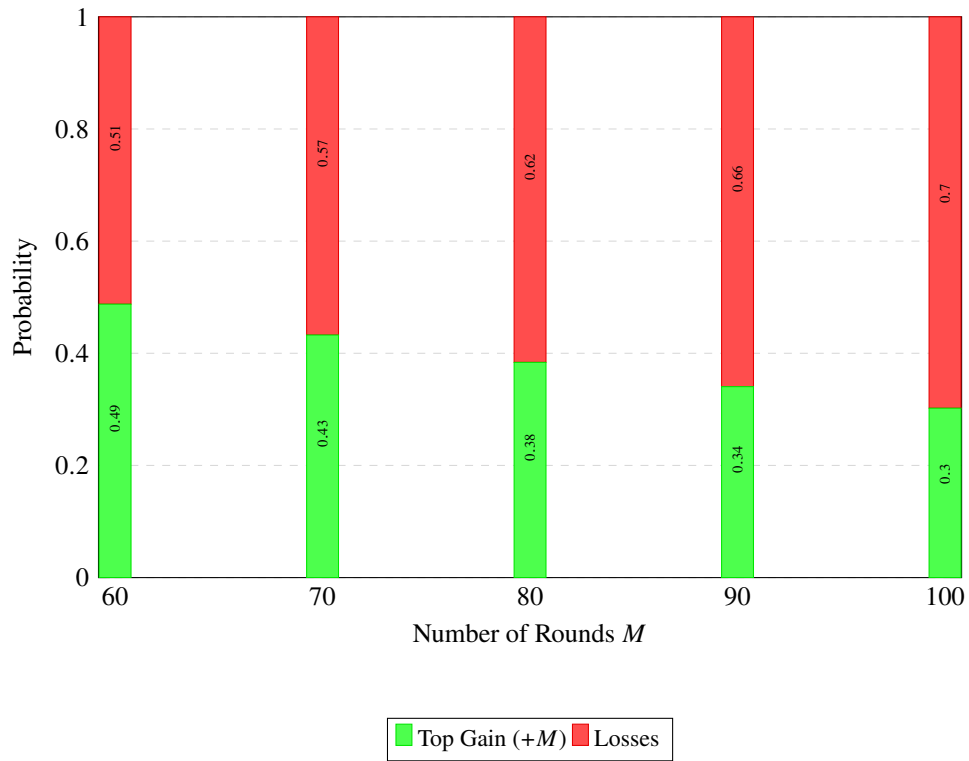


Figure 6: Probability Distributions of Total Gains W for Oscar's Grind with $M = 60$ – 100 rounds. Top gain ($W = M$) is positive (green); remaining outcomes are losses (red). The range of losses corresponds to the maximum losses shown in the table of most likely outcomes, from about -1,191 units ($M = 60$) to -1,657 units ($M = 100$).

