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Gaming the Gamer? – The Ethics of Exploiting Psychological Research in Video Games

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INTRODUCTION

Gamers' demands, expectations and willingness to spend money on video games have changed profoundly from the days of buying cardboard boxes filled with disks and manuals in a store. We now live in an age of stunning free-to-play games integrated as apps in your social media platform or smart phone. The video game industry is finding new ways to earn money, advertise, and persuade players to commit to playing their games for hours when there is a jungle of distractions just a mouse-click away. On top of this, potential gamers increasingly expect to constantly multi-task between windows and screens, instantly load any application without installation, and not to leave the web browser except for firing up an app on the smart phone or tablet (Bothun et al., 2012, Radwanick and Aquino, 2011). Game companies are facing a reality where their old marketing strategies may not work anymore and the prospects of making their game stick out and make any form of profit is dwindling. How can game companies survive this climate, and how is it possible that we still have very simple yet tremendously successful games like *Angry Birds*, *Bejeweled* and *Candy Crush Saga*? The answers may lie in psychology: the gamers' psychology, and the game companies' implicit or explicit exploitation thereof. The purpose of this paper is threefold: (i) to outline some important principles, findings and practices from behavioral psychology and behavioral economics that can be exploited in video game design; (ii) discuss their ethical justifiability; and (iii) propose constructive ways in which to counteract the most unethical forms of exploitation.

The use of psychology in video games

According to Mike Ambinder, Senior Experimental Psychologist at game developer company *Valve*, "More and more companies are starting to see the value in hiring psychologists or folks with a background in psychology" (Clay, 2012, p.16). Indeed, the American Psychological Association now lists "video game psychology" as a "hot career", stating that game companies regularly hire psychologists to consult on game design and conduct research on player experiences (Clay, 2012). If it is the case that psychologists increasingly assist game developers in game design, this is good news insofar as psychological tools, findings and principles are used to create a more enjoyable and rewarding gaming experience. At the same time, this could enable game companies to exploit various cognitive

biases, mental heuristics, conditioning and behavioral dispositions in such a way that gamers are willing to spend time and money on their games even if detrimental to their well-being and self-determination. Thus, there is an urgent need to consider the ethics of this practice, and find ways to *responsibly* make use of psychology in games.

Before proceeding, allow me to emphasize that it is not the purpose of this paper to criticize the involvement of psychologists in the game industry. Quite the contrary, I believe it is essential to draw on psychological research in order to enhance gamers' subjective well-being, skills training, autonomy and sense of purpose. I also regret that the scope of this paper does not allow for a comprehensive account of which types of game mechanics map onto which types of psychological phenomena – although I will refer to several sources of such a mapping, in particular the inspiring work of Jamie Madigan (2014). My more modest purpose is to briefly illustrate how some of the more well-known types of behavior-modification and cognitive biases *can* be used to manipulate gamers' behavior in ethically problematic ways, describe why video games are particularly well suited for such a purpose, and how we may counteract such influences by means of education rather than regulation. By “ethically problematic” I do not necessarily refer to addiction or other diagnosable consequences, but more informally to gamers' continued spending of time, money and/or energy on a game at the expense of health, social relations, important obligations and/or subjective well-being.ⁱ

I argue below that it is in many cases unethical to exploit certain psychological mechanisms for the purpose of making profit, but it may be problematic in itself that psychological research is being carried out by game companies and then directly applied to their game design. According to psychologist Amy Jo Kim, who is also CEO of the game design studio Shufflebrain: “The work is also fast-paced ... and that can be a shock to academics accustomed to conducting research slowly and carefully. ... researchers in the games industry work as quickly as possible, with the aim of putting results into immediate action to improve games” (Clay, 2012, p. 17). With this kind of pace, it is unlikely that these game companies, especially the smaller ones, have the time and resources to evaluate their findings in depth. Although all professional psychologists are expected to adhere to professional codes of ethics when conducting research, the importance of early release and business confidentiality also makes it impossible in practice for the research to be properly peer reviewed – let alone assessed by research ethics committees. Thus, it is of immense importance that we look more closely at the consequences of such practices and consider ways in which they can be counteracted.

What Makes Video Games Special?

What is it that makes video games special, and why is the use of psychology in video games possibly more worrisome than the ways in which it has, for a long time, been used in advertising, political rhetoric and gambling (Blanco et al., 2001, George and Murali, 2005)? I will argue below that video games, if designed in particular ways, can give rise to a form of obsession that is comparable (although not necessarily the same as) pathological gambling (see also Fisher (1994)). Still, the most obvious difference between video games and gambling is that there is, in practice, no regulation of game *mechanics*. Where gambling is legal it is typically heavily regulated, and most countries in which gambling is allowed disallow children from entering casinos and engaging in gambling to any substantial degree.ⁱⁱ Video games, on the other hand, are often aimed directly at children – and video game

regulations focus exclusively on *semantic* content that could be inappropriate for children (violence, sexual content, drug use etc.). To my knowledge, games are never regulated on the basis of the game *mechanics*. As I will outline in detail below, the game *mechanics* – or what Miguel Sicart (2009) helpfully distinguishes as the “procedural gradient of abstraction”ⁱⁱⁱ – is precisely where the potentially problematic exploitation of psychological research can be implemented.

This difference between games and the types of persuasion that have been informed by psychology for a long time, such as advertising and political rhetoric, can be described in terms of the difference between Pavlovian and Skinnerian behaviorism; between classical and operant conditioning. The pioneering work of Pavlov (Pavlov, 2003, Asratyan, 2001) was restricted to classical conditioning, in which responses to new stimuli are learned through association. This means that an already existing response to a given stimulus is paired with a new, unconditioned stimulus until that stimulus comes to elicit the same response. A common practice in both advertising and politics is to pair whatever it is that you are trying to sell with a stimulus that already contains positive associations, e.g. when otherwise unrelated celebrities endorse a product or through the widespread practice of pairing something with sexual imagery (De Houwer et al., 2001, Olson and Fazio, 2001). This can also be done in a negative fashion, by pairing a product with a stimulus that already contains negative associations, as exemplified by anti-smoking campaigns in which smoking is paired with disease or social exclusion (Kübler, 2001). What all these strategies have in common is that they rely on classical conditioning, but even more profound changes to behavior can be brought about by means of *operant* conditioning.

