



LIQUID AND GRIT

Slots Design Report

Competitive research and data insights for slots designers

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INTRODUCTION



“Do not merely practice your art, but force your way into its secrets” – Ludwig van Beethoven

Dear Slots Designer,

One cannot merely practice the art of slots design to create the best machines. We must develop a deep understanding of how machines entertain and charm slots players.

Look closely at four new developments this month: Big Fish Casino’s *Angle Pay* and *Interactive Bonus Game* within the RMG machine *Crazy Money Deluxe*; Goldfish Casino’s *Hot Zone* that adds anticipation to more spins; and, Caesars Slots’ *More More Buffalo!* eight reel sets during the bonus.

In August, IP-themed machines rebounded with five IP-themed machines released in Featured Apps, and two more in non-Featured Apps. Mini-steppers and wheels that spin to select other bonuses are on the rise—consider both mechanics for your next premium machine. See Market Trends for details.

The Deep Dives deconstruct four RMG machines: Incredible Technologies’ *Crazy Money Deluxe* (released in Big Fish Casino), Scientific Games’ *Kooza Cirque Du Soleil* (released in Jackpot Party), IGT’s *Cleopatra Plus*, and Barcrest’s *Hercules High & Mighty*.

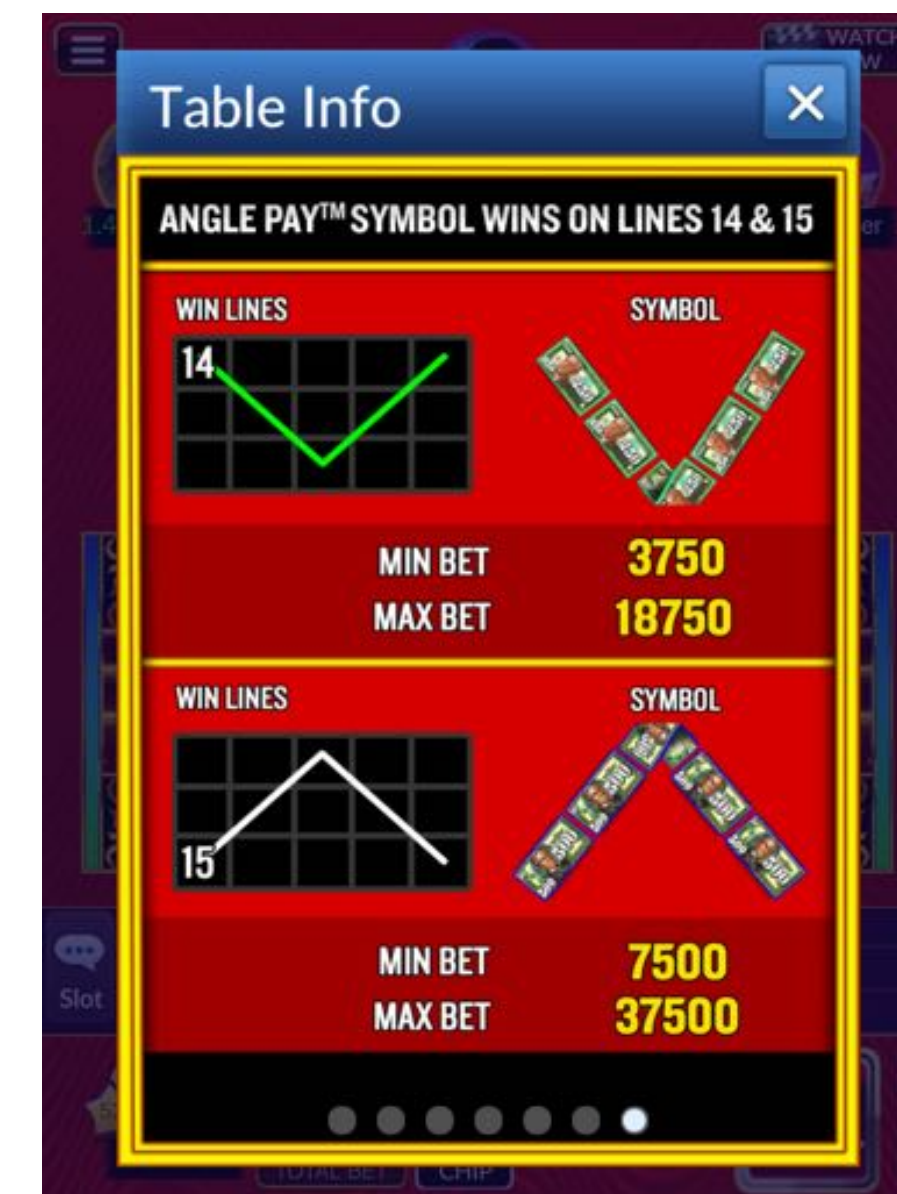
Learn the secrets of your art.

Brett Nowak
Editor-in-Chief

NEW INNOVATIONS

ANGLE PAYS

Include *Angle Pays* so players feel like there are new and more ways to win, while maintaining similar hit frequency. This line mechanic is from Incredible Technologies' RMG machine *Crazy Money Deluxe* released within Big Fish Casino



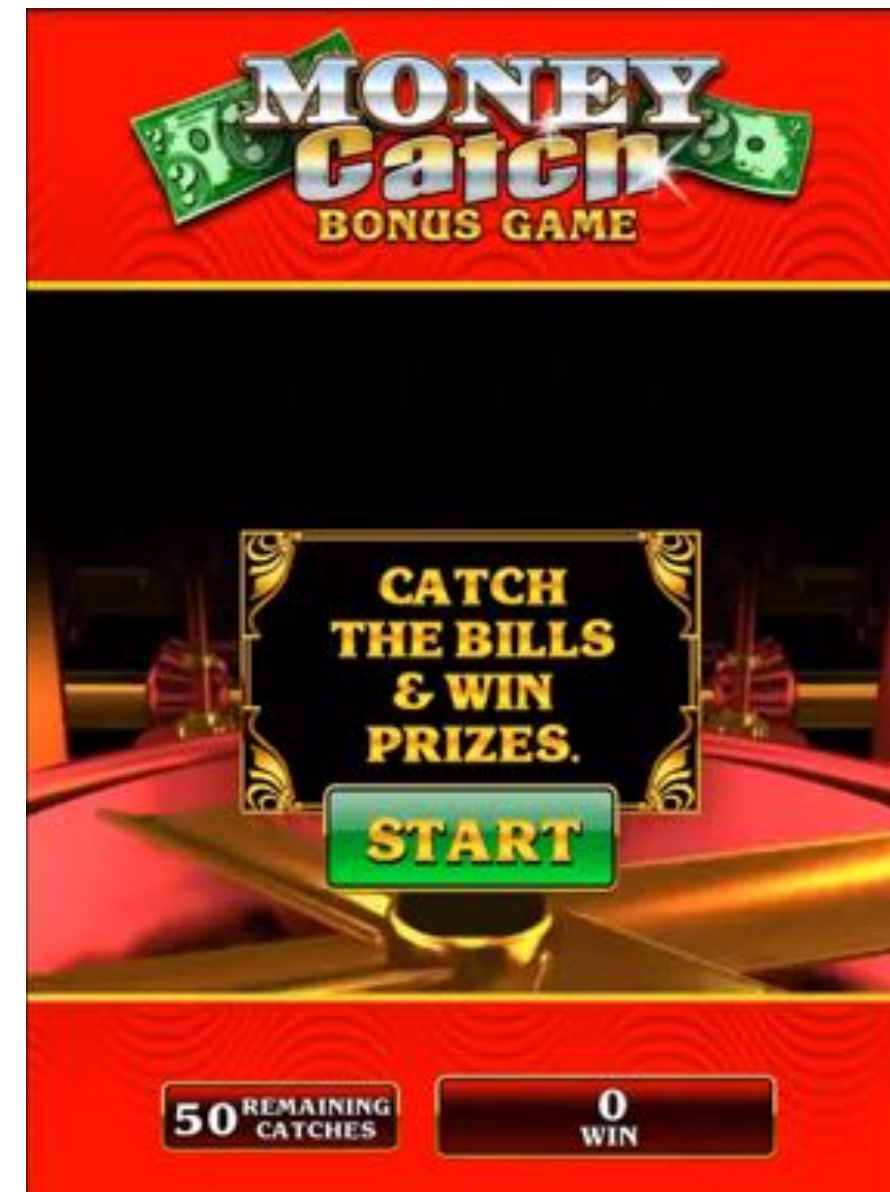
Crazy Money Deluxe lets players win when dollar symbols fall straight across (left image), diagonally (center image), and in a V-shape (right image)

INTERACTIVE BONUS GAMES

Increase interaction with a simple bonus game that lets players select items that move on the screen. This bonus game is also from Incredible Technologies' RMG machine *Crazy Money Deluxe*



In *Crazy Money Deluxe*, the bonus game is triggered by a wheel. Players win 20, 30, 40, 50, or 100 picks, depending on the inner wheel spin outcome (see Deep Dives for details)



The bonus game informs players to, 'Catch the bills & win prizes'



Players receive 'catches' of dollar bills that fly around on the screen. Picking a bill reveals the winning amount

HOT ZONES

Add *Hot Zones* to introduce a new way to win and add anticipation to every spin. Goldfish Casino's *Devilicious* and Bally's *Playboy Hot Zone* are two machines that have *Hot Zones* unattached to any reel set



In Goldfish Casino's *Devilicious*, *Hot Zones* are combinations that spin in addition to the normal reel set



Having a *Hot Zone* land on the reel set converts symbols to wild and then pays any wins on the board



In Bally's *Playboy Hot Zone*, a RMG machine, the *Hot Zone* works well because there is space above the reel set to show the *Hot Zone* coming down onto the reel set (orange squares above the reel set)

MULTIPLE REEL SETS

Push the limit on the number of reel sets during bonus and base game play. The RMG example of this mechanic is in Aristocrat's *Wonder 4* series. Caesars Slots' *More More Buffalo!* is one of the first examples of eight reel sets in social casino (images below)