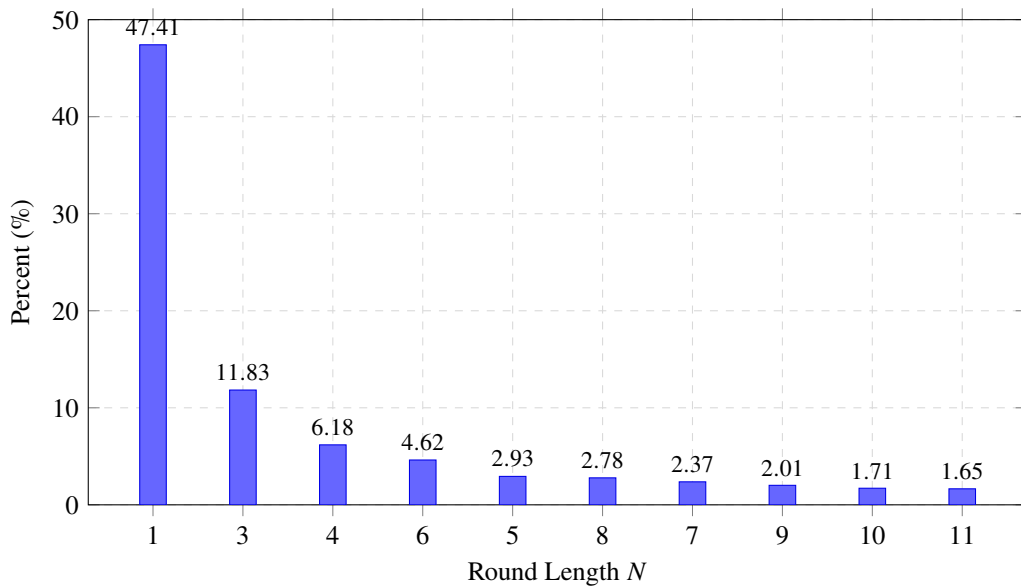


Figure 7: Top 10 Frequencies of Round Lengths N (Percent per 1 Million Sessions). The ten most frequent values together account for 83.49% of all sessions.

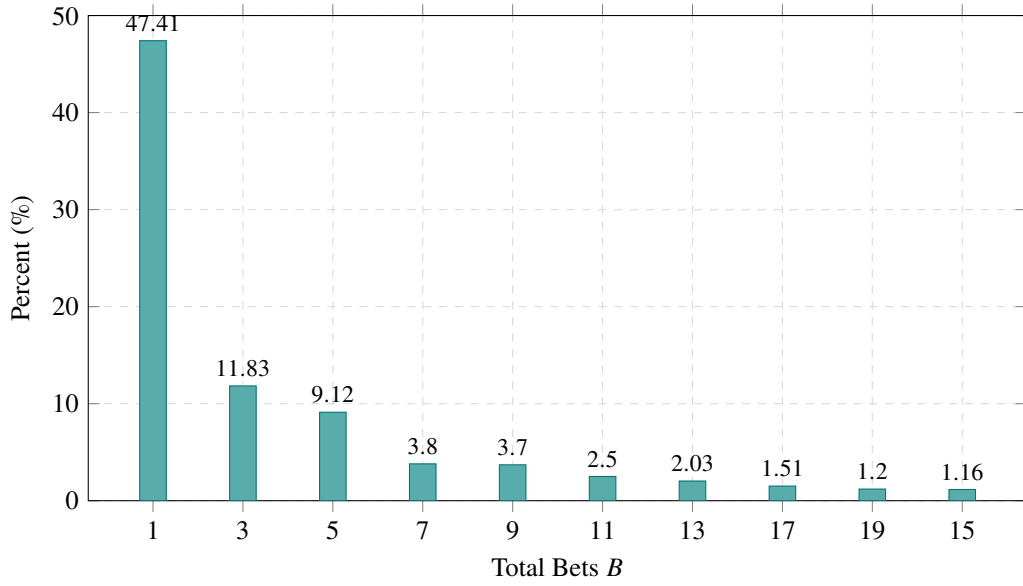


Figure 8: Top 10 Frequencies of Total Bets B (Percent per 1 Million Sessions). The ten most frequent values together account for 84.26% of all sessions.