Skinner’s more radical type of behaviorism (Skinner, 1965, 1974) employed operant conditioning, in which behavior is rewarded or punished, and thereby strengthened or weakened. For this type of conditioning to occur, there must be some form of *interaction*, where a particular type of behavior is (more or less) consistently rewarded or punished. I will return to this in more detail below, but the important point for now is that video games are perfect for this type of operant conditioning. Indeed, many games even resemble the types of puzzles used by the behaviorist experimenters themselves. Since operant conditioning and reinforcement learning in general can contribute to drastic changes in behavior (Codd and Twohig, 2011, Bouton, 2007) and its neuronal basis (Schlinger, 2015), we need to start paying more attention to the way in which games may exploit such mechanisms to make gamers spend more time and money on their games. I will outline a couple of recommendations towards the end of this paper, but let us first look at how the application of psychological research to video games could be ethically problematic.

PSYCHOLOGY IN VIDEO GAMES

Our brain’s way of constantly seeking and finding relationships between behavior and reward lies at the core of many of the pathological changes in behavior that trouble us most in contemporary society, including addiction, depression, compulsive behavior, conformity, and xenophobia. Although we do not want to make the same mistake that the early behaviorists did, thinking that *every* change in behavior can be explained and brought about by conditioning or that animal research is sufficient for fully understanding human motivation (Lowe et al., 1978), there is little doubt that people’s behavior can be changed tremendously by manufacturing specific associations between

behavior and reward (Kirsch et al., 2004). Games, just like advanced slot machines, are perfect at manufacturing such behavior due to their inherently interactive and reward-driven mechanic.

More specifically, the design of game mechanics can – and often do – draw on various findings from psychology and behavioral economics. Several scholars have provided insightful analyses and overviews of how such principles are technically implemented in various games (see in particular Zagal et al., 2013, Lewis et al., 2012, Madigan, 2014), and I will discuss some of the most important ones for present purposes below. First, it is important to understand how different types of operant conditioning differ, and what kinds of effects they may have on gamer behavior.

Different Types of Operant Conditioning and Their Use in Games

Behaviorists discovered early on that different schemes of reinforcement would produce drastically different learning effects (Ferster and Skinner, 1957, Miltenberger, 2011, p. 152-156, Schlinger et al., 2008). The two main schedules of reinforcement were ‘fixed’ and ‘variable’. Fixed reinforcement schedules would present rewards according to a simple rule, e.g. that a particular behavior would produce a reward on every fifth occasion, or after a fixed amount of time. Variable schedules, however, would present a reward, for instance, on *an average* of every 50th trial, but could just as well occur after 1 or 100. The big difference between the two was that fixed intervals allowed the organism to, eventually, discover a pattern between behavior and reward, and to adjust their behavior accordingly. Variable schedules, however, allowed of no such pattern to be found, and would in some cases produce obsessive and seemingly irrational behavior – behavior that is often detrimental to the organism’s autonomy and well-being, as well as being more resistant to extinction (Wong, 2008, Cameron and Pierce, 2006, Miltenberger, 2011, Levy, 2006). The effect can most clearly be seen in gambling, where the random payouts constitute a variable rate schedule that in some cases lead to obsessive and pathological behavior (Blanco et al., 2001). Another problem with this type of learning is that when there are no reliable reinforcement patterns, we tend to fabricate and post-hoc rationalize such patterns based on accident – giving rise to superstitious belief and such familiar gambling expressions as being “jinxed”, “on a lucky streak”, or “out of luck” (Clark, 2011, p. 103). It is no secret that casinos and other gambling establishments exploit these phenomena (Schüll, 2012), and this is why gambling is heavily regulated in most jurisdictions – especially when it comes to disallowing gambling for children. Still, the exact same variable ratio operant conditioning reinforcement schedule is being used in video games, and these games are even *targeted* at children.

Why are variable ratio schedules so important to games? The most important reason is to avoid pauses in gameplay that make the player bored or distracted. Fixed reinforcement schedules are characterized by a big reduction in activity after the reward is presented, because the organism knows (consciously or not) that the next trial will not produce the desired result (Schlinger et al., 2008). Variable schedules, however, are characterized by high-rate, steady activity – there is no reason to pause because your next trial is the one that may be rewarded. The key is to keep gamers occupied while playing the game, to allow for a pause after having completed the daily “chores”, and then to offer an incentive for returning again later – often in the form of having one’s resources renewed at a particular time of day. In this way, developers can avoid gamers abandoning the game due to the simple and

repetitive nature of the gameplay by engineering bursts of gaming maintained by conditioning and having them return to the game by the promise of receiving renewed resources (or through “gifting”, as I will return to below).

The importance of sustained activity may seem to run counter to many casual games in which you run out of resources or have to take pauses, but this is a natural consequence of the relatively simple game mechanics involved in many of these games – which basically entails that gamers should *not* spend too much time in one sitting, or the gameplay will become too boring. Although less efficient, reinforcement need not be a reward but can also be a punishment, and another way of entrenching a new behavior is to punish the organism when it does *not* act in a particular way. When used in games, this can give rise to what is known as “Fear Of Missing Out” (Przybylski et al., 2013), and it can be a powerful means of making gamers return to the game when resources are renewed or when other timed events occur. One example of this is *Pro Evolution Soccer 2015*, in which you receive daily rewards that are lost if you do not log in and where some opportunities are only available during particular time windows. This can have a profound effect on gamers’ daily lives insofar as the fear of missing out on timed events dictates the gamer’s sleep cycle, when/whether to go to school/work, and whether or not to socialize.