In Caesars Slots' *More More Buffalo!*, players may win up to 8 reel sets during free spins



Players unlock additional reel sets by collecting *Golden Buffalo* symbols

BREAK-THE-CHAINS

Trigger bonus games when all the tiles on the reel set are broken. This mechanic is similar to Scatter Slots' break-the-chain mechanic; players must break all the chains to level up. This mechanic does not work in RMG because it encourages 'hawking' (when a player or group lurk around a machine to jump onto the machine when the mechanic is near completion)



In Caesars Slots' *Jackpot Destiny*, players must have wins on all reel sets to break all the tiles



Hitting tiles makes the tiles explode



Breaking all the tiles completes the fill meter and awards the *Crystal Bonus Pick 'Em*

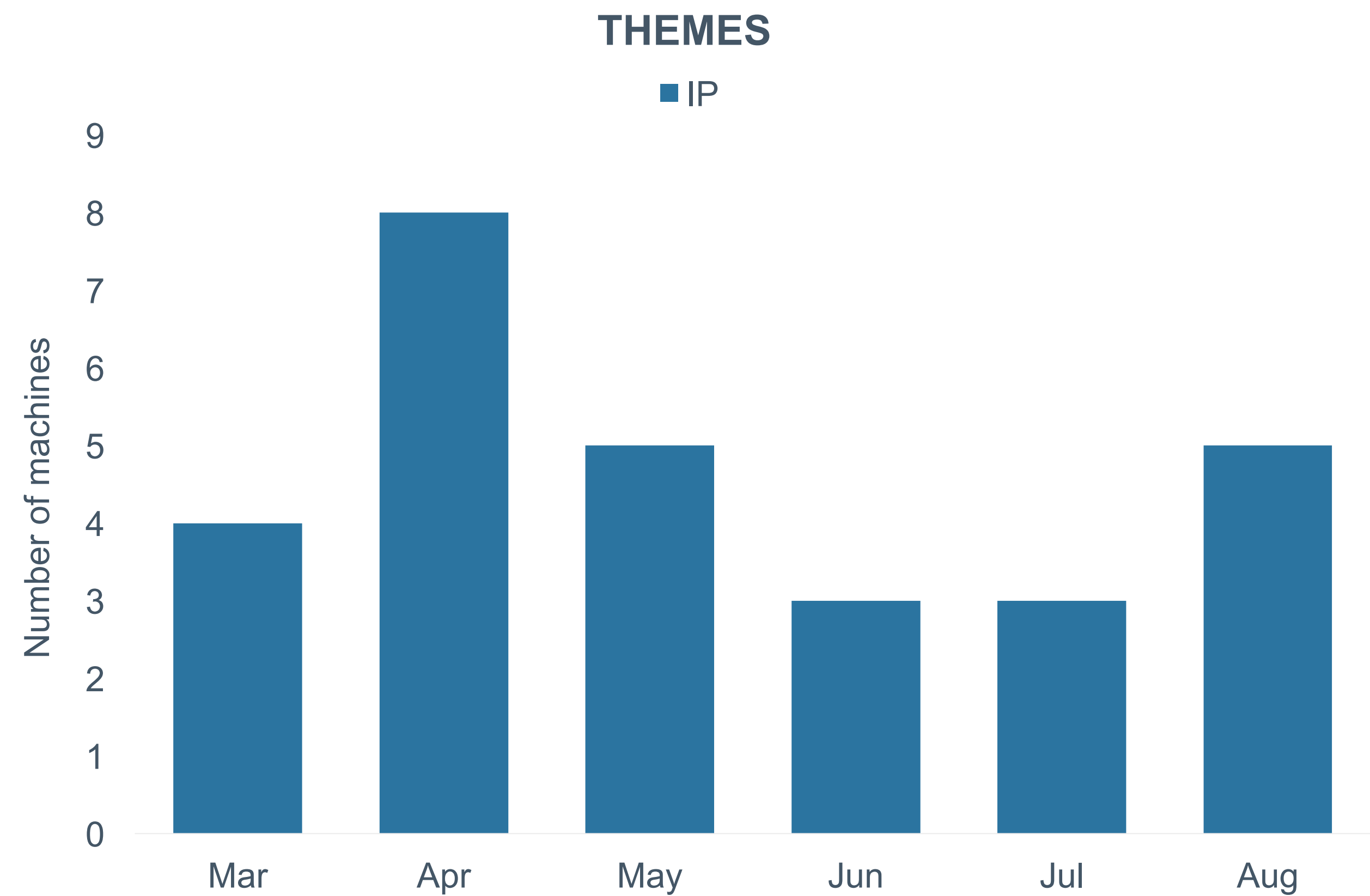
MARKET TRENDS

Apps included in the trend data:

DoubleDown Casino, Heart of Vegas, House of Fun, Goldfish Casino, Slotomania, Jackpot Party, Hit it Rich, Caesars Slots, Quick Hit Slots, and Hot Shot Casino

THEMES

IP-themed machines rebounded in August. IP released: Jackpot Party's *Kooza Cirque Du Soleil*, Quick Hit Slots' *Monopoly Corners*, Hit it Rich's *Sinatra Ol'Blue Eyes*, and Goldfish Casino's *Beat It* and *Betty Boop's Fortune Teller*



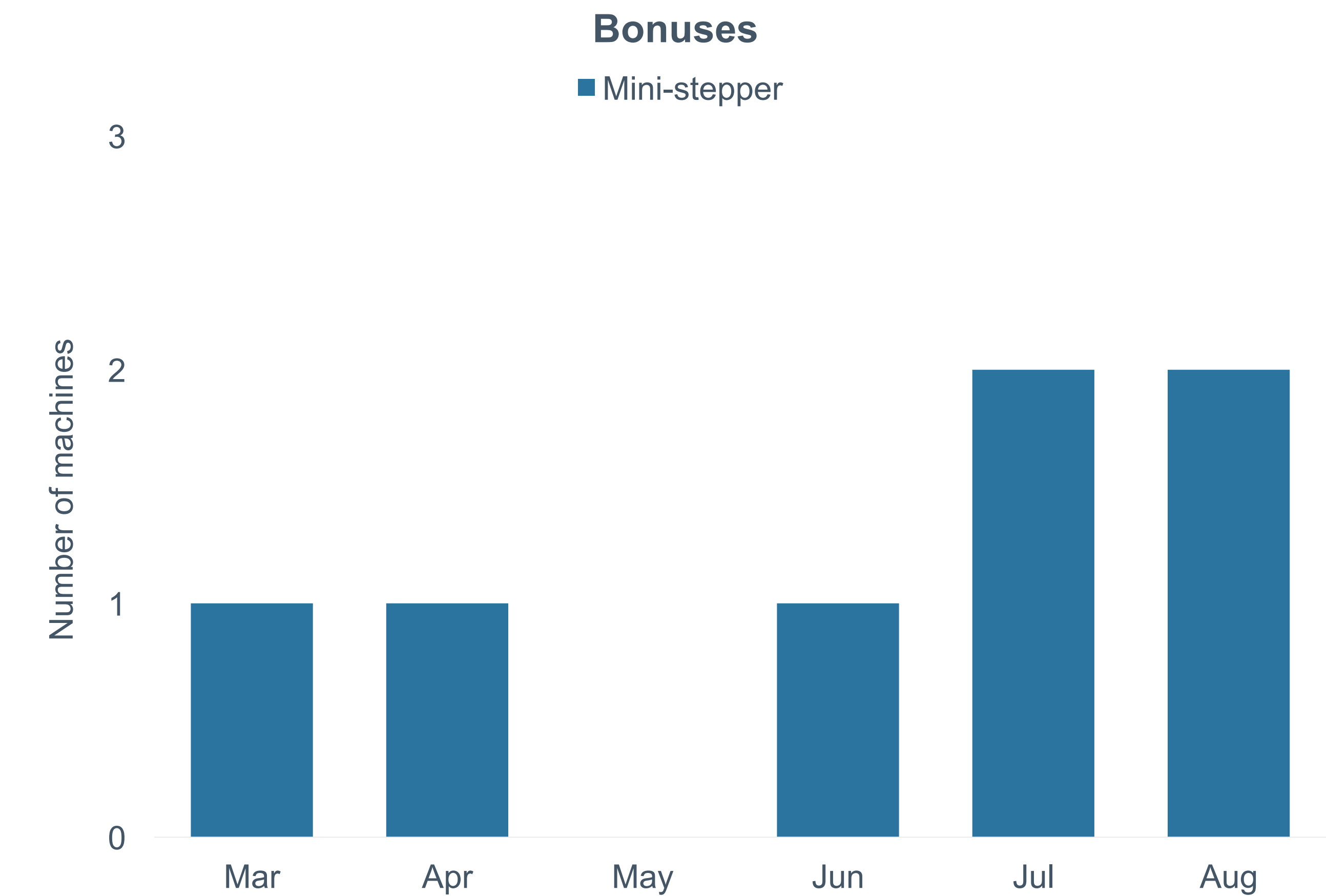
Jackpot Party's *Kooza Cirque Du Soleil*



Goldfish Casino's *Betty Boop's Fortune Teller*

BONUSES

Mini-stepper bonus games are growing in popularity. This continues to be a well-used mechanic for apps by Scientific Games and Playtika



