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## **An Analysis of Operant Conditioning and its Relationship with Video Game Addiction**

Daniel Vu

*San Jose State University*, [danielvu1000@gmail.com](mailto:danielvu1000@gmail.com)

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## An Analysis of Operant Conditioning and its Relationship with Video Game Addiction

A report published by the Entertainment Software Association revealed that in 2015, 155 million Americans play video games with an average of two gamers in each game-playing household (Entertainment Software Association, “Essential Facts about the Computer and Video Game Industry”). With this massive popularity that has sprung alongside video games, the question must be asked: how are video games affecting today's people? With the current way some video games are structured, the video game rewards players for achieving certain accomplishments. For example, competitive video games reward players who achieve victories by giving them a higher ranking or other games display the player's score so that other players can see their score. With this in mind, some video game players may place more emphasis on their gaming achievements rather than their happiness or success in their own real lives. Once this emphasis has been placed, video game players have a chance to become addicted to their respective game; however, a distinction must be set between video game addiction and operant conditioning. Operant conditioning is a video game design that many of today's video games utilize. The use of operant conditioning towards a gamer can be one of the factors contributing towards video game addiction; operant conditioning is the strategy while video game addiction can be the by product or operant conditioning.

Before one talks about video games, they must first know what a game is. Games are “closed, formal systems that engages players in structured conflict and resolves its uncertainty in an unequal outcome” (Fullerton, 47). Games are closed in the fact that once engaged in the game, the player sets aside their rules for their daily life and accepts the rules of the game as the status quo. In a

way, the player undergoes a suspension of disbelief while playing their respective game. Games are defined on formal elements in the form of aesthetics, mechanics, or dynamics. Aesthetics are the emotional responses evoked from the player, dynamics work to create aesthetics, and mechanics are the various actions or mechanism available to the player to utilize in their respective game. These games are structured in a way where the player must face conflict with either the game, other players, or their self. The player will resolve these conflicts in a way that is not certain as no one except for the player knows what they plan to do. Every player has the possibility of solving these conflicts in a different way. With this in mind, video games encapsulate this through a different medium. Video games are created with software and are modeled after “some system in the world”(Bogost, “Persuasive Games”). Models are created for this system for which the player will interact with.

As the player is given choices when they resolve conflicts, rewards and punishments can stem from these choices. Up to no debate, players enjoy being rewarded for their choices and dislike being punished for their mistakes. With this in mind, game designers often “emphasizes the rewards while limiting the punishments”(Fullteron, 354). This design philosophy in turn helps game designers create systems of rewards and punishments. Games would be too easy in terms of difficulty if mistakes are not punished; however, games that are too hard make the player easily frustrated. A more balanced reward and punishment system may allow players to find that respective game more interesting.

Psychologist Nick Yee, co-found and analytics lead of Quantic Foundry, has done research on some addictive reward and punishment systems for games such as EverQuest, a MMORPG( massively multi-player online role playing games). His research findings have revealed that the addictive behavior behind these game systems may be a result of a behavior theory called operant conditioning. First proposed by psychologist Burrhus F. Skinner, operant conditioning's main claim is that the correlation between the numbers of times an action is executed is dependent on if that action is rewarded or punished. This concept is usually explained with the example of a Skinner Box. Skinner boxes are glass

cages equipped with a mechanism for the subject to do something. Most commonly, that mechanism is a lever. Inside these skinner boxes are a subject whom the test will be done. In most example, that subject is a lab rat. On initial placing into the skinner box, these rats have no idea what to do with the lever. Later on, these rats are conditioned to press the lever. Rats that are placed in these skinner boxes are rewarded with food pellets for pressing the lever an arbitrary amount of times. These behaviors are imprinted through a process called reinforcement which will be discussed later on.

Operant conditioning is used across many of today's video game titles. For example, most MMORPG games start the player off by giving them many instances of instant gratification. The player picks and starts a new character which where they start their first quest. Quests are essentially missions that the player has to fulfill, which is usually by completed by fulfilling an objective. These starting quests are usually very easy and the player is given everything they need in order to finish that specific quest. In Yee's research on Everquest, he revealed that on an initial new character "everything you need to do is close by- finding the guildmaster; finding mobs to kill"(Yee,"The Virtual Skinner Box"). Yee continues on and illuminates that the first monsters he had to kill took almost no effort. He was rewarded a level up(player character getting stronger) in about 5 monster kills. After a few levels, the easy initial tasks assigned to the player begin to take more time and effort. Mechanics such as leveling up, slaying monsters, or completing quests require way more time and effort; however, the rewards for these aspects "drive you to perform tasks more elaborate than before because trivial tasks are no longer rewarded"(Yee,"The Virtual Skinner Box"). The instant gratification the player receives initially is postponed to later on.