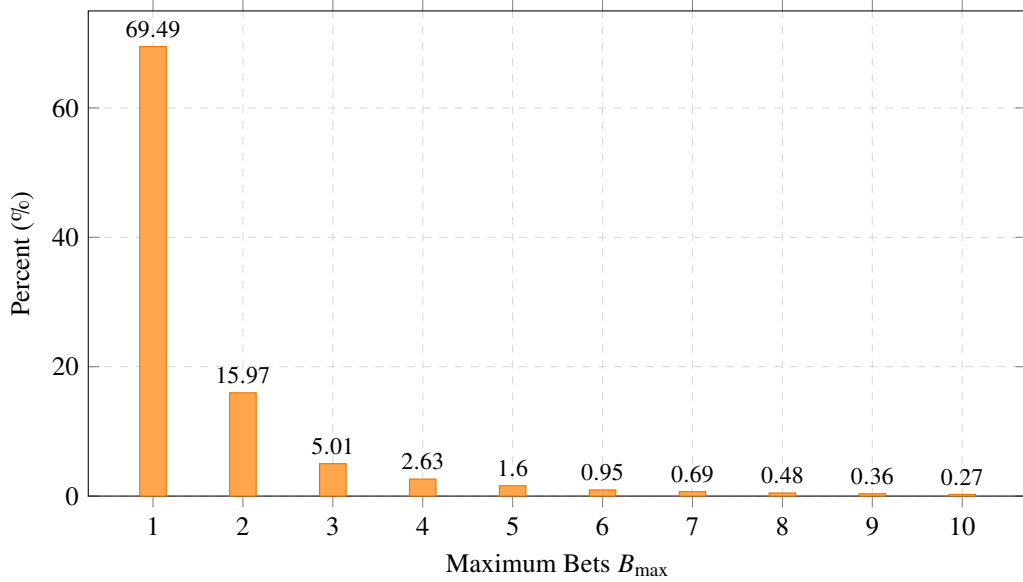


Figure 9: Top 10 Frequencies of Maximum Bets $B_{\max}$ (Percent per 1 Million Sessions). The ten most frequent values together account for 97.44% of all sessions.

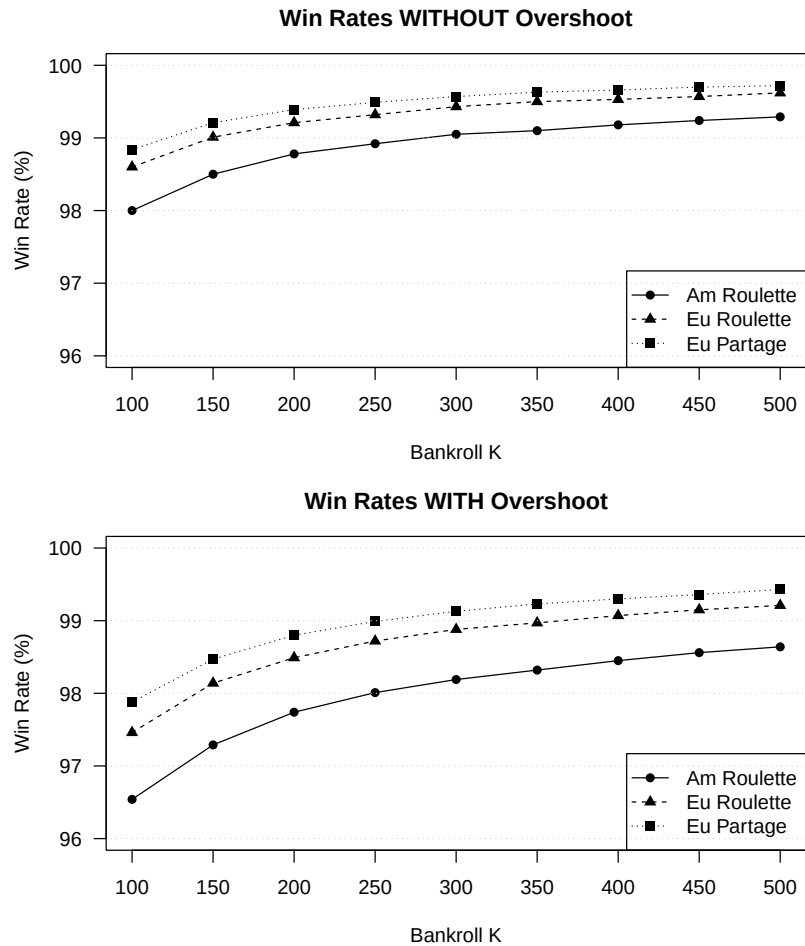


Figure 10: Win Rates of Oscar's Grind as a Function of Bankroll K . Top panel: *without overshoot*; bottom panel: *with overshoot*. Three game variants are shown: American Roulette, European Roulette, and European Roulette with *partage* rule.

B: Tables

Table 14: Example of a Complete Losing Session in Oscar's Grind (59 Spins, $K = 250$)