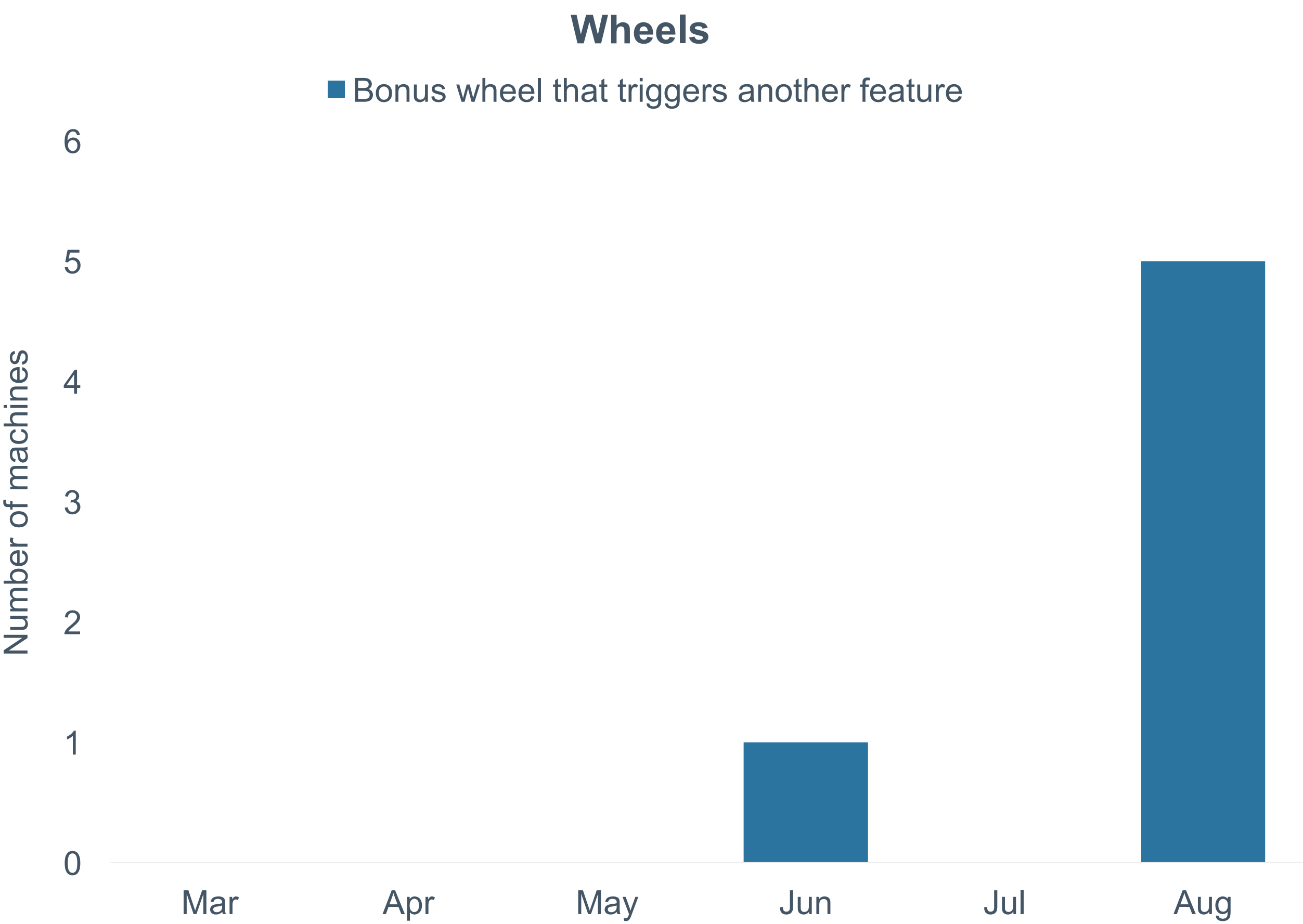
Hot Shot Casino's *Lightning Jackpots*



House of Fun's *Bank of Jackpots*

WHEELS

Wheels that spin to select another feature, like free spins or a bonus game, spiked in August. This mechanic was utilized by a wide range of apps



Heart of Vegas' *Tarzan Lord of the Jungle*



Slotomania's *Return to Eden*

DEEP DIVES

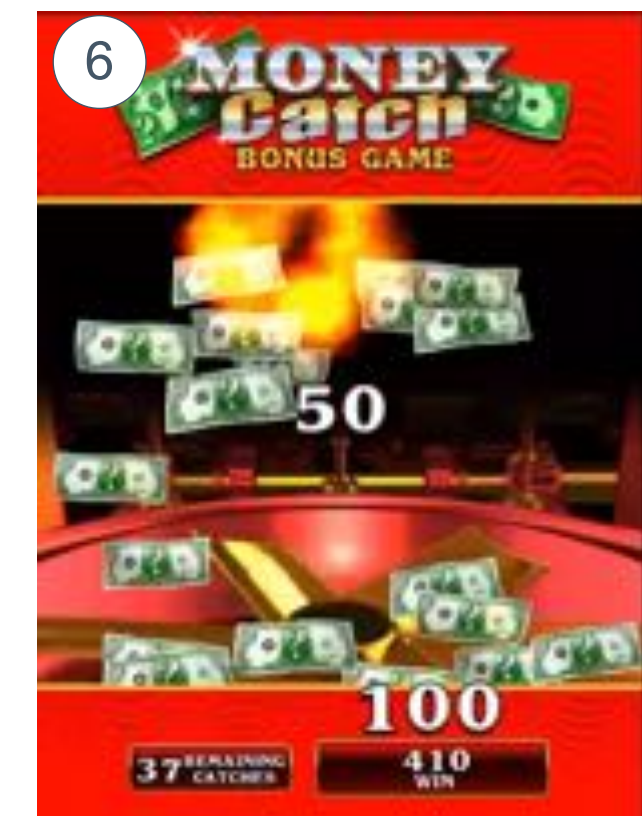
SOCIAL CASINO

- *Crazy Money Deluxe* – Big Fish Casino
- *Jackpot Destiny* – Caesars Slots
- *Kooza Cirque Du Soleil* – Jackpot Party
- *Horoscope Heroes* – Jackpotjoy Slots

CRAZY MONEY DELUXE

Big Fish Casino released *Crazy Money Deluxe*, an RMG machine from Incredible Technologies. Players receive *Angle Pay* lines and an interactive bonus game

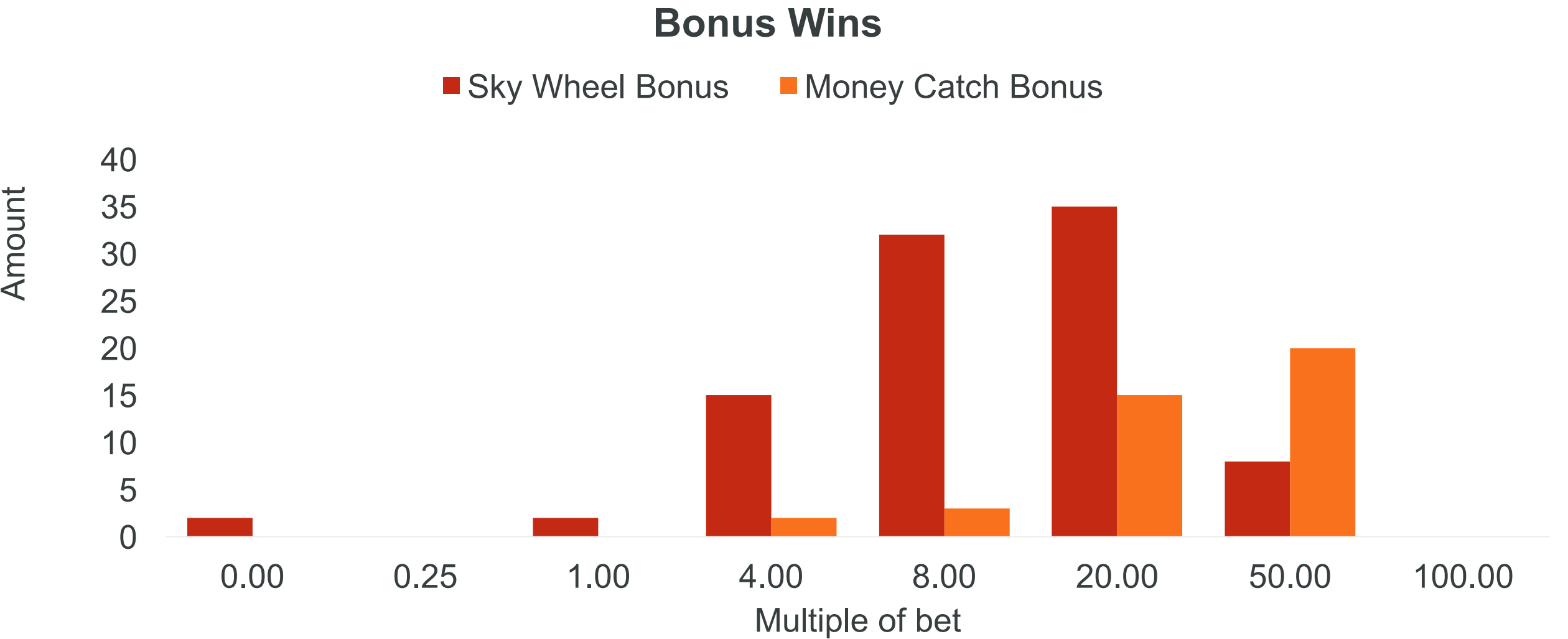
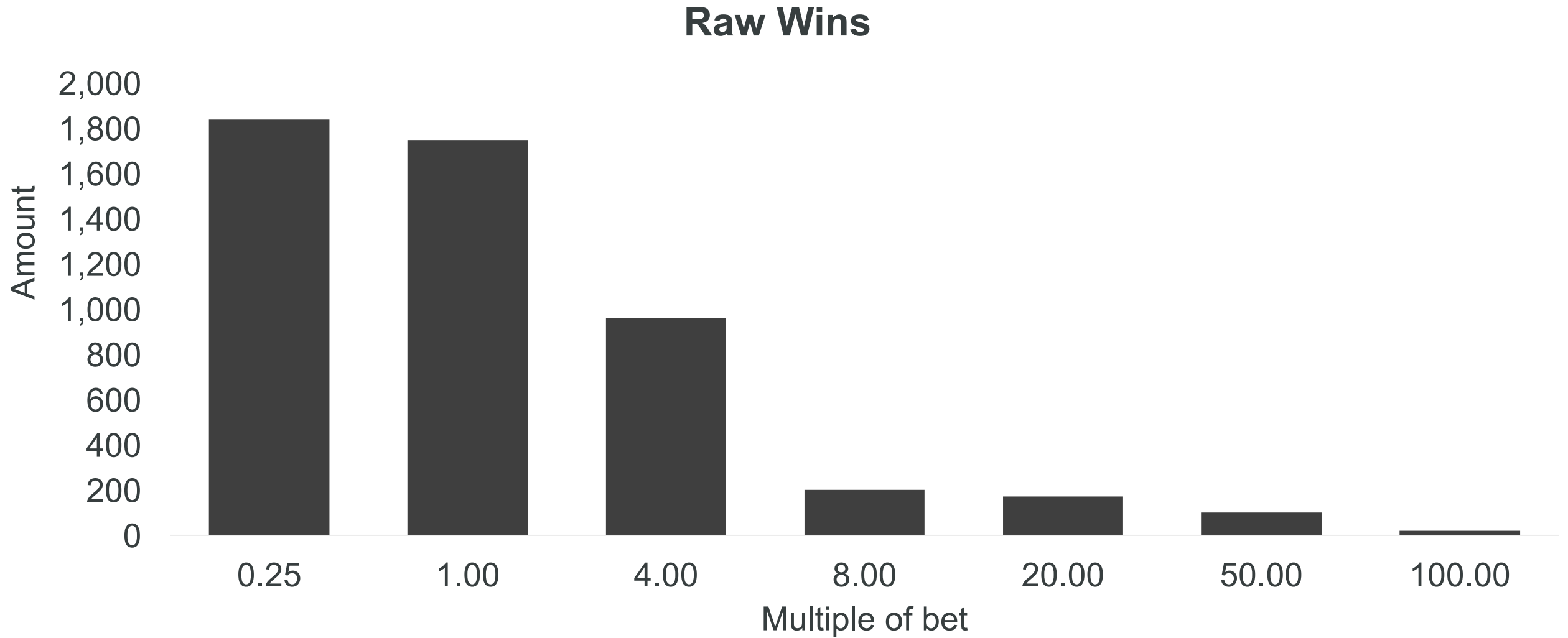
- *Crazy Money Deluxe* includes four progressive jackpots and *Angle Pay* lines (see image 1 and New Innovations for details on *Angle Pay*).
- Wheel symbols landing on reels 1, 3, and 5 triggers the *Sky Wheel Bonus* (image 2).
- The *Sky Wheel Bonus* presents a wheel with various coin prizes, jackpots, bonus wedges, and a spin button (image 3).
- A coin prize wedge landing on the wheel awards a spin of the inner wheel for a multiplier, or a re-spin of the *Sky Wheel* (image 4).
- Landing on the bonus wedge triggers the *Money Catch Bonus* and a spin of the inner wheel for the number of bonus game picks (image 5).
- Players are presented with a 'Start' button to begin the *Money Catch Bonus*. Money floats on the screen to catch. Remaining catches and total amount won are displayed (see image 6 and New Innovations for details).



