

The Brand Stickiness Mechanism of Uncertain Rewards: A Case Study of Mall Claw Machines

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Abstract. In experiential retail, uncertainty reward is becoming an important factor to promote consumption. This study takes the shopping mall claw machine as a case to analyze the psychological path of repeated consumption and the mechanism of establishing brand dependence. Qualitative methods were used to conduct in-depth interviews with 15 players to reveal their participation motivation and cognitive bias. The analysis shows that player behavior is mainly affected by the illusion of control and the near-cause winning effect. The former enables players to attribute random results to their own technology, while the latter enables near-misses to stimulate dopamine release and strengthen the urge to try again; these psychological effects are also enhanced by offline environment and onlooker factors. Studies have shown that brand stickiness depends on the behavior cycle driven by psychological expectations, rather than the product function itself; the research conclusions can provide reference for experiential business strategy design and consumer rights protection.

Keywords: Uncertain Rewards, Brand Stickiness, Illusion of Control, Near-Winning Effect, Behavioral Economics

1. Introduction

A common consumption phenomenon in shopping malls is that many people are willing to throw a lot of coins into the claw machine to catch plush toys, but the retail price of these toys is often only a small part of the amount invested; a small doll with less than ten yuan often allows players to spend hundreds of dollars to catch. It is worth noting that when they repeatedly fail to catch, the player will not walk away directly, but will try again and again. This kind of high-frequency input consumption is not consistent with the rational man hypothesis of traditional economics, because according to that theory, consumers should stop when the cumulative cost exceeds the expected return, but the actual behavior is not the case, which shows that in these consumption scenarios, people's satisfaction not only comes from the toy itself, but also a large part from the psychological level in the consumption process. Grab the baby machine is actually just a concrete manifestation of the big phenomenon of uncertainty reward economy.

In addition, blind boxes, card games and promotional sweepstakes on live platforms are also typical examples of this type; according to the data released by the industry, the market size of the grab doll machine has exceeded 30 billion yuan in 2023, and has maintained an annual growth rate

of more than 12 % in recent years. In the face of this trend of continuous expansion, whether from the perspective of theory or business practice, it is of certain value to clarify its growth mechanism. In the existing behavioral economics and consumer psychology research, some scholars have proposed that unfixed reinforcement arrangements and uncertainty of results can indeed improve consumers' participation enthusiasm to a certain extent. However, there are still many gaps in the understanding of how these temporary psychological states gradually transform into long-term dependence and stickiness on brands in a real, multi-sensory offline business environment.

The core issue to be examined in this study is what kind of internal psychological mechanisms do uncertainty rewards promote consumers' repeated consumption, and how these mechanisms generate continuous brand stickiness in the physical retail environment; in order to answer these questions, the researchers used a semi-structured interview method in qualitative research to carefully examine the various characteristics of players in the decision-making process, the trajectory of emotional changes in the participation process, and their various perceptions and evaluations of their own consumer behavior.

From a theoretical point of view, the significance of this study is mainly to integrate the relevant knowledge of behavioral economics and cognitive psychology to build a relatively coherent analytical framework, so as to better describe the evolution process from uncertainty to brand loyalty. From a practical point of view, this study can also provide some valuable references for business operators. On the one hand, it can help them design more attractive consumption experience. On the other hand, it can help them identify the boundary conditions that need to be paid attention to, and avoid the problem of excessive induction or even predatory operation in mechanism design.

The overall structure of this article is arranged in this way. The second part makes a systematic review and review of the existing research on uncertainty incentive, cognitive bias and reinforcement mechanism. The third part gives a detailed account of the qualitative research design adopted in this study and the screening methods of participants. The fourth part presents some findings obtained through empirical analysis, specifically related to the two aspects of cognitive attribution and the reinforcement effect at the neural level; the fifth part mainly discusses the possible enlightenment and significance of these findings from the perspectives of theory and practice. The sixth part is a summary of the whole research, and also puts forward some corresponding regulatory suggestions, and makes a prospect for the future research direction that can be further explored.

