Behavioral economics theory explains a popular banana-clicking video game

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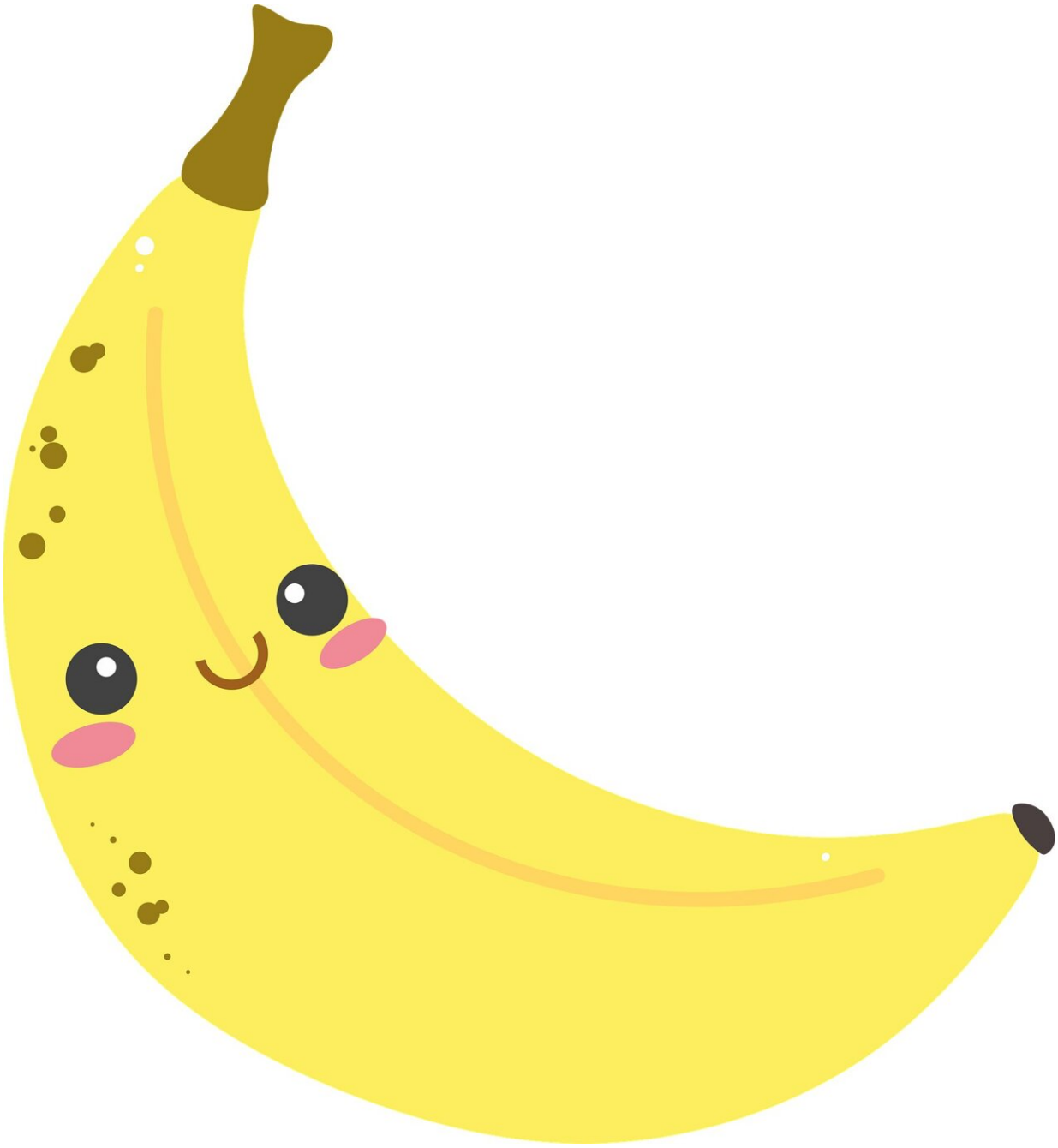

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In the ever-evolving online gaming landscape, one seemingly simple online game has captivated players. The free-to-play clicker Banana has

amassed more than 850,000 concurrent players on the gaming platform Steam.

The game involves clicking on bananas and being rewarded every so often with "skins." These are essentially virtual items that can be sold on the Steam marketplace for real money.

While most banana skins are close to worthless, some rare ones may sell for much more (much like rare NFTs did at one point). The highest-recorded sales have raked in upwards of US $1,300 (about A $1,950).