CRAZY MONEY DELUXE STATS

Game play	
Hit frequency	50%
Volatility	10.9
Spins until a bonus	70
Distribution of RTP as % of total RTP	
Base game	80%
Bonus game	20%
Sky Wheel Bonus	12%
Money Catch Bonus	8%
RTP range	
Minimum range	111%
Median	129%
Maximum range	147%
Jackpots	
Amount	2
Jackpot 1	2,500,070 x bet
Jackpot 2	1,310 x bet

- Volatility is the standard deviation of the 10K payouts
- The distribution of RTP is base or bonus game RTP over total RTP
- RTP range is 90% confidence with 10K spins
- Jackpots are payouts greater than 1000 x bet and are removed from the RTP range numbers



JACKPOT DESTINY

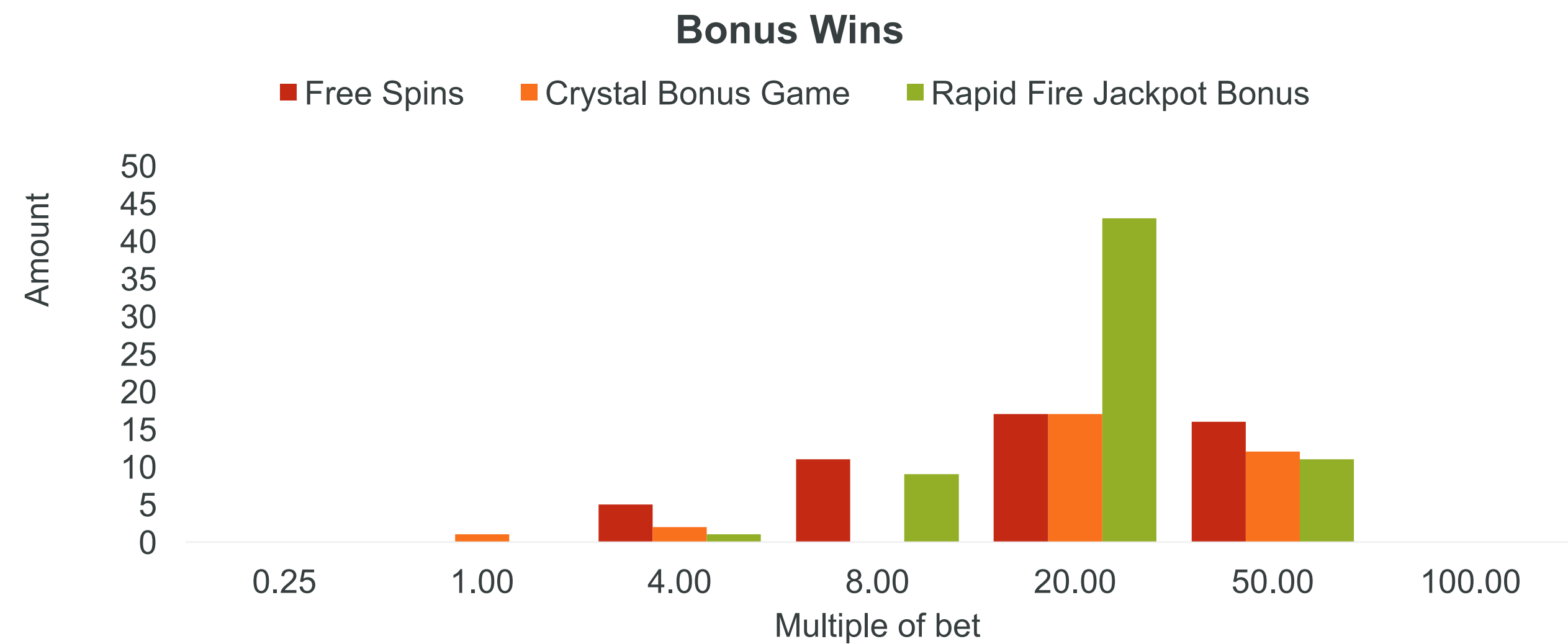
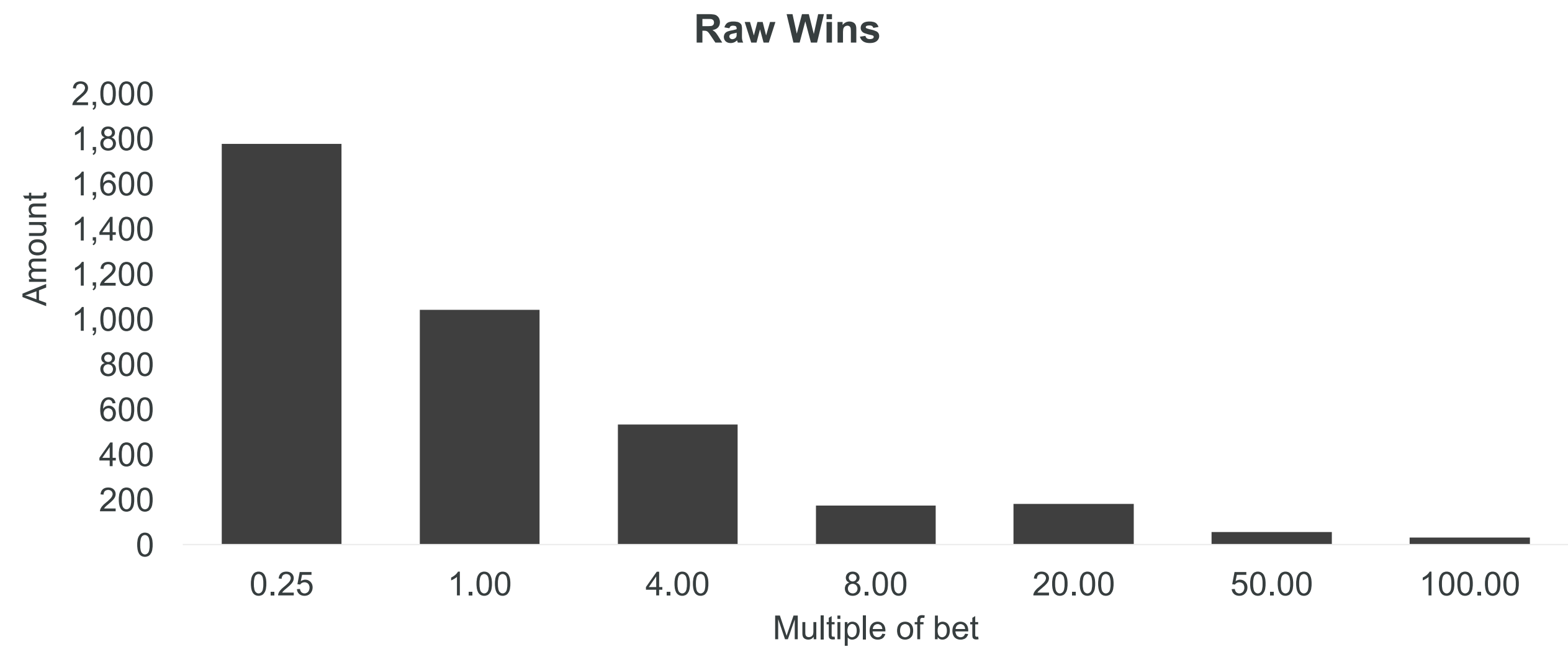
The reels are covered with tiles for players to break to trigger a bonus game. The pick 'em bonus game also awards prizes and additional picks that increase a jackpot win