Another issue that game companies often have to take into account is related to a phenomenon known as ‘behavioral contrast’ (Reynolds, 1961). It is difficult to reduce the reward rate once steady activity has been established, simply because such reduction tends to also reduce activity. In a famous experiment, Leo Crespi (1942) showed that rats that first had become reinforced with increasingly positive rewards but then shifted to smaller rewards would reduce their activity *below* that of the control group in which no reinforcement had been given. One way of overcoming behavioral contrast is to provide disproportionate feedback, where a small action will produce enormous rewards – such as a single click of the mouse producing a cascade of falling gems in *Bejeweled*. Games need to either keep up, or increase, the magnitude and ratio of reinforcement for a particular activity, or seamlessly direct the gamer onto other activities with equal or higher reinforcement strengths. In short, the current marketplace may punish games that do not condition high-rate activity coupled with a reason to return to the game after a break, and the problem is that it may be tempting to entice gamers to return to the game by means of exploiting reinforcement schemes and psychological biases, instead of having to provide a compelling storyline or stimulating game mechanics. If these insights from behavioral psychology can be used to engineer profound changes in behavior and well-being (Deci and Flaste, 1996, Reitman, 1998, De Houwer et al., 2001, Webb, 1999) this should be reason enough to be wary of their implementation in games given the central role they have in many of our lives.

Operant conditioning is particularly effective when it comes to entrenching novel types of behavior, and one of the most efficient ways of doing so is by a process known as ‘shaping’. This form of conditioning starts by rewarding an act that approaches the desired behavior. By gradually requiring more fine-grained behavior for the reward to occur, a large change in behavior can be produced incrementally. In Skinner’s own words, “In this way we can build complicated operants which would never appear in the repertoire of the organism otherwise. By reinforcing a series of successive approximations, we bring a rare response to a very high probability in a short time” (Skinner, 1965, p. 92). For this to work, game designers need to pay close attention to the successive trials of the game in order to, ultimately, make the gamers themselves prolong the life time of the game. In this manner, it is possible to gradually

shape gamer behavior in such a way that what may start out as a pleasurable activity is gradually shaped towards so-called “grinding”, which are repetitive, mindless and often boring tasks that only yield results much later on (Zagal et al., 2013). This can turn even the simplest of game mechanics into hours of gameplay. If the gamer is then presented with the possibility to bypass this grinding by spending money (as I will return to below), this can be a large return on a small investment for game companies.

In addition to the behaviorist principles discussed above, there are also several other psychological mechanisms and cognitive biases that can be exploited by game companies (see e.g. Madigan (2014) and Lewis, Wardrip-Fruin & Whitehead (2012) for comprehensive overviews). Many of these are related to findings from social psychology, and they are interesting and unique because their exploitation has largely been made possible by the increasing prevalence of the Internet – and social media in particular.

Social Comparison Theory

According to social comparison theories, competition between rivals depends on the commensurability and closeness of the rival, and their proximity to a meaningful standard (Garcia et al., 2006, Garcia and Tor, 2007). This means that competition – which readily translates to hours spent playing and getting better at a game – increases when rivals are close to approaching a particular well-defined goal. The most clearly defined measurement of success in contemporary games tends to be leaderboards, and in particular the top x players on this leaderboard (the x being determined by the scope of the game, but is often explicitly codified as “top 100” or similar). However, most games have a set of elite players whose skills and game points are far beyond the reach of average players, so how can games tap into the competitive streak in those who have little chance of reaching the top? The answer was provided by Internet gameplay, and social media in particular. That is, although the “top 100” might be far out of reach, the scores of your (actual or virtual) friends may be beatable. Thus, by creating local leaderboards populated with just a few competitors that you have either met online (e.g. *XBOX live*) or drawn from your actual set of friends (e.g. *Facebook*), social comparison again becomes a driving force. These leaderboards may also be divided up into several dimensions (ranked according to number of hours played, particular items collected, in-game currency, and so forth). Again, this is a driving force that can lead the gamer to spend hours “grinding” as described above. Indeed, such grinding can in some cases be irrelevant to the game plot itself, the *only* motivation being to compete on one’s local leaderboard.

The driving force of social comparison is sometimes discussed in terms of malicious and benign envy (van de Ven et al., 2009). Envy is generally a state of pain caused by the success of others. We tend to feel *malicious* envy towards anyone whose success we regard as undeserving, and benign envy towards those whose success we regard as deserved. Interestingly, only benign envy seems to provide positive motivation, other types of envy tending more towards destructive tendencies (van de Ven et al., 2011). Although both improving one’s own score and damaging that of others’ translate into hours spent playing a game, the former is a more sustainable source of motivation – and benign envy is less likely to lead to cheating and in-game vandalism. With single-player games as well as online games where you never interact with others, it is difficult to assess the merit of those whose leaderboard position you want to challenge. In these games, benign envy cannot be a motivational factor due to the simple fact that we have no

way of knowing whether the success of others is deserved or not. When the leaderboard consists of either actual friends or in-game friends whose skill you can see in action (primarily Massively Multiplayer Online games), it is much more likely that we experience a form of benign envy – a sense that the success of the other is deserved, which comes with the motivation to improve ourselves towards the same level. Again, this driving force is largely made possible by the Internet and social media, and it is a driving force that could be responsible for much of the popularity of games embedded in social media.

Another exploit made possible by social media is reciprocity from gifting. Facebook games often feature gifts that you can send to your friends without cost. Receiving a gift in this manner tends to facilitate a favor in return, “not by affecting general good-will or liking for the confederate, but primarily by making the subject conscious of a sense of indebtedness, inequity, or obligation toward the confederate” (Regan, 1971, p. 638). This either translates to more game play, in order to receive the same gift-giving opportunities as those from whom you receive gifts – or, importantly, it can bring back customers who had abandoned a game.

Assessment Problems and Ego Depletion

In addition to the effects discussed above, there are also several other techniques that can be used. Confusing our ability to assign value to something is a strategy common to most games that employ some kind of in-game currency. The most obvious strategy is to use an in-game currency that is difficult to convert into the corresponding value of one’s actual currency. Rarely will you see a game where a unit of game currency equals \$1 or €10. Typically you have to buy something like 800 credits at the price of \$12, making it hard to convert on-the-fly, and easier to make impulse purchases without comprehending the exact value of what one is purchasing. To make it even easier to spend one’s in-game currency, they will often be referred to as berries, gems, or some other term not commonly translated into actual value.