2. Literature review

If you want to understand the reason why uncertainty has that kind of incentive effect, you must first examine the classic behavioral psychology, behavioral economics, and modern consumer research in these different areas of some of the relevant theories; the existing literature has actually provided a more critical theoretical basis for explaining a phenomenon. This phenomenon is that those results are not guaranteed in advance, and are often more likely to cause consumers to participate and invest in a higher degree than those predictable fixed rewards.

2.1. Uncertainty as a motivational driver

In those classical economic models, risk and uncertainty are usually regarded as a kind of negative utility, that is to say, rational actors generally try to avoid them, or they need to be compensated to be willing to bear these things [1]. However, some results of behavioral research have shown that

under the condition of that specific low risk, uncertainty can actually play a relatively strong incentive role. Hsee and Shen pointed out in their research that uncertainty itself has an inherent 'incentive attribute' [2]. In their experiment, they compared the two situations of fixed reward and uncertain reward, and found that those participants who were assigned to uncertain reward conditions were significantly higher in the two indicators of behavioral persistence and effort. The amount of output they finally completed is almost twice that of those participants in the fixed reward group [2]. This research result also means the psychological excitement and arousal state stimulated by uncertainty. In fact, it has nothing to do with the actual value of the reward itself [2].

On the basis of this research, Goldsmith and Amir further pointed out the role of the psychological phenomenon of 'optimistic bias' in the promotion activities. In their research, they found that when consumers are faced with uncertainty rewards with lower risk, they tend to overestimate the possibility of winning the prize at the system level [3]. This cognitive bias will make consumers' evaluation of those uncertain promotion activities far better than the level that objective probability should support. Moreover, the actual effect of this promotion method is often not worse than that of the more valuable but determined reward method, and sometimes it can even reach almost the same level [3].

2.2. Reinforcement schedules and behavioral persistence

The theoretical origin of the behavior persistence that can be observed in the environment of uncertain reward can actually be traced back to the principle of operant conditioning established by Skinner [4]. Skinner once pointed out in his research that the reinforcement arrangement of variable ratio (VR), specifically, is that the reward appears randomly after the participant makes an indefinite number of responses. Compared with the two reinforcement methods of fixed ratio or fixed interval, the response frequency caused by VR is the highest, and the participant's resistance to behavior regression under this arrangement is also the strongest [4].

In contemporary marketing practice, Silk once made a corresponding assessment of the variable reinforcement methods used in consumer loyalty programs [5]. He concluded that the random and unpredictable reward structure, compared with those fixed reward programs that set clear thresholds and the results can be known in advance, can often maintain consumers' enthusiasm for participation for a longer time, and can also keep them active for a longer time in these programs [5]. The psychological mechanism behind this is actually that there is a sense of expectation that the participants will continue to have a 'next attempt may win'. It is this persistent expectation that makes it difficult for the target behavior to fade [5].

2.3. The near-miss effect and dopaminergic response

There is a relatively core cognitive phenomenon in the uncertainty reward mechanism, that is, the so-called 'near-winning effect'; according to Reid's definition, nearly winning a prize means that a result is very close to winning at the visual or perceptual level, but in the end it is not really rewarded [6]. Psychological research and neurobiological research have shown that the human brain does not treat these near-winning events as a complete failure when dealing with them, but will understand such events as a signal that is gradually advancing towards success [6, 7].

According to the situation revealed by the neuroimaging study, the result of almost winning the prize can actually trigger the activation of dopamine in the striatum of the midbrain, and the intensity of this activation is basically the same as the level of neural activity recorded in the actual winning time. In some cases, it is even higher than the latter [7, 8]. Therefore, the result of nearly

winning the prize does not make the participants feel discouraged or want to withdraw. On the contrary, they can play a relatively strong reinforcing role at the psychological level, because this experience will give the participants a feeling that success is imminent, and it is this feeling that further encourages them to continue to invest and participate [6, 8]. This effect has been extensively documented and confirmed in commercial gambling devices, such as slot machines, which are often intentionally adjusted by designers in terms of mechanical configuration and lottery settings. The purpose of this is to make the frequency of near-winning events significantly higher than the level that the natural statistical distribution should have been [6, 8].