- Caesars Slots' *Jackpot Destiny* offers a 4 x 5 reel set, eight *Rapid Fire* jackpots, and a fill meter. Each position on the reels is covered by tiles able to be broken by winning combinations (image 1).
- Breaking all the tiles fills the meter and triggers the *Crystal Bonus*. Two picks are awarded from 12 crystals with a fill meter visible above (image 2).
- The *Crystal Bonus* fill meter displays a win multiplier and point goal. Each crystal pick reveals a number. Reaching the goal awards players two more picks and 12 new crystals. The bonus ends when a point goal is not met (image 3).
- Five or more *Rapid Fire* symbols triggers the *Rapid Fire Jackpot Bonus*. Players are presented with 20 spaces and three picks (image 4).
- Each space may contain more picks, coins, or additional jackpot symbols. Revealing a *Rapid Fire* symbol increases the jackpot (image 5).
- Three or more scatter symbols trigger the *Wild Reel Free Spins* with *Surprise Wild Reels*. Players may win up to 25 free spins by landing five scatters during the free spins that retriggers the free spins (image 6).



JACKPOT DESTINY STATS

Game play	
Hit frequency	38%
Volatility	9.7
Spins until a bonus	60
Distribution of RTP as % of total RTP	
Base game	56%
Bonus game	44%
Free Spins	10%
Crystal Bonus Game	22%
Rapid Fire Jackpot Bonus	12%
RTP range	
Minimum range	93%
Median	109%
Maximum range	125%



KOOZA CIRQUE DU SOLEIL

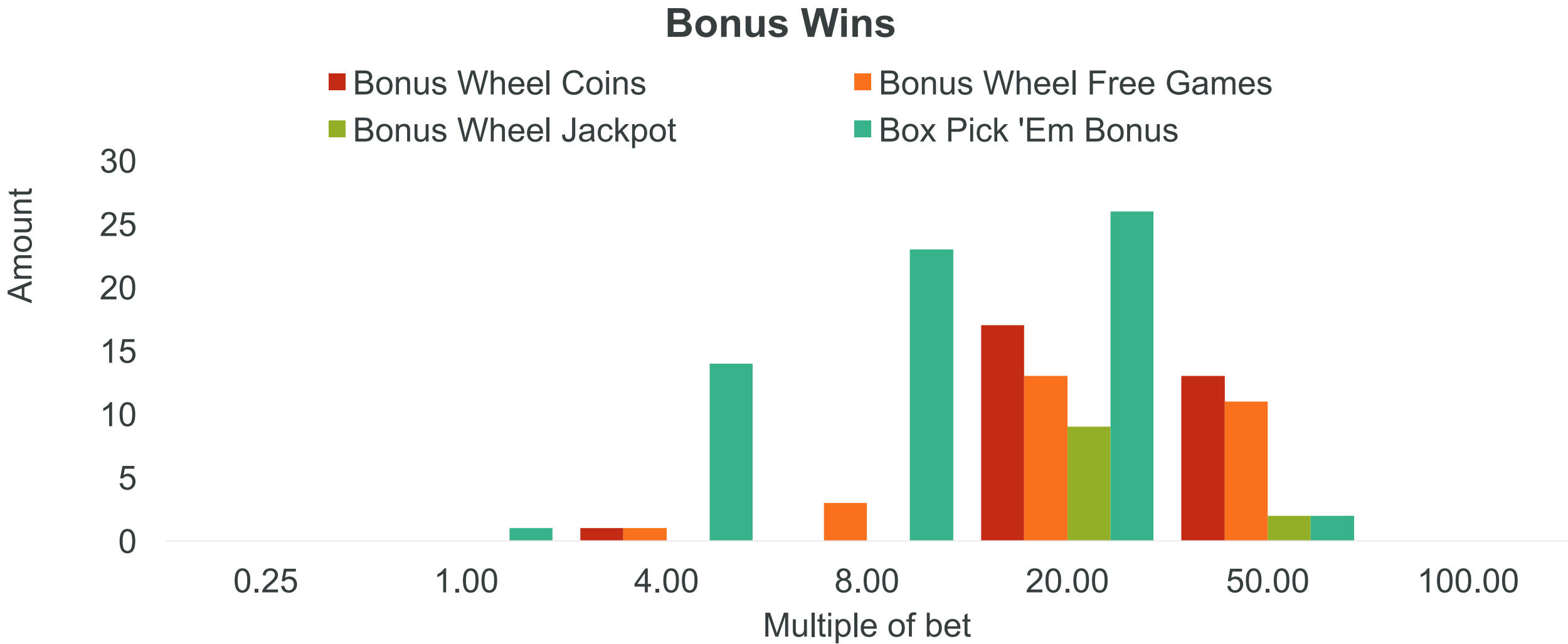
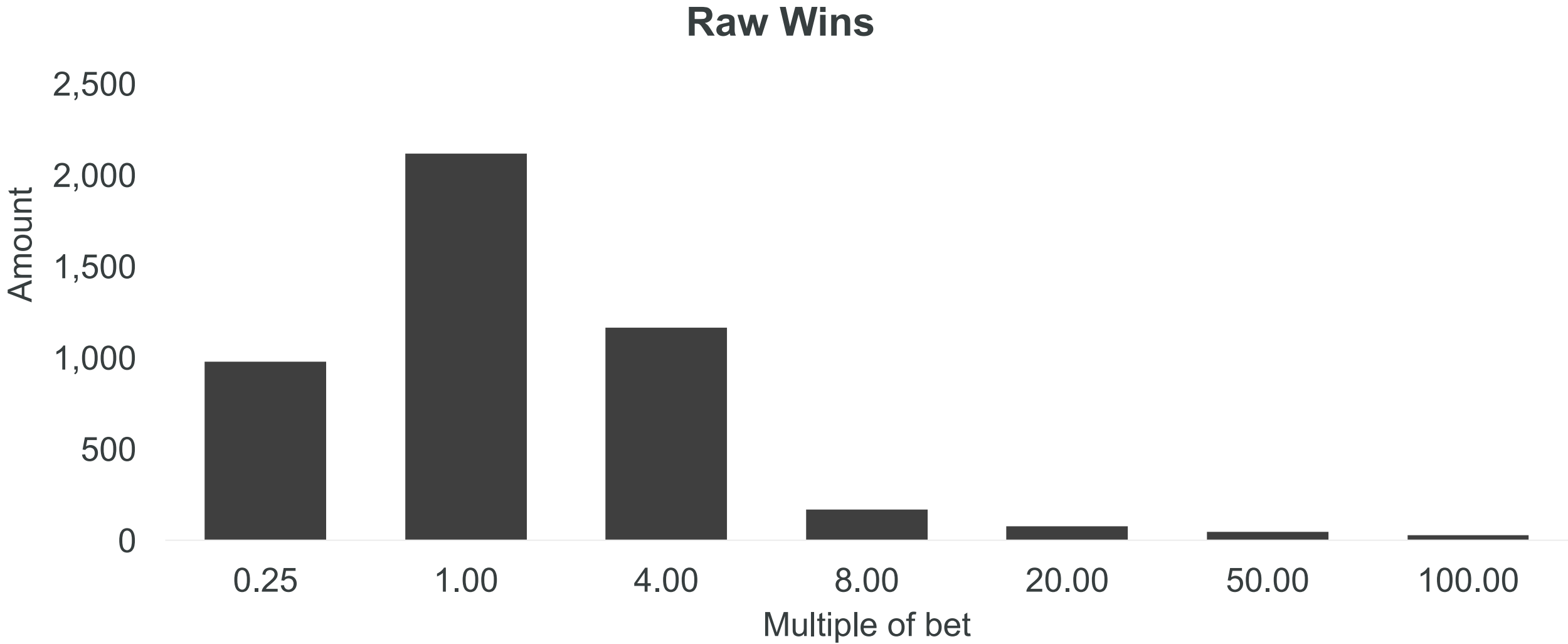
Jackpot Party's *Kooza Cirque Du Soleil*'s bonus wheel awards 200x to 5,000x the bet, two free games, and a *Jackpot Feature* that triggers a wheel that only includes jackpot sleeves

- Jackpot Party's *Kooza Cirque Du Soleil* initially released as a 4 x 5 machine with four jackpots and a progressive jackpot with an eligible bet (image 1). The progressive jackpot initially offered has since been removed.
- Any time during play, the *Mystery Stacked Symbol* feature may trigger, replacing each selected reel position with one paying symbol (image 2).
- During the base game, box symbols landing on reels 1, 3, and 5 trigger the *Box Pick Bonus*. Players pick one of three boxes for coins or a bonus (image 3).
- The *Bonus Wheel* is triggered by bonus symbols landing on reels 2, 3, and 4. Players are presented with a wheel and prompted to 'Press to Spin' (image 4).
- The *Bonus Wheel* offers prizes of: credit values from 200x to 5,000x the bet, two bonuses (*Trickster Free Games* and *Wheel of Death Free Games*), and a *Jackpot Feature* (image 5).
- A *Jackpot Feature* is triggered when the *Bonus Wheel* stops on the 'Jackpot'. A new wheel surfaces with every space on the wheel representing one of the four jackpots (image 6).