The common practice of purchasing a desired amount of credits to deposit into one’s in-game account also taps into the so-called waste aversion effect. In short, people may sometimes prefer to *be* wasteful in order to avoid *feeling* wasteful (Zultan and Bar-Hillel, 2010). This means that when you have already wasted actual money on a sum of in-game money, there is a drive to spend that in-game money such that the original purchase is not felt as wasted. Saving ones in-game funds may be less wasteful, but *feels* more wasteful because you did not really need to “invalidate” your actual money if it would only sit there in your in-game savings. This is closely related to the so-called sunk-cost bias, which is a motivation to spend more money on a project because abandonment would mean admitting that prior monetary investments were wasted (Arkes, 1996).

Another common practice is to exploit our natural bias for valuing scarce resources (Worchel et al., 1975). Games will often contain some resources or items that are in abundance, and some exceedingly rare objects that can normally be acquired only by completing some extraordinary feat or through sheer luck – such as looting corpses in *World of Warcraft*. Since having such items can lead to both monetary gain, game advantage and, not least, social status, gamers will often put extraordinary effort into acquiring them, translating into additional gameplay (again, typically in the form of “grinding”) or spending money as a shortcut – a win-win situation for game companies. This drive can be augmented by exploiting a phenomenon known as the endowed progress effect, where we are more

likely to complete a task if we feel that we are already underway. Nunes and Dreze (2006) showed that customers who got a card that required 8 total stamps to get a free item were less likely to complete the rewards card than customers who were given a card that required 10 stamps yet came with 2 stamps for free. Games can exploit this strategy as well, where many achievements will typically be partially completed through normal gameplay. If the same phenomenon holds for games, having accidentally acquired 4 out of the 10 items needed for some achievement will make the gamer more likely to invest time getting the remaining six than if six items have to be acquired from scratch. This kind of behavior can be exacerbated in gamers with a disposition for ‘hoarding’ (Graft, 2009), a form of obsessive-compulsive disorder in which someone acquires excessive quantities of objects. Since such hoarding is characterized by the excessive acquisition of objects without proportional utility, virtual objects lend themselves readily to such behavior as well. This behavior is also difficult to eradicate since hoarding is also characterized by lack of awareness of the severity of their behavior (Tolin et al., 2010).

There are also several cognitive biases related to our remarkable inability to understand statistics, perhaps best illustrated by the well-known Monty Hall problem (Krauss and Wang, 2003). Such inability to understand the implications of statistical regularities can lead to the erroneous belief that statistical outcomes apply to small and arbitrarily defined samples, most commonly experienced as the idea that several losses in a row increases the chance of winning in the next round. This can often be disastrous when gamblers place large bets because they think that they cannot lose any more times in a row, or when employing a strategy based on the premise that there are limits to how many times in a row you can lose (the so-called ‘martingale’ system).

Manipulating our ability to compare the value of in-game items with other things we might value “in real life” is another common exploitation of psychology in games. This can most clearly be seen in what is quickly becoming the most lucrative return-on-investment for game companies, the seemingly paradoxical “free-to-play” concept. Why would anyone wish to spend money on a game that is free to play? These games lure you in by completely removing any initial investment and offering two ways to play the game – you can either proceed through hard work (“grinding”) or you can buy your way to the top. When starting out, this naturally plays on our feelings of getting “paid” for your work, where not having to invest money is experienced as a way of saving that money. However, when competing with those who spend money you typically need to invest an extraordinary amount of hours – and when we invest so much time into something, it becomes hard to admit that this activity is meaningless. This is a variant of the sunk-cost effect discussed above. The gamers will usually come to a point where it turns out that all the time invested still does not allow them to compete against those who spend money, or that some game features are simply made unavailable to non-paying gamers. At this point, the time already invested would be wasted if one simply quits, so in an act of waste aversion we may start buying our way to the top. This might even come with the additional bonus that we feel good about our decision because it frees up the time we previously had to invest on a daily basis.^{iv} In this manner, a game that no one would buy “over the counter” on the basis of game features (which could arguably be said for games like *Farmville*, a rather simple farming simulation game) turns into some of the most popular and revenue-making games of all time. In a manner of speaking, this is a result of the two-way relationship between time and money. We start these games thinking that we save money by playing for free and

investing time instead, but once we start regarding the game as meaningful (because of having invested so much time in it), we start investing money instead of time.

Most of the mechanisms described above seem to take place at a fairly instinctual level. Surely, rational adults can counter-act these forces by the use of their ability for rational deliberation and will-power? I believe this is true to some degree, as argued elsewhere (Søraker, 2010) and as I will return to below, but our capacity for self-control can also be manipulated. ‘Ego depletion’ has become a generally accepted concept in psychology, and the core idea behind it “is that the self’s acts of volition draw on some limited resource, akin to strength or energy and that, therefore, one act of volition will have a detrimental impact on subsequent volition” (Baumeister et al., 1998, p. 1252). Baumeister et al showed that one act of self-control (such as resisting to eat a chocolate) can affect a very different act of self-control (such as finishing a difficult puzzle) – indicating that self-control is a resource that is being spent whenever we engage in *any* act of self-control.

This phenomenon can perhaps be most clearly experienced in casinos, where one might exercise self-control early in the evening but this quickly evaporates as the evening unfolds and one’s limited pool of self-control runs out. Games will often require self-control, and our returning example of “grinding” can be so boring and repetitive that we constantly need to exercise self-control in order to reach the next threshold – and to stop ourselves from buying our way instead. According to ego depletion theories, we can only exercise self-control so far, and the impulse to spend money becomes more difficult to resist the more time we spend in the game. What makes matters worse, illustrating the problem with these games being targeted at children, is that ego depletion is primarily a phenomenon that can be found in those under the age of 25 (Dahm et al., 2011).

If we add to this all the other psychological principles discussed above and elsewhere (cf. Zagal et al., 2013, Lewis et al., 2012, Madigan, 2014), a common result is that long-term free-to-play customers become buying customers – even those who had no intention of spending any money on the game in the first place. If this happens because of being manipulated by means of exploiting psychology to engineer obsessive and irrational behavior, rather than from gamers enjoying the game, this raises the question of whether there is anything that can be done to counter such practices.

ADDRESSING THE PROBLEM

The mechanisms and findings outlined in the previous sections should be sufficient to show that the exploitation of psychological research for the purpose of generating profit is ethically problematic. Still, the (applied) ethics community has not paid much attention to the issues involved. One reason might be a sense of ‘ought’ implying ‘can’, i.e. the sense that nothing much can be done to redress these kinds of developments. It is highly unlikely that any type of legal regulation will be of much help, mainly due to the familiar problems related to jurisdiction and the sheer volume of games distributed through non-moderated channels.