2.4. Theoretical synthesis and research gap

Although the existing literature has made a relatively full record of the various specific levels involved in uncertainty, such as variable enhancement, optimistic bias, and the dopamine response to the nearly winning prize, etc., there are still two major limitations in the current research status:

Most of these existing studies are carried out in a controlled laboratory environment [2, 3]. In fact, there is no way to completely copy the complex and multi-sensory real scene in the physical commercial space, because the latter usually includes background music, changing lighting effects, social gaze from people around them, and the actual physical interaction between consumers and equipment [9].

Another limitation is that most of the current empirical research focuses on the immediate response of short-term, single-participation behavior, so the theoretical explanation of how these temporary psychological states gradually transform into long-term brand stickiness and habitual consumption is relatively limited [9, 10].

The previous literature review work actually provides the corresponding theoretical basis and direction guidance for the analysis framework of this study. This study did not choose to examine these mechanisms separately, but integrated the control illusion, the dynamic process of proximate cause winning, and the environmental cues at the sensory level in the specific scene into the same analysis model. By constructing such an integrated framework, we can better explain the real-time psychological arousal generated in the physical retail space, and what kind of path is gradually transformed into long-term retention and continuous patronage of consumers.

3. Methodology

In order to make up for the shortcomings of previous studies based on laboratory environment, this study adopts the method of semi-structured interview in qualitative research to carry out specific investigation.

3.1. Methodological rationale

The core theoretical concepts involved in this study, such as 'perceptual control', 'emotional intensity brought by nearly winning the prize' and 'subjective brand attachment' and so on, are biased towards qualitative, experiential and highly related to specific situations in nature. If we use that kind of pure quantitative questionnaire survey, researchers can only measure those variables that have been defined in advance, and there is no way to capture the cognitive attribution process and subtle emotional changes experienced by consumers in the process of participation.

By using the qualitative research method of semi-structured interview, this study can use the players' own words to present their thoughts and feelings in the process of consumption decision-

making. This approach is also consistent with the exploratory nature of this study, because the study itself focuses on how those real-time psychological reactions are transformed into persistent brand stickiness step by step. It should be noted that in order to ensure the clarity of the research method and the consistency of the whole research, this study did not adopt the method of quantitative questionnaire, but chose the design path of in-depth qualitative research [11].

3.2. Participant selection and sampling logic

When selecting participants, this study uses a combination of purposeful sampling and snowball sampling. The purpose of this study is to find individuals who have rich and repeated experience in catching claw machines in shopping malls. In order to ensure that the collected data has a certain richness and fullness, the study also set up some basic screening conditions. Participants need to maintain the frequency of playing catch machine at least twice a month for the past six months, and their total consumption amount in places such as commercial game halls or shopping mall counters also needs more than 100 yuan.

Finally, 15 participants were interviewed, including 8 females and 7 males. Their age distribution ranged from 18 to 32 years old. The number of samples is not randomly determined, but based on the standard of data saturation to make a judgment, that is to say, when the interview to a certain extent, the new interview has no way to provide new theoretical insights or new themes on participation motivation, cognitive attribution or brand retention. At this time, it can be considered that the sample size is enough.

3.3. Data collection procedure

The interview was conducted in two ways. One was to do face-to-face communication in a quiet place near the game hall, and the other was to complete through online voice calls. Each interview lasted about 30 to 45 minutes.

The whole interview outline is mainly designed around four themes. The first theme is the initial driving factor, mainly to understand how the players first came into contact with this thing and what the reasons for their participation are; the second theme is cognitive evaluation, which focuses on the real-time cognitive response and emotional changes of players in the face of different results such as win, failure and proximate win. The third topic is about the attribution of skill and luck, that is, to explore the player's own views on the relationship between operational skills and probability results, which also corresponds to the evaluation of the concept of illusion of control; the last theme is the formation mechanism of brand loyalty, which mainly focuses on what factors will prompt players to repeatedly patronize a specific claw machine point or game hall brand.

All interviews were recorded with the participants' prior explicit consent, and then these recordings were transcribed verbatim into text materials, eventually forming more than 120,000 words of original text data, which will be used for subsequent coding and analysis. In the process of data analysis, the researchers used the method of thematic analysis to systematically process the post-transcriptional text materials. The specific operation steps were based on the six-stage analysis framework proposed by Braun and Clarke [12].