KOOZA CIRQUE DU SOLEIL STATS

Game play	
Hit frequency	41%
Volatility	5.5
Spins until a bonus	67
Distribution of RTP as % of total RTP	
Base game	66%
Bonus game	34%
Bonus Wheel Coins	9%
Bonus Wheel Free Games	13%
Bonus Wheel Jackpot	5%
Box Pick 'Em Bonus	7%
RTP range	
Minimum range	83%
Median	92%
Maximum range	101%



HOROSCOPE HEROES

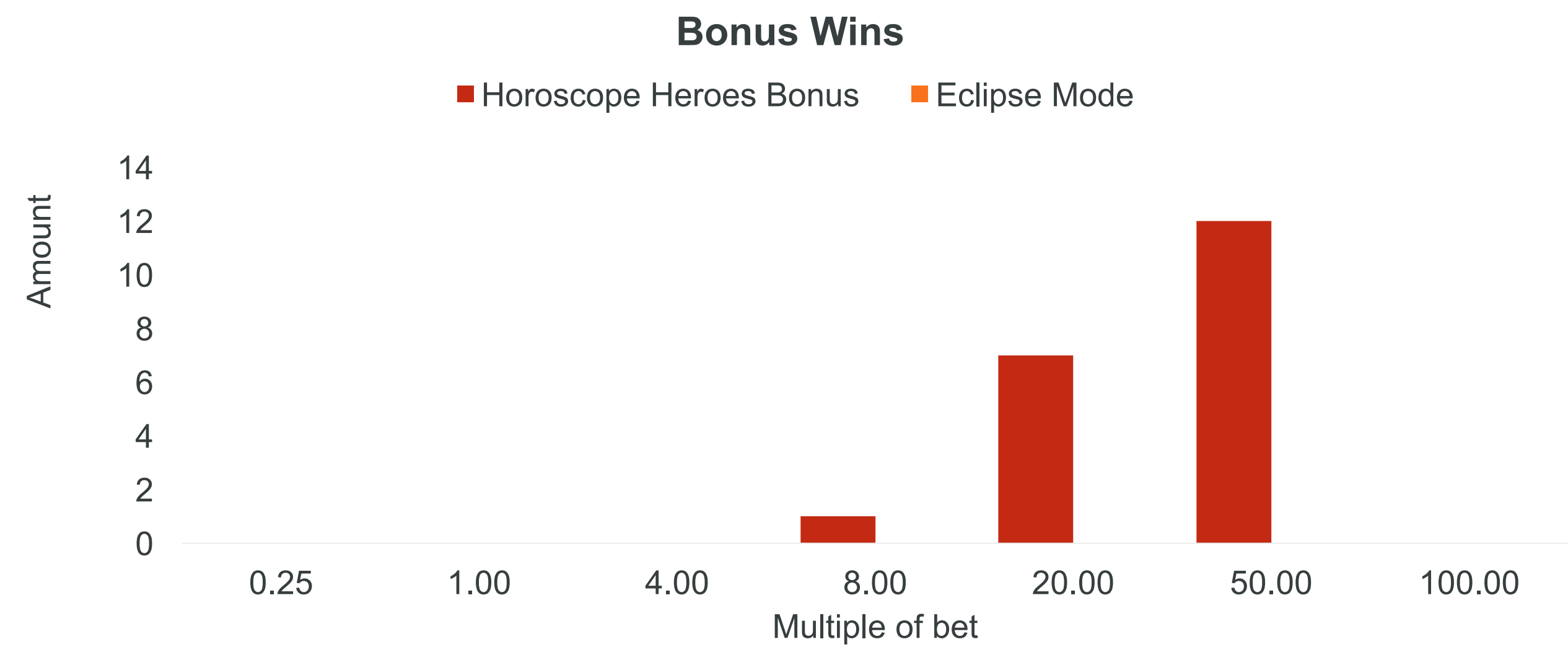
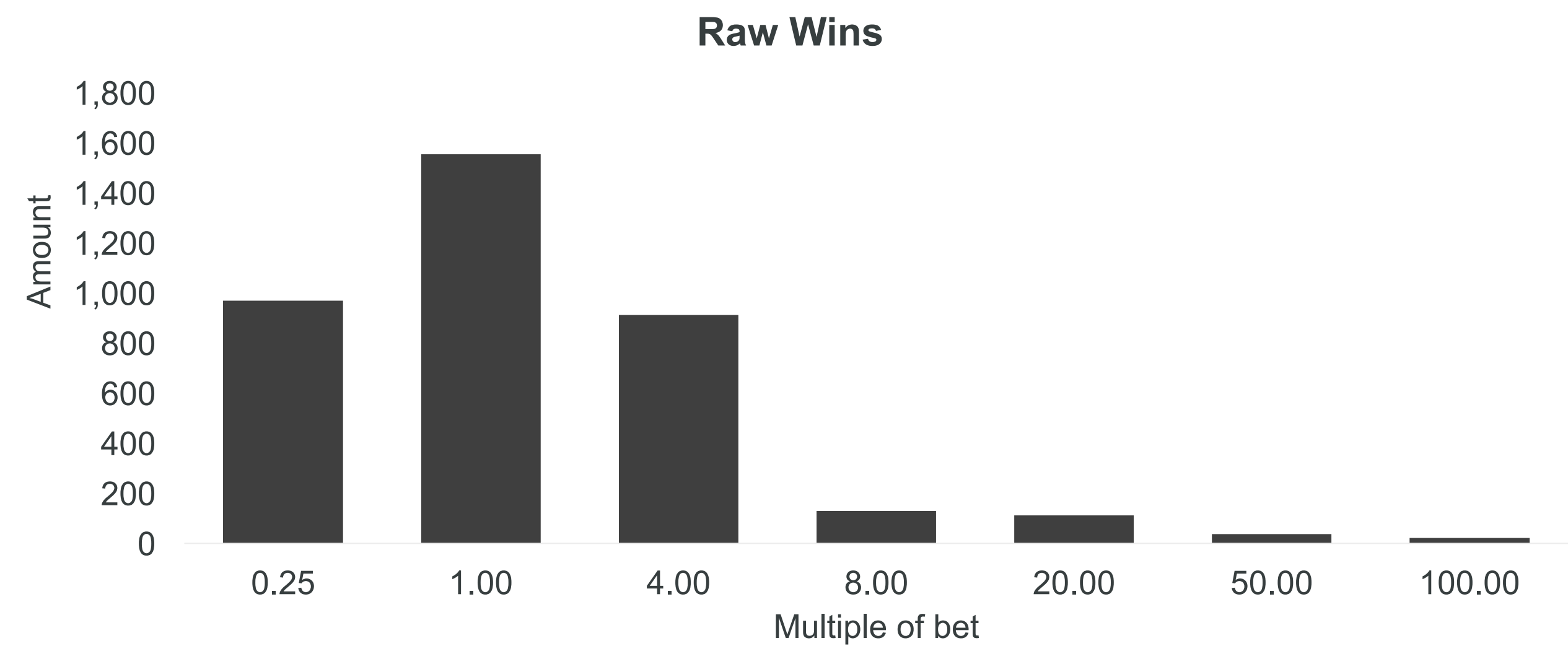
Jackpotjoy Slots' *Horoscope Heroes* has an in-machine objective to unlock various heroes. Unlocking all heroes turns on a bonus that randomly triggers during the base game

- In Jackpotjoy Slots' *Horoscope Heroes* a 'What's Your Star Sign' dialogue appears, awarding one pick at machine-entry to unlock a hero (image 1).
- The chosen hero appears with 11 other locked heroes above a 4 x 5 reel set. Each hero represents a different bonus round and feature (image 2).
- There are a total of 12 *Horoscope Objectives* to unlock all heroes and their bonuses. Clicking the *Horoscope Heroes* space above the reels displays objectives, progress, and information (image 3).
- A dialogue appears when an objective has been completed, randomly unlocking a new hero (image 4).
- Bonus symbols landing on reels 2, 3, and 4 trigger the *Horoscope Heroes Bonus*. Players choose the bonus based on the available unlocked heroes (image 5).
- Completing all 12 objectives and unlocking all *Hero Bonuses* unlocks the *Eclipse Mode* feature. In *Eclipse Mode*, bets are doubled and may award one of 12 various *Eclipse* feature spins (image 6).



HOROSCOPE HEROES STATS

Game play	
Hit frequency	37%
Volatility	9.1
Spins until a bonus	323
Distribution of RTP as % of total RTP	
Base game	84%
Bonus games	16%
Horoscope Heroes Bonus	16%
Eclipse Mode	0%
RTP range	
Minimum range	78%
Median	93%
Maximum range	108%