A rating system for these kinds of risks also seems unrealistic for the same reasons. Although their reliability and validity has been questioned (Walsh and Gentile, 2001, p. 1306), we do have video game content rating systems in place for *semantic* content in games (e.g. ESRB and PEGI). It is of course a time consuming process to rate games

based on semantic content, but these ratings only rely on identifying overt, audiovisual elements, primarily portrayal of violence, sex and strong language. It is a much more time-consuming process to rate games on the basis of interactive elements and their behavioral and psychological implications. Making a plea to game developers not to make use of the kinds of psychological phenomena and principles mentioned above also seems unrealistic in a highly competitive and over-saturated marketplace.

Because of the feasibility problems, one important concern – and an important issue for further research – is to clarify how game companies can retain the same level of gamer involvement without exploiting psychological research in ethically questionable ways. One of the main problems here is that game companies are now able to gather a vast array of real-time data about their customers: when they play, for how long they play, what they purchase and with whom they interact. If a particular game mechanic is introduced in a game and there is an immediate increase in gamer activity or in-game purchases, the game companies may naturally resort to that same game mechanic again and again. The problem is that there may be very different reasons behind the increase in gamer activity: Do they play more because they find the game more fun? Or, do they play more because they have become more obsessed?

Recent neuroscientific research on the relationship between rewards and dopamine neurotransmission suggests that our brains employ separate circuits for ‘wanting’ and ‘liking’, both of which can act as motivators (Berridge, 2007). The key difference is that the opioid “liking” paths and the dopamine “wanting” paths can result in the exact same overt behavior – we do something again and again because we have an urge to do so (‘wanting’) or because we experience pleasure (‘liking’). When game companies analyze customer behavior, however, “hours played” does not differentiate between the two. This is problematic since “wanting” without “liking” can lead to behavior that severely undermines our autonomy (Levy, 2006) and our well-being (Krentzman, 2013). As shown above, gaming hours can be exceedingly dull, especially when the majority of hours spent consists in repetitive “grinding”, so in order not to exploit psychology in an ethically questionable manner (whether intentionally or not), it is imperative that game companies ask themselves the question whether hours played reflect gamers’ obsession or fun.

It seems as if some game companies have forgotten that gamers can spend the same amount of money and hours due to the game being *fun*, and then gamers will recommend the games to their friends because the game is fun. Instead, many game companies may resort to the tactics above to *make* gamers spend their time and money *despite* lack of fun, and to push gamers to “recommend” the games to friends by *requiring* them to broadcast game events through social media. I admit that a turn away from these strategies may be utopian, however, since the tactics described above can allow for enormous revenue from relatively simple games that are cheap to produce. Conscientious game companies *should* consider abstaining from these tricks, however, and consumer activism empowered by metacognition (as I will return to below) can help bring this about.

Some ethical responsibility also lies with psychologists who seek a career in game development, whose training in mental health should give rise to an uneasy feeling when aiding game companies in exploiting gamers’ weaknesses. If we regard game psychologists as professionals, we should expect them to abide by their profession’s code of ethics. If we look at the American Psychologist Association code of ethics, it states:

Because psychologists' scientific and professional judgments and actions may affect the lives of others, they are alert to and guard against personal, financial, social, organizational, or political factors that might lead to misuse of their influence ... They are aware of their professional and scientific responsibilities to society ... Psychologists seek to promote accuracy, honesty, and truthfulness ... Psychologists respect the dignity and worth of all people, and the rights of individuals to privacy, confidentiality, and self-determination (American Psychological Association, 2010)

Exploiting psychology in games can go against many of these values if not done responsibly and professionally. As outlined above, such exploitation can have a dramatic effect on personal, financial and social factors, and it may harm the very capacity for self-determination emphasized in the code of ethics. It is important to point out that these kinds of effects on gamers may be unintentional side-effects due to the hectic pace of game development rather than any lack of professionalism on the part of the psychologist. A psychologist may provide recommendations to the game developers complete with cautions and caveats, yet have little control over how these recommendations are actually implemented by the game developers. The implementation, in turn, might not be an intentional act of negative exploitation on the part of the game developers, but simply result from not having the background in psychology needed to fully appreciate the consequences the recommendations may have if implemented in particular ways. It is still important to point out, however, that the rapid development cycle common to game development is not an excuse and it is also important to consider ways in which the various software development methodologies employed in game companies can implement checks and balances to avoid these kinds of negative side-effects. Indeed, psychologists can fulfil an important role in facilitating the integration of gamers and other stakeholders into the process of research and innovation itself. This remains pragmatically and economically challenging, however, especially for small game companies.

There is another constructive and possibly more realistic way of trying to mitigate the potential problems discussed above. My main concern, and the initial inspiration for this paper, is that although the psychological mechanisms and biases outlined above are typically covered even in introductory psychology courses, they are not generally well-known to people who have never taken such a course. Indeed, having taught similar topics at university level for many years, I am often surprised by how little of this has been taught in students' pre-university education. Given the non-feasibility of implementing legal regulations to combat the exploitation of psychology in games, the main (if not only) way to reduce the effects is to improve gamers' understanding of their own biases and weaknesses. This is what psychologists refer to as 'metacognition'. Metacognitive knowledge "consists primarily of knowledge or beliefs about what factors or variables act and interact in what ways to affect the course and outcome of cognitive enterprises" (Flavell, 1979, p. 907). The degree to which mere metacognition can make us resilient and resist temptation is clearly subjective and situational (Masten, 2007), but there is little doubt that metacognition *can* help us devise strategies for resisting or avoiding temptation. This is at least implicitly supported by several studies demonstrating that metacognitive strategies can be of help when overcoming various forms of addiction (Hajloo et al., 2014, Wasmuth et al., 2015) and that raising patients' metacognitive awareness about cognitive biases can be an important treatment for overcoming Obsessive-Compulsive Disorder (Moritz et al., 2010). To further illustrate the potential of metacognition, although less related to obsessive gaming, it has even been shown effective in treatment of severe mental health problems like schizophrenia (Lysaker et al., 2011). Metacognition can *at least* enable us to

arrange our lives in such a manner that we are not confronted with temptations that we, from experience and corresponding metacognition, know that we cannot resist. A common example of such a strategy would be the alcoholic who does not keep bottles at home and never goes to bars.