The whole analysis process can be roughly divided into several steps. The first step is to be familiar with the materials, that is, the researchers first read the transcribed text content in order to record some preliminary observations and impressions; the second step is to generate the initial coding. The specific method is to openly encode the representative citation fragments in the original text, such as 'complaining about the claw angle', 'feeling a little worse', 'like those clean machines'

and so on. The third step is to find topics, which is to group them into a wider range of potential categories according to the correlation between the initial codes. The fourth step is to review the theme. The thing to do in this step is to cross-compare the extracted thematic framework with the original transcription material to confirm whether they are consistent and coherent at the narrative level; the final step is to define the theme, that is, to finalize the core theoretical categories, such as the concepts of 'cognitive skill misattribution', 'dopamine-related proximal win-driven' and 'place-level brand retention'.

4. Findings

Through the thematic analysis of the empirical interview data, the researchers identified a number of specific psychological and situational driving factors, which play an important role in the formation of continuous consumption behavior and brand stickiness.

4.1. Skill misattribution and the illusion of control

A core finding emerging from qualitative data is that players tend to systematically attribute the final results to their own operational skills, rather than to the probability program set by the machine itself. In fact, the operation mechanism of the common claw machines in shopping malls is mainly controlled by a fixed reward algorithm. Specifically, the strength of the claw will be electronically adjusted through an internal counter. For example, only once in every N time will a complete grip be maintained. However, despite the fact that the machine is such a reality at the structural level, 14 of the 15 participants showed a strong belief that their operation will directly determine the final outcome. During the interview, participants described in detail a number of specific operational 'tricks', such as creating an inertial effect by swinging a rocker (they call this 'swinging claws'), or aiming at certain points of force on the plush toys to lower the claws, or precisely controlling the timing of the paw drop button. When a certain capture fails, participants almost always attribute this failure to their own operational errors, rather than to the probability setting of the machine itself; a 26-year-old female participant once said: 'I knew the angle was right at that time, but I was half a beat slower when I pressed the button. If I adjust the timing after the next coin, and then flick the claw to the left a little bit, I should be able to tick that label. This cognitive level of error attribution, in fact, constitutes the basis for the generation of the phenomenon of illusion of control [13]. It is precisely because consumers believe that the fluctuation of results is dominated by controllable skills, rather than by random probability, so failure in their eyes is not an insurmountable economic loss, but only temporary operation shows a little problem. In this case, they will not choose to leave directly after the failure, but will re-adjust their operation strategy, and then immediately go to do the next attempt.

4.2. Dopaminergic reinforcement of the near-miss

From the respondents' answers, it can be seen that the most intense moment of emotional response in the whole game is not when the prize is actually captured, but the scene that is almost captured, that is, the claw has successfully grabbed the doll and moved in the direction of the exit, but fell off at the edge of the hole; many interviewees mentioned that at that moment there was a clear sense of increased physical and psychological tension and excitement. Almost winning doesn't make them feel frustrated and choose to leave. On the contrary, almost everyone understands the experience as a visually evidence that the machine is about to win or that victory is in sight. A 25-year-old male

gamer described that when the doll was raised to the top and then fell down at the edge of the hole, the heart beat faster, and it felt like it really touched its fur. At that time, it felt that another coin would definitely push it down. From the cognitive point of view, the proximate win is actually to redefine the absolute failure as a state of 'almost succeed', because the visual confirmation of the doll 's close to the hole will make the player feel that success is indeed achievable; this neurobiological feedback loop keeps the motivation level of participants at a relatively high level, thus prompting them to continue to invest and consume.

4.3. Social embedding and commercial environmental influences

From the qualitative data, it can be seen that the psychological cycle at the individual level, that is, the strengthening effect of control illusions and near-cause wins, will be significantly amplified in the physical environment of the game hall; the interviewed players emphasized the influence of various factors in the space, such as bright lights, victory sounds, stacked dolls, and onlookers. These factors together create a stronger sense of immersion. At the same time, the existence of companions or bystanders also brings the dimension of social identity. A 22-year-old male player said that when someone stopped to look, if he sent the doll to the edge of the hole and then walked away, it was as if he gave the victory to someone else. It feels good to catch the doll in front of others, but failure at the hole will feel the responsibility to get it out; this kind of social attention actually turns every coin into a public display of personal skills, both worried about the machine they have fed being picked up by others and eager to be recognized by people around them. Together, these two kinds of psychology greatly strengthen the player's investment behavior from playing to success.