Peer recognition, especially in multi-player games, would function the same as the pellet of food in the Skinner box example. This need for peer recognition can be seen in Maslow's hierarchy of needs. This hierarchy is structured as a pyramid where basic needs such as food, safety, water, and rest are on the bottom. The middle of the pyramid is where psychological needs are: belonging,love, and

esteem. The top of the pyramid is where self-fulfillment needs are. Under Maslow's hierarchy of needs, esteem is the feeling of accomplishment. People want others to acknowledge their achievements in video games as a way of making them feel recognized for their efforts within the game. In video games, anyone can become a hero or champion. Defeating the final boss of any video could require hours, lots of effort, and a keen laser focus. After the defeat of this boss, players feel like heroes as their characters within the video game's story is also seen as a hero. Defeating another player in games such as first-person-shooters reward the player with score ratings. The higher the score, the better the player performed. These scores are updated in real time and shared with every other player in the game. Players in this scenario want to perform the best they can in order to have their peers recognize them. In the case of casinos, slot machines are designed to have the player stay for hours. They provide the player with many flashing lights and sound effects to reward the player when they play. If they lose money, they want to continue playing to make that money back. If they win money, the sound effects reveal to their surroundings that they have won. In turn for this effort, they make their money back and more while basking in recognition from their peers. What happens when it becomes easier to attain achievements in video games than it is in real life? Is it not easier to click a mouse than to actually take out the trash? When this neglect begins to happen as a result of prolonged exposure to operant conditioning, the player may suffer from symptoms of video game addiction.

The recent scientific studies of the concept of addiction reveal that there is evidence that points that addiction is caused by the underlying neural circuitry that fires when presented with the reward a certain substance provides as opposed to the theory that patients lose control because of the substance. The current understanding of addiction lies with the brain's reward system. The continued use of a substance helps activate the release of dopamine in the brain. Dopamine is a type of neurotransmitter, a chemical messenger. These neurotransmitters bind to molecules called receptors where they get absorbed in certain parts of the brain. Two areas of the brain produce dopamine: the

substantia nigra and the ventral tegmental area. Dopamine from the substantia nigra helps humans begin movement and speech. If the brain cells that are contained in the substantia nigra die, a person can have major trouble initiating movement. The ventral tegmental area releases dopamine in the brain when people expect or receive some kind of reward. This reward comes in many different mediums such as playing someone's favorite song, eating ice cream, and etc. The dopamine from this part of the brain relays information to the brain that whatever they just experience is worth getting more of. This also affects something called reinforcement. Reinforcement is the motivation for a person to do something again and again. Dopamine helps prompt people to seek out where to find important things such as food or water. The continued release of dopamine helps modify the neural circuits until these circuits respond to the mere anticipation of the reward( reinforcement and reward). Over time, this anticipation of the reward becomes a craving. As cravings increase, the dopamine receptors and their pathways become more tolerant to dopamine. This in turn means that the sense of pleasure is diminished and requires more dopamine to feel the same amount of pleasure.

Overexposure to dopamine causes changes in other brain areas. These changes can result in boosts of negative emotions, such as fear or stress, leaving people to seek the same source of dopamine to escape the clutches of withdrawals. Nora Volkow, director of the National Institute on Drug Abuse, says that people get activated on certain triggers. In the case of real drugs, this may be seeing the syringe or the sight of their local dealer. In video games, it could be “burst of speed from a successful trick or the cry of a defeated enemy”(Zastrow). The mobile game, Candy Crush, utilizes this approach towards its player base. In this game, players are tasked to arrange candies in rows and columns to align them in certain patterns. If done successfully, the game shows that row or column disappearing alongside a sound effect. Every time the player is presented with that visual disappearance or sound effect, they are getting conditioned to seeing that visual or hearing that sound effect to where it gets to the point that it is reinforced within the brain.

Operant conditioning can be contributed as one of the various factors for video game addiction. Through operant conditioning, players get rewarded for various tasks that increase in difficulty as the game goes on. In a way, they are placed in a skinner box. The player is conditioned to utilize mechanics at certain times in order to receive their reward. At first, the player is assigned easy tasks to inspire confidence and feel good. The initial rewards give the player instant gratification, which in turn reinforces that neural circuit in the brain. As the difficulty increases, the player's brain is spiked with dopamine as a result of the time and effort it took to complete that task. These continued spikes of dopamine over time cause the neural circuits to become tolerant to that dopamine. In time, it requires more dopamine than it did before to feel the same sanctification as it did before.

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