Lacking in understanding of one's own mental capacities and biases is particularly a problem for children and adolescents, which is part of the reason why gambling is normally illegal for children. With the increasing use of games that are targeted at children *and* exploiting children's lack of metacognition, the best strategy would be to *improve* children's metacognition. Since the exploits discussed above all relate to fundamental and widely shared characteristics of the human psyche, it is of crucial importance that we are aware of them at an early age. In other words, the most constructive solution to the problems discussed in this paper is simply to place much more emphasis on teaching basic psychology to children and adolescents.^v

Teaching behavioral psychology and metacognitive strategies to children and adolescents will not make them immune to these temptations and schemes, but it may increase the likelihood that they will catch themselves in their tracks. It might help them understand that the reason they poured so many hours into a game ultimately stems from psychological forces that have nothing to do with the enjoyment of the game – whether they did it because of having been conditioned in a particular way, not grasping the value of in-game items, being driven by social comparison, or any of the other strategies that could be employed by game companies. Enhanced metacognitive ability and control can make gamers ask themselves, “Am I really having fun?” and reflect on their own behavior accordingly. To make sure that they understand the relevance for their own lives, such education could even be framed in the context of these kinds of issues, for instance to provide an introduction to behaviorist principles by means of examples from the games they are used to playing. Indeed, this might be necessary to help pupils see the direct relevance of behavioral psychology for their own lives.

Such an insight, sometimes referred to as a ‘metacognitive experience’ (Flavell, 1979, pp. 908-910), can more easily allow us to quit a game that, all things considered, does not really contribute to our well-being – and to realize that one's unwillingness to quit is itself a result of manipulation. Indeed, if the gamer comes to the realization that her behavioral freedom is being limited by the way in which the game is designed, this could foster ‘reactance’ (Carver and Scheier, 1981, Crawford et al., 2002), which manifests itself as a refusal to comply with the corresponding behavior. For instance, recognizing that the game requires one to keep on “grinding” despite few if any occurrences of joy can (and should) lead to the metacognitive realization that the game mechanic is designed in ways that needlessly inhibit their freedom to enjoy the game – and a corresponding refusal to be manipulated in this way. By raising awareness about the exploitation of psychology in games and by improving the metacognition of gamers, the hope is that gamers can make more informed choices and that this in turn can affect the marketplace in such a way that game companies that produce fun games are rewarded instead of those that exploit psychology in ways that harm the well-being and self-determination of their gamers. The relationship between metacognition, reactance and behavior manipulation is not well understood, however, and would benefit from further empirical research.

CONCLUDING REMARKS

In this paper I have outlined several strategies that can be used by game companies to exploit our psychological weaknesses and cognitive biases, many of which are grounded in relatively simple forms of conditioning, reinforcement, ascription of value, and social comparison. I have argued that a promising way to resist these tactics is to gain a better metacognitive understanding of oneself, and that this is particularly important for children and young adults. More concretely, I recommend the teaching of psychology, in particular as applied to relevant aspects of their own lives, from an early age in order to facilitate increased metacognition. Part of the reason for this solution is the realization that game companies, who may often base their strategies on profit alone, cannot be expected to stop using tactics that demonstrably have a high cost-to-revenue ratio. We may plead for game companies to remind themselves that they do not have to resort to such tactics in order to make a game enjoyable and popular, and plead for psychologists working in the game industry to remember their training as mental health professionals and corresponding professional responsibility. If both of those options are unrealistic, as I believe they are, the best solution may be to make ourselves and our children more resilient by means of enhancing metacognition and our understanding of when we are being “gamed by the game”.

References

- American Psychological Association (2010), "American Psychological Association ethical principles of psychologists and code of conduct".
- Arkes, H. R. (1996), "The Psychology of Waste", *Journal of Behavioral Decision Making*, Vol. 9 No. 3, pp. 213-224.
- Asratyan, E. A. (2001), *I. P. Pavlov: His Life and Work*, University Press of the Pacific, Honolulu, HI.
- Baumeister, R. F., Bratslavsky, E., Muraven, M. and Tice, D. M. (1998), "Ego depletion: Is the active self a limited resource?", *Journal of personality and social psychology*, Vol. 74 No. 5, pp. 1252-1265.
- Berridge, K. (2007), "The debate over dopamine's role in reward: the case for incentive salience", *Psychopharmacology*, Vol. 191 No. 3, pp. 391-431.
- Blanco, C., Moreyra, P., Nunes, E. V., Sáiz-Ruiz, J. and Ibáñez, A. (2001), "Pathological gambling: addiction or compulsion?", *Seminars in clinical neuropsychiatry*, Vol. 6 No. 3, pp. 167-176.
- Bothun, D., Driscoll, L., Lieberman, M. and Yatsko, M. (2012), "The Evolution of Video Gaming and Content Consumption", available at www.pwc.com/us/en/industry/entertainment-media/publications/assets/pwc-video-gaming-and-content-consumption.pdf (accessed 10 May 2015).
- Bouton, M. E. (2007), *Learning and behavior: A contemporary synthesis*, Sinauer Associates, Sunderland, MA, US.
- Cameron, J. and Pierce, W. D. (2006), *Rewards and Intrinsic Motivation: Resolving the Controversy*, Information Age Publishing, Charlotte, NC.
- Carver, C. S. and Scheier, M. F. (1981), "Self-consciousness and reactance", *Journal of Research in Personality*, Vol. 15 No. 1, pp. 16-29.
- Charlton, J. P. and Danforth, I. D. W. (2007), "Distinguishing addiction and high engagement in the context of online game playing", *Computers in Human Behavior*, Vol. 23 No. 3, pp. 1531-1548.
- Clark, L. (2011), "Epidemiology and Phenomenology of Pathological Gambling", in Grant, J. E. and Potenza, M. N. (Eds.) *The Oxford Handbook of Impulse Control Disorders*, Oxford University Press, Oxford, pp. 94-116.
- Clay, R. A. (2012), "Video Game Design and Development", *GradPSYCH, January 2012*, pp. 14-17.
- Codd, R. T., III and Twohig, M. (2011), "Obsessive-Compulsive Disorder", in Goldstein, S. and Naglieri, J. (Eds.) *Encyclopedia of Child Behavior and Development*, Springer US, pp. 1032-1036.
- Crawford, M. T., McConnell, A. R., Lewis, A. C. and Sherman, S. J. (2002), "Reactance, Compliance, and Anticipated Regret", *Journal of Experimental Social Psychology*, Vol. 38 No. 1, pp. 56-63.
- Crespi, L. P. (1942), "Quantitative variation of incentive and performance in the white rat", *The American Journal of Psychology*, Vol. 55 No. 4, pp. 467-517.
- Dahm, T., Neshat-Doost, H. T., Golden, A.-M., Horn, E., Hagger, M. and Dalgleish, T. (2011), "Age Shall Not Weary Us: Deleterious Effects of Self-Regulation Depletion Are Specific to Younger Adults", *PLoS ONE*, Vol. 6 No. 10, p. e26351.
- De Houwer, J., Thomas, S. and Baeyens, F. (2001), "Association learning of likes and dislikes: A review of 25 years of research on human evaluative conditioning", *Psychological Bulletin*, Vol. 127 No. 6, pp. 853-869.