Spin	Bet	Outcome	Profit	Bankroll
1	1	LOSS	-1	249
2	1	WIN	0	250
3	1	LOSS	-1	249
4	1	LOSS	-2	248
5	1	WIN	-1	249
6	2	LOSS	-3	247
7	2	LOSS	-5	245
8	2	LOSS	-7	243
9	2	LOSS	-9	241
10	2	LOSS	-11	239
11	2	WIN	-9	241
12	3	LOSS	-12	238
13	3	WIN	-9	241
14	4	LOSS	-13	237
15	4	LOSS	-17	233
16	4	LOSS	-21	229
17	4	WIN	-17	233
18	5	LOSS	-22	228
19	5	WIN	-17	233
20	6	LOSS	-23	227
21	6	LOSS	-29	221
22	6	LOSS	-35	215
23	6	LOSS	-41	209
24	6	WIN	-35	215
25	7	WIN	-28	222
26	8	WIN	-20	230
27	9	WIN	-11	239
28	10	LOSS	-21	229
29	10	LOSS	-31	219
30	10	WIN	-21	229
31	11	LOSS	-32	218
32	11	LOSS	-43	207
33	11	WIN	-32	218
34	12	LOSS	-44	206
35	12	LOSS	-56	194
36	12	LOSS	-68	182
37	12	WIN	-56	194
38	13	WIN	-43	207
39	14	LOSS	-57	193
40	14	WIN	-43	207
41	15	WIN	-28	222
42	16	LOSS	-44	206
43	16	LOSS	-60	190
44	16	LOSS	-76	174

Continued on next page

Spin	Bet	Outcome	Sess. Profit	Bankroll
45	16	LOSS	-92	158
46	16	LOSS	-108	142
47	16	LOSS	-124	126
48	16	LOSS	-140	110
49	16	WIN	-124	126
50	17	LOSS	-141	109
51	17	LOSS	-158	92
52	17	LOSS	-175	75
53	17	LOSS	-192	58
54	17	LOSS	-209	41
55	17	WIN	-192	58
56	18	LOSS	-210	40
57	18	LOSS	-228	22
58	18	LOSS	-246	4
59	18	LOSS	-264	-14

Summary:

- Total spins: 59
- Final session profit: -264
- Final bankroll: -14 (exceeding the intended $K = 250$ limit)
- Total amount wagered: 572
- Average bet size: 9.69
- Gain per-unit wagered: $E(g) = -0.462$
- Note: In spin 3, the bet is not increased after a win because increasing it would overshoot the session target of +1 unit.
- Note: In a more restricted application of the rule, the final bet would be capped (e.g., at 4 units) to avoid exceeding the bankroll limit $K = 250$.

Table 15: OG Total Gain Probabilities for $M = 10-50$

M	TotalGain	Probability	E_W	SD_W
10	10	0.8872	-19.87	86.07
	-241	0.1068		
	-492	0.0058		
	-743	0.0002		
20	20	0.7871	-39.74	121.72
	-231	0.1896		
	-482	0.0217		
	-733	0.0016		
30	-984	0.0001	-59.61	149.08
	30	0.6983		
	-221	0.2523		
	-472	0.0441		
40	-723	0.0050	-79.48	172.14
	-974	0.0004		
	40	0.6195		
	-211	0.2984		
50	-462	0.0701	-99.35	192.46
	-713	0.0107		
	-964	0.0012		
	-1215	0.0001		
	50	0.5496		
	-201	0.3309		
	-452	0.0977		
	-703	0.0188		
	-954	0.0027		
	-1205	0.0003		

Table 16: OG Total Gain Probabilities for $M = 60-100$

M	TotalGain	Probability	E_W	SD_W
60	60	0.4876	-119.21	210.83
	-191	0.3523		
	-442	0.1252		
	-693	0.0291		
	-944	0.0050		
	-1195	0.0007		
70	70	0.4326	-139.08	227.72
	-181	0.3647		
	-432	0.1515		
	-683	0.0414		
	-934	0.0083		
	-1185	0.0013		
80	-1436	0.0002	-158.95	243.44
	80	0.3838		
	-171	0.3697		
	-422	0.1759		
	-673	0.0551		
	-924	0.0128		
90	-1175	0.0023	-178.82	258.21
	-1426	0.0004		
	90	0.3405		
	-161	0.3690		
	-412	0.1978		
	-663	0.0699		
100	-914	0.0183	-198.69	272.17
	-1165	0.0038		
	-1416	0.0006		
	-1667	0.0001		
	100	0.3021		
	-151	0.3638		
	-402	0.2169		
	-653	0.0853		
	-904	0.0249		
	-1155	0.0058		
	-1406	0.0011		
	-1657	0.0002		



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