

How to balance win/loss ratio

- No win/loss ratio in the traditional sense because every spin is made from a random number generator and spin to spin is independent of one another
- However the house generally will give themselves an edge by making changes to the game design.
- Designers will tweak how volatile the rewards are of the game, meaning that they might use small hits to give you a sense that you are winning
- A low-volatility game produces more frequent modest wins; a high-volatility game produces longer dry spells but bigger occasional payouts.
- This culminates into a percentage RTP, or the expected return of the player when playing the game. For example, a 90% rtp means the return will be about 90\$ for every 100\$ wagered, which means the house will have a 10% edge
- Generally even a 1-2% edge will win the house a lot of money in the long term
- This RTP can be calculated before hand given the odds and the payout
- $RTP = (\text{probability of each outcome}) * \text{payout of that outcome}$
- We can manipulate the probability of each outcome by weighing different symbols to appear more together or individually and then designing payouts for different outcomes.
- Surprisingly, the phenomenon that we all experience when we open loot boxes, where we get a near miss, is calculated by the house.
- Research has shown that near misses can increase motivation to continue, speed up the next spin, and sometimes increase later betting.
- Mechanically, casinos can program near misses as so: use a rng to select a stop from a large set of virtual reel positions. [Title:](#)
 - Virtual reel position is basically a position in a list that can be mapped to symbols that will appear on the screen when you roll
- Virtual reel positions are chosen as sort of a hashmap because you can weigh these positions more since they are in the software. They can make certain symbols appear more together or cooccur together more frequently. For example they can weigh that the first 2 symbols will be a banana together more often, than all three positions will be a banana, (hence getting a smaller payout on avg, but the illusion that you were so close to the big one).

What is the science behind sound effects

- Sound plays an important role, influencing the stress response and the excitement of players.
- The use of sound for positive reinforcement, such as for wins is important
- One study demonstrates that gamers misremember the number of wins when playing with sounds switched on, compared to playing on mute
- Winning sounds are important to the popularity and attraction of the machines, and losing sounds are rarely heard

- The paper entitled “The Impact of Sound in Modern Multiline Video Slot Machine Play” (Dixon et al., 2013,) showed a tendency to focus on successes rather than losses, making players feel better overall.
- Winning sounds are designed so they could be heard over any loud ambient sounds.
- It draws attention to the machine and raises the self-esteem of the player
- Often the winning music contains high-pitched, brighter sounding songs, which has a tendency to increase the perception of urgency
- Use of loud sounds serves to create feelings of excitement that distract the player by increasing cognitive load
- This gives the impression that winning is much more common than losing.
- Advertising research suggests that image and sound, when used together tend to amplify each other, not just on its own.
- People find playing without sounds more boring
- The sound design should fit the theme.
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How to keep users?

- This ties into the near misses discussion described above in the how to balance the win/loss ratio
- We want to optimize the near misses and the rtp to maximize player return and house edge.
- Keep people coming back with new themes, seasonal events, missions, collections, achievement tracks, and “come back tomorrow” style reasons to return.
- Rewards help retention: VIP tiers, streaks for logins, missions, non-cash cosmetics, and occasional low-complexity bonuses.
- Make cash out reliable, this is apparently very important for users on the app store.
- Users tend to like slot machine apps that have a very flashy UI.
- Losses that are disguised as wins: this goes in tandem with sound design as if a player wins less than their bet, it can be disguised as a win with celebratory sounds and lights
- Having some kind of “bank” that accumulates as more ppl play, giving a higher payout and creates the impression that eventually someone would win.