- Deci, E. L. and Flaste, R. (1996), *Why we do what we do: the dynamics of personal autonomy*, Penguin, New York.
- Drury, I. (2008), "One million children are addicted to gambling under New Labour's lenient gaming laws, say experts", *Daily Mail*, available at <http://www.dailymail.co.uk/news/article-1078940/One-million-children-addicted-gambling-New-Labours-lenient-gaming-laws-say-experts.html> (accessed 27 May 2014).
- Ferster, C. B. and Skinner, B. F. (1957), *Schedules of reinforcement*, Appleton-Century-Crofts, New York.
- Fisher, S. (1994), "Identifying video game addiction in children and adolescents", *Addictive Behaviors*, Vol. 19 No. 5, pp. 545-553.
- Flavell, J. H. (1979), "Metacognition and cognitive monitoring", *American psychologist*, Vol. 34 No. 10, pp. 906-911.
- Garcia, S. M. and Tor, A. (2007), "Rankings, standards, and competition: Task vs. scale comparisons", *Organizational Behavior and Human Decision Processes*, Vol. 102 No. 1, pp. 95-108.
- Garcia, S. M., Tor, A. and Gonzalez, R. (2006), "Ranks and rivals: A theory of competition", *Personality and Social Psychology Bulletin*, Vol. 32 No. 7, pp. 970-982.
- George, S. and Murali, V. (2005), "Pathological gambling: an overview of assessment and treatment", *Advances in Psychiatric Treatment*, Vol. 11 No. 6, pp. 450-456.
- Graft, K. (2009), "Analysis: The Psychology Behind Item Collecting And Achievement Hoarding", available at http://www.gamasutra.com/view/news/114668/Analysis_The_Psychology_Behind_Item_Collecting_And_Achievement_Hoarding.php (accessed 10 May 2015)
- Hajloo, N., Sadeghi, H., Babayi Nadinloei, K. and Habibi, Z. (2014), "The Role of Meta-cognition in Students' Addiction Potential Tendency", *International journal of high risk behaviors & addiction*, p. e9355.
- Kirsch, I., Lynn, S. J., Vigorito, M. and Miller, R. R. (2004), "The role of cognition in classical and operant conditioning", *Journal of Clinical Psychology*, Vol. 60 No. 4, pp. 369-392.
- Krauss, S. and Wang, X. T. (2003), "The psychology of the Monty Hall problem: Discovering psychological mechanisms for solving a tenacious brain teaser", *Journal of Experimental Psychology*, Vol. 132 No. 1, pp. 3-22.
- Krentzman, A. R. (2013), "Review of the application of positive psychology to substance use, addiction, and recovery research", *Psychology of Addictive Behaviors*, Vol. 27 No. 1, pp. 151-165.
- Kübler, D. (2001), "On the Regulation of Social Norms", *Journal of Law, Economics, and Organization*, Vol. 17 No. 2, pp. 449-476.
- Levy, N. (2006), "Autonomy and Addiction", *Canadian Journal of Philosophy*, Vol. 36 No. 3, pp. 427-447.
- Lewis, C., Wardrip-Fruin, N. and Whitehead, J. (2012), "Motivational game design patterns of 'ville games'", *Proceedings of the International Conference on the Foundations of Digital Games 2012*, Raleigh, NC, pp. 172-179.
- Lowe, C. F., Harzem, P. and Hughes, S. (1978), "Determinants of operant behaviour in humans: Some differences from animals", *Quarterly Journal of Experimental Psychology*, Vol. 30 No. 2, pp. 373-386.
- Lysaker, P. H., Buck, K. D., Carcione, A., Procacci, M., Salvatore, G., Nicolò, G. and Dimaggio, G. (2011), "Addressing metacognitive capacity for self reflection in the psychotherapy for schizophrenia: A conceptual model of the key tasks and processes", *Psychology and Psychotherapy: Theory, Research and Practice*, Vol. 84 No. 1, pp. 58-69.
- Madigan, J. (2014), "The Psychology of Video Games", available at: www.psychologyofgames.com (accessed 8 January 2015).
- Masten, A. S. (2007), "Resilience in developing systems: Progress and promise as the fourth wave rises", *Development and Psychopathology*, Vol. 19 No. 03, pp. 921-930.
- Miltenberger, R. (2011), *Behavior Modification: Principles and Procedures*, Cengage Learning, Belmont, CA.
- Moritz, S., Jelinek, L., Hauschildt, M. and Naber, D. (2010), "How to treat the untreated: effectiveness of a self-help metacognitive training program (myMCT) for obsessive-compulsive disorder", *Dialogues in Clinical Neuroscience*, Vol. 12 No. 2, pp. 209-220.
- Nunes, J. C. and Dreze, X. (2006), "The endowed progress effect: How artificial advancement increases effort", *Journal of Consumer Research*, Vol. 32 No. 4, pp. 504-512.
- Olson, M. A. and Fazio, R. H. (2001), "Implicit Attitude Formation Through Classical Conditioning", *Psychological Science*, Vol. 12 No. 5, pp. 413-417.
- Pavlov, I. P. (2003), *Conditioned Reflexes*, Dover Publications, Mineola, NY.
- Przybylski, A. K., Murayama, K., DeHaan, C. R. and Gladwell, V. (2013), "Motivational, emotional, and behavioral correlates of fear of missing out", *Computers in Human Behavior*, Vol. 29 No. 4, pp. 1841-1848.
- Radwanick, S. and Aquino, C. (2011), "Digital Omnivores: How Tablets, Smartphones and Connected Devices are Changing U.S. Digital Media Consumption Habits", available at: www.iab.net/media/file/Digital%2BOmnivores.pdf (accessed 17 May 2015).
- Regan, D. T. (1971), "Effects of a favor and liking on compliance", *Journal of Experimental Social Psychology*, Vol. 7 No. 6, pp. 627-639.
- Reitman, D. (1998), "The real and imagined harmful effects of rewards: Implications for clinical practice", *Journal of Behavior Therapy and Experimental Psychiatry*, Vol. 29 No. 2, pp. 101-113.
- Reynolds, G. S. (1961), "Behavioral Contrast", *Journal of the Experimental Analysis of Behavior*, Vol. 4 No. 1, pp. 57-71.
- Schlinger, H. D. (2015), "Behavior analysis and behavioral neuroscience", *Frontiers in Human Neuroscience*, Vol. 9, Article 210.
- Schlinger, H. D., Derenne, A. and Baron, A. (2008), "What 50 Years of Research Tell Us About Pausing Under Ratio Schedules of Reinforcement", *The Behavior Analyst*, Vol. 31 No. 1, pp. 39-60.
- Schüll, N. D. (2012), *Addiction by Design: Machine Gambling in Las Vegas*, Princeton University Press.