Since its release on April 23, Banana has eclipsed major titles such as Baldur's Gate 3 and Apex Legends, seemingly demonstrating mass appeal and the creation of a bustling virtual economy.

At the same time, most of the "players" aren't real people, according to the developers. They are bots, deployed in masses to maximize earnings for their creators.

Some might consider Banana a new and counterintuitive phenomenon. But it actually ties into a probability puzzle that's more than 300 years old.

This game highlights ongoing debates in behavioral economics about how people value future prospects and manage uncertainty—especially as these prospects come from increasingly complex and automated economic systems.

A game promising infinite amounts of money?

The renowned St. Petersburg paradox is likely the earliest known

behavioral dilemma and is thought to have catalyzed the development of "decision theory" as a scientific field.

The paradox was formulated by Nicolas Bernoulli in 1713 and later popularized by his cousin Daniel Bernoulli during his time in St. Petersburg, Russia.

It revolves around a theoretical coin game in which a player makes an initial offer (of their choosing) to play. Let's imagine the game pool begins at a value of $2. The coin is repeatedly flipped and every time it lands on heads, the potential winnings double. But when it lands on tails, the player must leave with whatever sum is in the pool.

As such, the player has a ½ chance of winning $2 dollars, a ¼ chance of winning $4 dollars, and a 1/8 chance of winning $8 dollars, and so on. And as long as the coin theoretically keeps landing on heads, they could end up winning an infinite amount of money.

The "paradox" here is that despite the infinite theoretical winnings, practical offers to play the game for any amount higher than $2 are likely to remain low. And this highlights a fundamental inconsistency between expected values in theory and real world decision-making.

Connections to Banana

In Banana's case, players face a situation similar to the St. Petersburg paradox in that the initial cost to join is minimal (merely the time spent clicking), but it comes with the potential to earn valuable skins (akin to the "theoretically infinite" winnings in the coin game).

However, unlike the St. Petersburg paradox in which high potential rewards fail to entice participants, playing Banana involves no monetary costs. The game's appeal also lies in the tangible nature of the rewards

(skins). These are easier for players to value and understand compared to the abstract payoffs in the paradox scenario.

Engagement with Banana can also be understood through the lens of something called "diminishing marginal utility"—a concept Swiss mathematician Daniel Bernoulli proposed as a resolution to the St. Petersburg paradox. It suggests the value of money decreases with increasing wealth. And this would explain why some players will invest their time in Banana (despite diminishing returns)—and others will not.

A cookie cutter formula

The St. Petersburg paradox fundamentally challenges our understanding of risk, value and decision-making amid uncertainty. And while the exact probabilities and mechanics of Banana differ from the St. Petersburg coin-flipping scenario, the underlying principle of weighing potential high rewards with initial low investment is relevant in both cases.

Both examples also highlight the importance of understanding specific probabilities in different reward structures.

Banana is not unique in its appeal. It's part of a much broader trend of games tapping into basic human instincts. These games (including Cookie Clicker, Diamond Hunt, Adventure Capitalist, Clicker Heroes, Farmville) range from idle clickers to more complex simulations that exploit mechanisms allowing for "exponential growth" and the thrill of accumulating (real or virtual) wealth and items.

While various behavioral science explanations such as prospect theory, the fear of missing out and the sunk cost fallacy provide insights into player behavior, the St. Petersburg paradox is key to understanding why these games are so captivating.

Bots and the new gaming economy

But there's yet another catch: The integration of bots in games such as Banana represents a significant shift in how they are played and perceived. In fact, bots can influence the entire microeconomics of such a digital game.

The bots function as tools to maximize expected returns, much like algorithmic trading systems in real financial markets. They harness the game's reward mechanisms to endlessly repeat tasks without fatigue and inflate the number of transactions.

In doing so, they disrupt the game's natural supply-demand equilibrium. This may result in inflationary spirals, where the value of rewards diminishes due to their abundance, or deflationary trends, where too much efficiency leads to undervaluation of routine tasks and rewards.

Bots also raise ethical questions. For instance, players who use them gain an unfair advantage over those who don't by progressing at a faster rate. This can lead to a two-tier gaming environment that undermines the integrity and competitive nature of the entire gaming experience.

Developers should continuously update game mechanics to mitigate the advantages bots provide—much like how we have regulatory measures in financial systems to ensure fairness.

Banana's developers are aware Banana's minimal resource demands have made it an attractive target for exploitation. They're working on adjusting the game to address the bot problem and have supposedly contacted Valve (Steam's developer) to find solutions. But it's hard to say when they will come, or what they will look like.

As we grapple with these issues, games like Banana continue to blur the

lines between paradox, profit and play.

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