The above findings illustrate how the short-term psychological arousal brought by uncertainty reward becomes continuous stickiness to specific places and brands over time. Consumers' attachment to the brand not only depends on whether they can catch the doll, but also comes from the perception of fairness and the evaluation of environmental experience. In the interview, players will distinguish between 'fair' and 'predatory' game halls. The former has reasonable claw power and often wins by proximate cause, while the latter has loose claws and basically cannot catch. Brands that are well balanced in probability design and have a high frequency of near-cause wins can better cultivate players' repeated patronage habits. A 23-year-old female gamer said that she went to a game room because the machine was not desperate, could not catch at least move, felt that there was still a chance, although it cost about fifty dollars each time but experienced stimulation, so she and her friends went to a fixed place every week.

In this industry, the formation of brand stickiness is fundamentally dependent on the predictability of the experience level provided under the uncertain results [14]. When a game hall brand can continuously provide that kind of high-awakening near-winning experience in a more attractive environment, and it is also equipped with good-quality physical prizes, consumers will gradually form a dynamic brand preference, and then establish the habit of fixed consumption every weekend.

5. Conclusion

This research has made some progress in the two directions of consumer behavior and uncertainty reward mechanism; it constructs an integrated analytical framework linking behavioral economics and offline experiential retailing, showing how individual-level cognitive biases such as control illusions and near-cause wins, together with physical sensory environments, promote repeated

consumption. The study also shifted the focus from the laboratory to the real game hall scene, indicating how multi-sensory variables and social variables amplify the effect of the change rate reinforcement arrangement; at the same time, it reveals the formation mechanism of brand stickiness, and points out that brand loyalty in experiential consumption depends more on the structural calibration of uncertainty itself, such as maintaining the appropriate frequency of near-cause wins, rather than relying on traditional product utility or determined returns.

For people who do experiential retail and gamification operations, these findings can provide some design references. For example, the machine setting should avoid the binary result of non-win-lose, but let the player see the obvious proximate win process by adjusting the parameters, so as to maintain the psychological arousal and retain the perception of fairness; in the aspect of prize display, we should highlight those physical prizes with good quality and attractive appearance, so as to reduce consumers' regret after consumption; in the layout of the venue, the gathering needs of onlookers should be considered, because the space design that can accommodate bystanders helps to enhance the sense of participation at the social level. However, although the uncertainty reward mechanism can effectively establish consumer participation, there are also certain ethical risks. If the goal of experience design changes from creating surprises to taking advantage of cognitive weaknesses, the long-term accumulated brand reputation and value may be seriously damaged.

In order to ensure the sustainable development of the industry and the basic rights and interests of consumers, we can consider referring to the regulatory practices of Japan and other countries and regions on the blind box and card-drawing mechanism in terms of probability transparency, and require operators to clearly mark the approximate probability of winning the prize or related parameters on the machine body or screen; in terms of consumption ceiling, a digital display screen can be installed on the device to display the duration of the game and the number of coins in real time, so as to help consumers understand their own expenses and avoid excessive consumption; in terms of operational fairness, relevant regulatory agencies can set some minimum mechanical performance standards to prevent 'zero-grab' machine configurations that have no grasping ability at all.

This study also has some methodological limitations. The sample range is limited to the claw machine, so the research results may not be fully extended to those non-entity digital uncertainty platforms; although qualitative interviews can deeply understand the psychological attribution at the individual level, they cannot accurately quantify the specific threshold between the frequency of near-cause winning and consumer frustration. Future research can be expanded in two directions. One is to use longitudinal quantitative tracking to measure the long-term value changes of consumers under different types of uncertain reward forms. The other is to do cross-category comparative research, such as comparing offline entity blind boxes, mobile card games and commercial lottery activities on live broadcast platforms, so as to establish a relatively complete classification system.

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