- Sicart, M. (2009), "The banality of simulated evil: designing ethical gameplay", *Ethics and Information Technology*, Vol. 11 No. 3, pp. 191-202.
- Skinner, B. F. (1965), *Science and human behavior*, Macmillan, Oxford.
- Skinner, B. F. (1974), *About Behaviorism*, Knopf, New York.
- Søraker, J. H. (2010), "The Neglect of Reason – A Plea for Rationalist Accounts of the Effects of Virtual Violence", in Wankel, C. and Malleck, S. (Eds.) *Emerging Ethical Issues of Life in Virtual Worlds*, Information Age Publishing Charlotte, NC, pp. 15-32.
- Tolin, D. F., Fitch, K. E., Frost, R. O. and Steketee, G. (2010), "Family Informants' Perceptions of Insight in Compulsive Hoarding", *Cognitive Therapy and Research*, Vol. 34 No. 1, pp. 69-81.
- van de Ven, N., Zeelenberg, M. and Pieters, R. (2009), "Leveling up and down: The experiences of benign and malicious envy", *Emotion*, Vol. 9 No. 3, pp. 419-429.
- van de Ven, N., Zeelenberg, M. and Pieters, R. (2011), "Why Envy Outperforms Admiration", *Personality and Social Psychology Bulletin*, Vol. 37 No. 6, pp. 784-795.
- Walsh, D. A. and Gentile, D. A. (2001), "A Validity Test of Movie, Television, and Video-Game Ratings", *Pediatrics*, Vol. 107 No. 6, pp. 1302-1308.
- Wasmuth, S. L., Outcalt, J., Buck, K., Leonhardt, B. L., Vohs, J. and Lysaker, P. H. (2015), "Metacognition in persons with substance abuse: Findings and implications for occupational therapists: La métacognition chez les personnes toxicomanes: Résultats et conséquences pour les ergothérapeutes", *Canadian Journal of Occupational Therapy*, Vol. 82 No. 3, pp. 150-159.
- Webb, R. (1999), "Operant Conditioning in Marketing", *Psychology of the Consumer and Its Development*, Springer, Boston, MA, pp. 257-284.
- Wong, S. E. (2008), "Operant Learning Theory", in Thyer, B. A. (Ed.) *Comprehensive Handbook of Social Work and Social Welfare. Volume 2: Human behavior in the social environment*, John Wiley & Sons, Inc., New York, pp. 69-99.
- Worchel, S., Lee, J. and Adewole, A. (1975), "Effects of supply and demand on ratings of object value", *Journal of personality and social psychology*, Vol. 32 No. 5, p. 906.
- Zagal, J., Björk, S. and Lewis, C. (2013), "Dark patterns in the design of games", in *Foundation of Digital Games* Crete, Greece.
- Zultan, R. i. and Bar-Hillel, M. (2010), "When being wasteful appears better than feeling wasteful", *Judgment and Decision Making*, Vol. 5 No. 7, pp. 489-496.

ⁱ For further discussion of the difference between games that produce high engagement as opposed to addiction, see Charlton and Danforth (2007).

ⁱⁱ The UK has some of the more lenient gambling laws, and also suffer from severe problems with addiction in youth (Drury, 2008).

ⁱⁱⁱ Sicart distinguishes between a video game's procedural and semantic gradients of abstraction, the former being "the direct interaction between agents and the state machine by means of game mechanics. This gradient is concerned with all the input/output operations performed by, and for, the modification of the game state within the limitations of the rule" (Sicart, 2009, p. 196). Sicart argues, parallel to the concerns raised in this paper, that "games in which agents just need to understand the procedural rules that determine the game state, without thinking about the actual moral implications of their actions, are deeply flawed in their ethical design" (Sicart, 2009, p. 196).

^{iv} I should add that some of this is conjecture and I have been unable to find empirical research demonstrating that the sunk-cost effect is applicable to time investment. I do not think this is very controversial, though, and there are several everyday examples of value ascribed on the basis of time invested in something and the socially constructed yet well-established norm of time and money being mutually exchangeable.

^v I regret not being able to go into detail about what types of education would best serve this purpose. This is partly due to the scope of this paper, but also a result of the fact that such a discussion should be interdisciplinary and the result of close collaboration with psychologists and educators. I hope to return to this in future research.

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