REAL MONEY

- *Cleopatra Plus* – IGT
- *Hercules High & Mighty* – SGI / Barcrest

CLEOPATRA PLUS

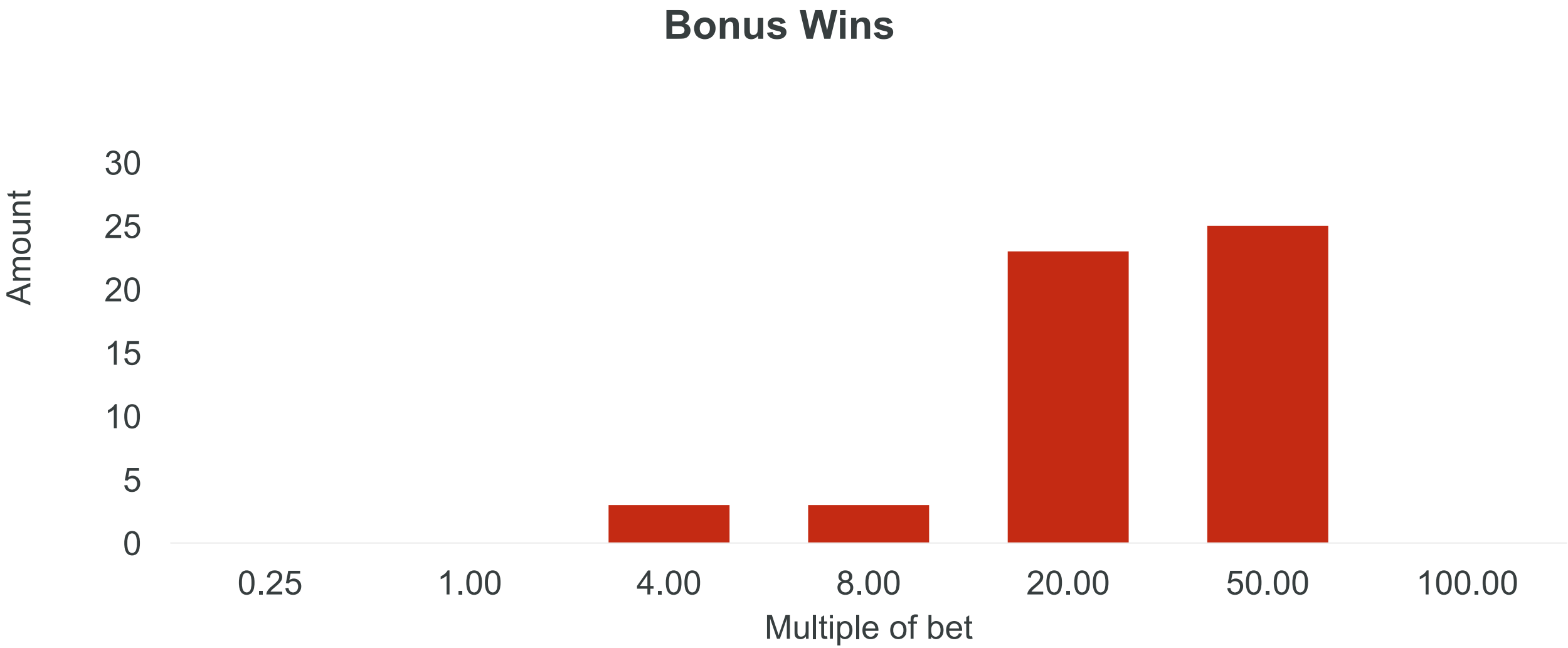
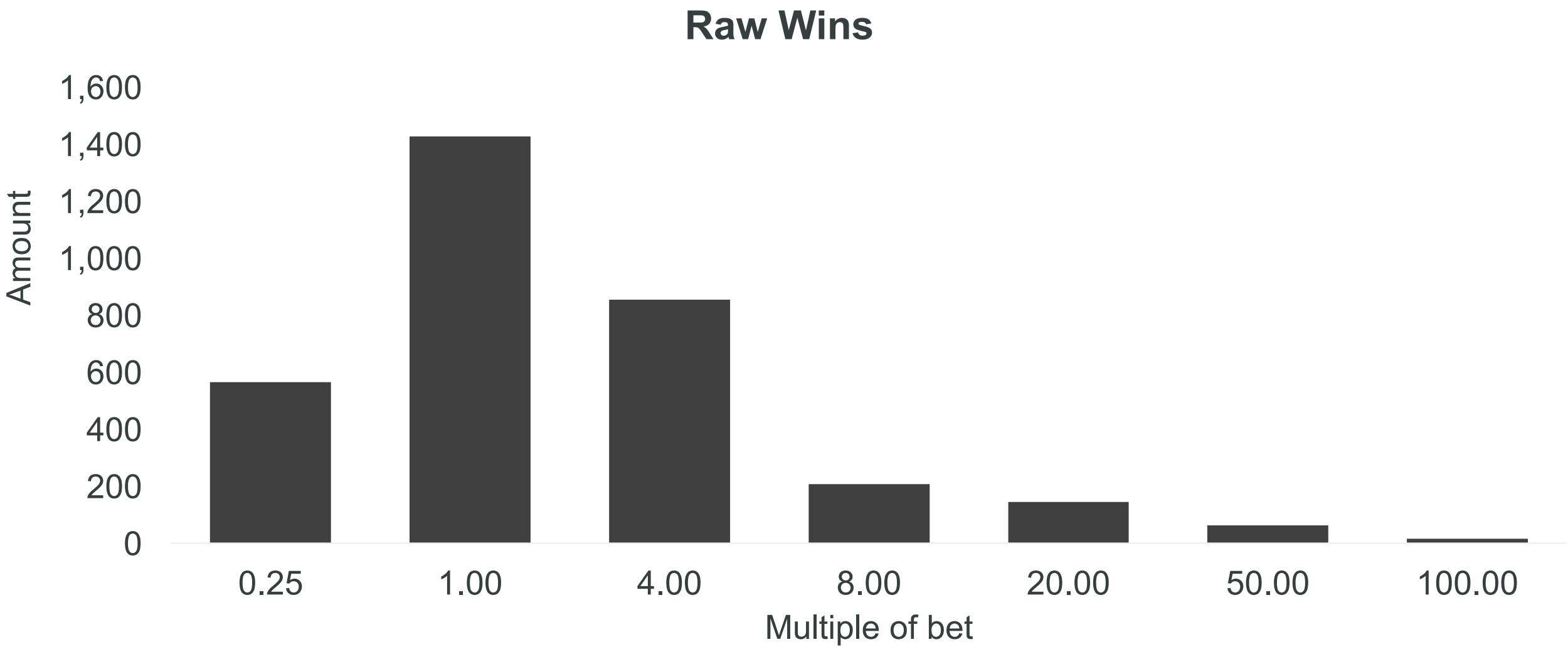
IGT's *Cleopatra Plus* incorporates mechanics associated with social: a collection mechanic and in-machine leveling

- *Cleopatra Plus* offers a 3 x 5 reel set, a button to change *Deities* symbols, and *Level Up Plus* collection mechanic (image 1).
- *Level Up Plus* offers new features and increased payback based on eight in-machine levels to unlock additional maps, *Deities*, and *Payback Boosts*. *Payback Boosts* are additional features awarded for specific levels obtained. Pressing the *Deities* symbol located at the top-left of the reels gives the option to change which symbol lands. Additional stacked *Deities* may be unlocked by obtaining a higher level by collecting *Follower* symbols (image 2).
- *Follower* symbols landing on the reels are collected to level up (image 3).
- Three or more *Follower* symbols landing triggers the bonus feature, giving players a choice of location. Obtaining higher machine levels unlocks up to three different locations (image 4).
- The bonus begins with five free spins and a number of picks from five locations on a map. The number of picks awarded is based on player level and triggering symbols. Picks may reveal coins, additional free spins, multipliers, *Super Spins*, or a *Last Spin Multiplier* (image 5).
- The *Last Spin Multiplier* awards a big multiplier for the last free spin, which is unlocked at level six. The *Super Spins* feature unlocks at level eight, adding super stacked wilds to the reels. Both features are awarded during the 'map pick' portion of the bonus (image 6).



CLEOPATRA PLUS STATS

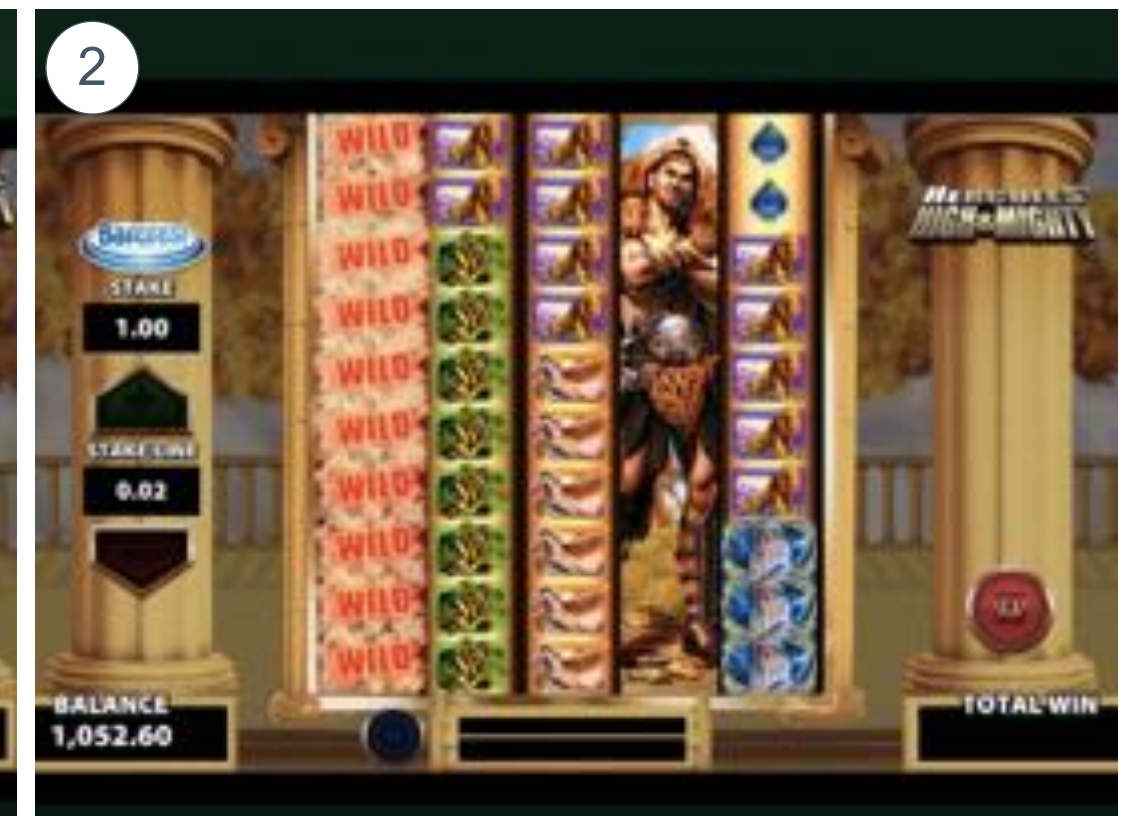
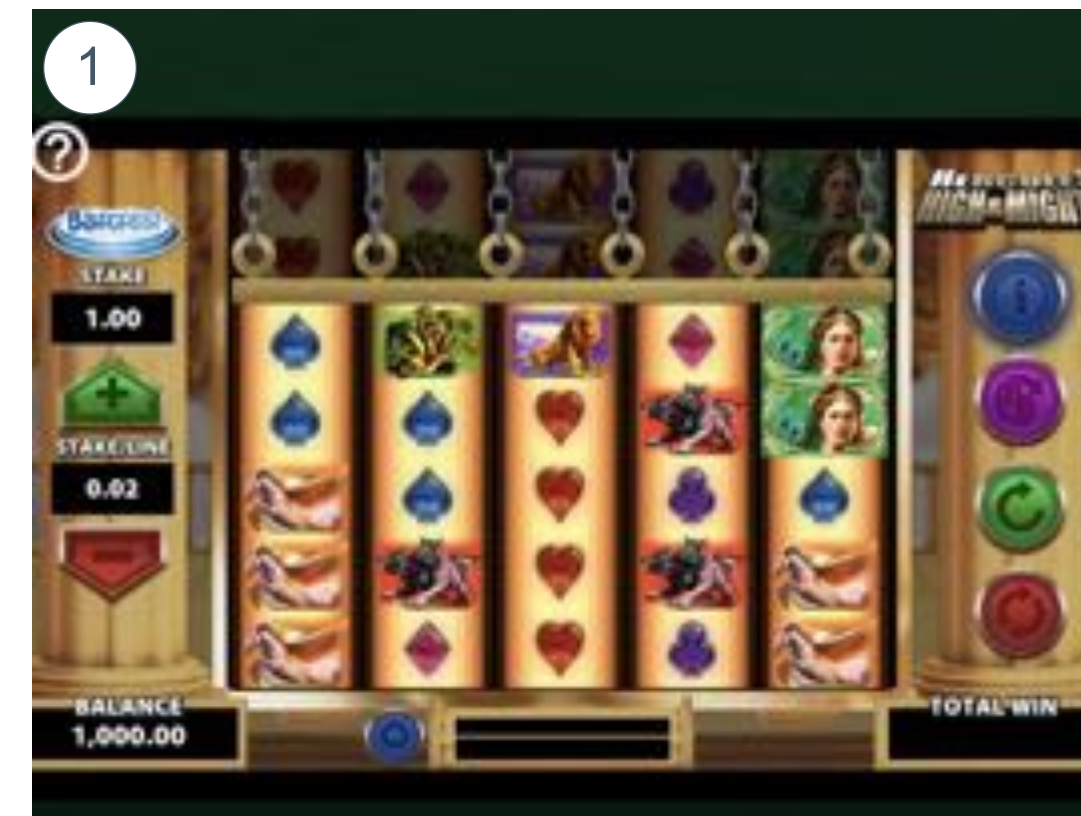
Game play	
Hit frequency	33%
Volatility	5.2
Spins until a bonus	154
Distribution of RTP as % of total RTP	
Base game	79%
Bonus game	21%
Pick 'Em with Free Spins	21%
RTP range	
Minimum range	86%
Median	94%
Maximum range	103%



HERCULES HIGH & MIGHTY

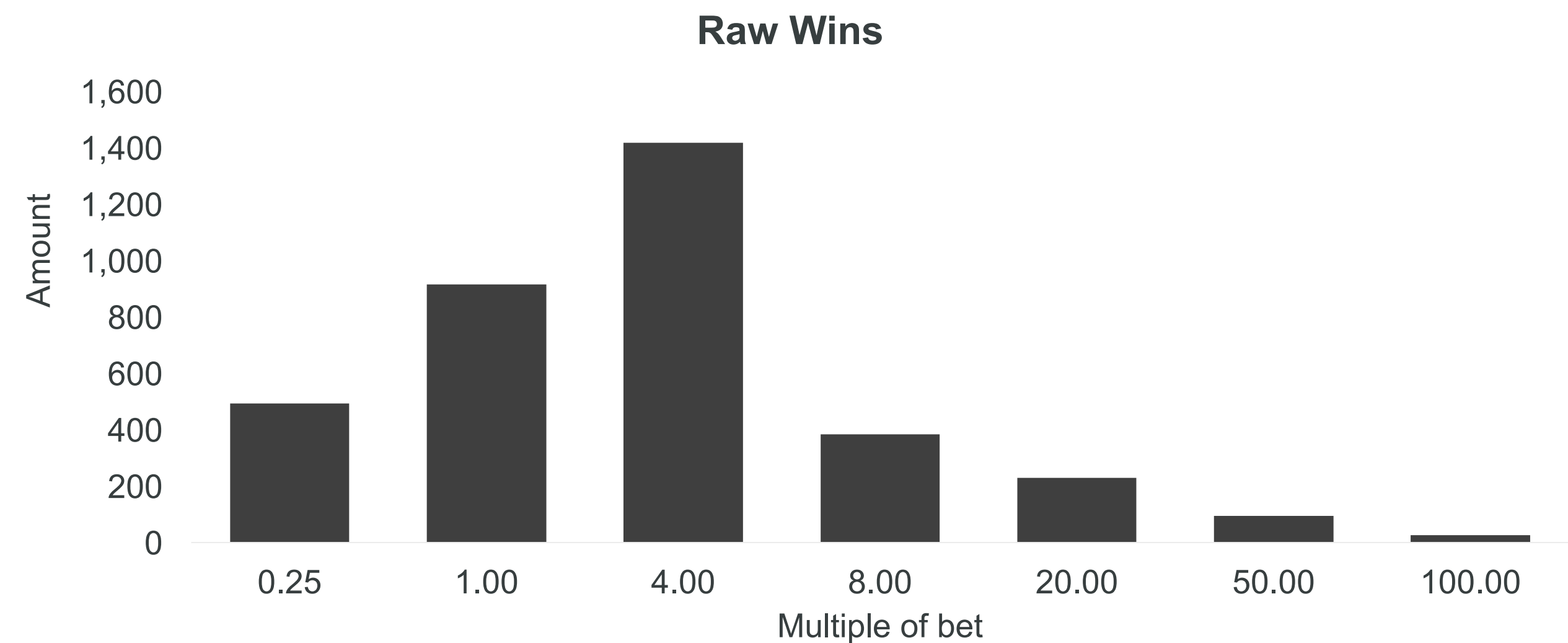
Barcrest's *Hercules High & Mighty* offers three bet tiers, each with unique bonus features

- Barcrest's *Hercules High & Mighty* features a base game 5 x 5 reel set with 50 paylines (image 1).
- Anytime during play, a *Hercules* wild symbol landing fully on active reels triggers the *Mighty Reels* feature. During the feature, full view wilds and reels expand doubling the paylines and exposing a 10 x 5 reel set (image 2).
- Any part of three or more bonus symbols landing within the active reels trigger a free spins bonus (image 3).
- Barcrest offers players three *Big Bet (BB)* options to purchase five linked spins for one total bet. Choosing a *BB* of \$20, \$30 or \$50 offers additional features not available in regular bet mode (image 4).
- Each of the *BB* options allows any part of the *Hercules* wild landing to trigger *Mighty Reels*. The \$30 and \$50 options include removed lower symbols. The \$50 option includes persistent *Mighty Reels* until a win is hit (image 5).
- At the conclusion of *BB* spins, a dialogue presents with the total amount won for all five spins (image 6).



HERCULES HIGH & MIGHTY STATS

Game play	
Hit frequency	36%
Volatility	6.1
Spins until a bonus	6
Distribution of RTP as % of total RTP	
Base game	24%
Bonus game	76%
Free Spins	23%
Mighty Reels	53%
RTP range	
Minimum range	124%
Median	134%
Maximum range	144%



APPENDIX

SLOTS PLAYER PERSONAS

	PLAIN JANE	NIGHT-OUT NANCY	ENTERTAIN-ME EDDIE	MR. AND MRS. RICARDO
Desire	Utility	Excitement	Multi-Purpose	Relaxation
Motivation	Looking for something to do: kill time and reduce boredom	Wants a buzz: thrill of winning a jackpot, relaxing, and having a good time	Considers machines “lucky” or fun to play	Socialization, have fun, and relieve day-to-day stress
Features for choosing one game over another	Denomination that I want to play	Bet within budget, fun game to play	Fun game to play, good chance of winning	Fun game to play, denomination want to play
% of machines played with progressives	29%	40%	37%	25%
Player Income	Medium-high	High	Low	Medium-low
% female	54%	59%	45%	48%
Size of group	20%	28%	27%	26%

DATA COLLECTION PROCESS

Machine observations are from 10,000 spins and an real money gaming accepted statistical process to determine 90% confidence levels of a machine's RTP. Recommendations, information and data comes from market research, app intelligence tools and deep analysis of the games

Machine information

- The RTP range is found using a sample of 10,000 spins, which is approximately 20 hours of play.
- To find the RTP range with 90% confidence, the median payout of the 10K spin +/- (standard error) x (z-score for 90% confidence) is calculated.
- The standard error is $(\text{standard deviation}) / \sqrt{\text{sample size}}$ and the z-score for 90% confidence is 1.65.
- For example, the median payout for *Zombie Prom* after 10K spins was 103% with a standard deviation of 3.3.
- The standard error is $3.3 / (\sqrt{10,000})$, which equals 3.3%
- The RTP range for *Zombie Prom* is then 103% +/- (1.65 x 3.3%).
- Based on this sample, the result is a 90% confidence that the real RTP of *Zombie Prom* falls between 97% and 109%.

Market research

- Each game is reviewed daily for updates, regardless of whether the game has been updated through the App Store.
- Transaction information comes from the iOS App Store's In-App Purchases tab. These transactions are ranked based on the number of transactions.
- Las Vegas player insights come from online sources, such as the Las Vegas Convention and Visitors Authority and the UNLV Center for Gaming Research.
- Progressive jackpot information comes from online research, specifically from wizardofodds.
- Trending revenue, downloads and package-rank data come from Priori Data, a Liquid and Grit partner.

Immature poets imitate; mature poets steal; bad poets deface what they take, and good poets make it into something better, or at least something different

– T.S. Elliot

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