IS GAMING A PROBLEM: A MIXED METHODS APPROACH TOWARDS CREATING A
TAXONOMY OF GAMING OUTCOMES

JODIE NICOLE RAYBOULD

Doctor of Philosophy

ASTON UNIVERSITY

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Aston University

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Internet Gaming Disorder (IGD) was introduced into the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a potential disorder in 2013. The condition has been widely studied by researchers; however, there are many who criticise and debate the validity of this diagnosis and its symptom criteria.

This thesis began by taking a comparative approach to the debate, where IGD was compared against established addiction disorders to find commonalities that may justify its inclusion under the umbrella of addiction. Some similarities were found between IGD, gambling, and substance use disorders. The variables were all related to cognitive instability, an aspect of impulsivity, and a two-factor model of impulsivity was found that was similar to factor models previously reported for substance use and gambling. It was concluded that while commonalities do exist, the factor predicting maladaptive gaming was opposite to the predictor of gambling and substance use. This suggested a significant difference, prompting the question, how else can we establish whether gaming might be disordered?

To address this question the thesis took a new approach following the work of Loftus and Loftus. They wrote that a behaviour that is not good for the individual may be disordered; in other words, the harmful outcomes of behaviour outweigh the benefits. The key aim of this thesis was therefore to create a comprehensive list of potential outcomes from gaming. The taxonomy was developed and tested, and all but one of the listed items was endorsed by at least one participant. Over ¼ of the sample reported more harms than benefits, with the most common being lost time, irritability, and sleep changes. This work could support future research and practical developments in measures and treatments of IGD. However, further development of the taxonomy, such as weighted items, would be beneficial.

Keywords: *Internet Gaming Disorder, Addiction, Taxonomy, Harms, Benefits*

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CHAPTER ONE

A HISTORY OF GAMING

1.1   INTRODUCTION

The American Psychiatric Association (APA) listed Internet Gaming Disorder (IGD) as a potential addiction within the 5th Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013). This means that while gaming is not currently recognised as an official addiction by the APA, their Substance-Related Disorders Work Group have called for rigorous research into the disorder's validity, aetiology, and temporal stability (Hasin et al., 2013). There is consequently a lot of debate around gaming (Griffiths, 2016; Kardfelt-Winther, 2014; Petry et al., 2014), with some researchers believing that it can become problematic (Charlton & Danforth, 2007; Gentile, 2009), framing it as similar to substance abuse disorders (Petry et al., 2014), while others are cautious (James & Tunney, 2017), believing that further analysis is needed.

Despite ongoing debate around the validity of the condition, a scoping review by Darvesh et al. (2020) reported prevalence rates for IGD between 0.21-57.50% in general populations globally and 3.20-91.00% in clinical populations. However, they noted that large variations in diagnostic approaches suggest the need for caution when interpreting these results. Prevalence rates in the United Kingdom (UK) sit at the lower end of this spectrum, with Pontes et al. (2016) reporting 2.50% among adolescents. However, treatment referrals to the National Health Service (NHS) National Centre for Gaming Disorders is increasing, with a jump of more than half between 2021 and 2022 (NHS, 2023). Highlighting the continuing need for research into gaming as a disorder. So how can we analyse whether gaming is a potentially addictive behaviour?

In order to contribute towards answering this question, and bettering our understanding of gaming, this thesis will examine gaming in comparison to established addiction disorders. The existence of underlying similarities between gaming and recognised sources of addiction could suggest that gaming presents in a way that is representative of what we know about addiction currently. Expanding on this, I will then discuss the importance of harm as a measure of the real-world impact of disorder. Langham et al. (2015) recognised the importance of a standardised measure for harm, creating a taxonomy of harmful outcomes for Gambling Disorder. They created this comprehensive list with the

intention of improving harm-related gambling research, providing a comparable measure for harm that represented actual experiences, rather than proxy measures. This thesis will therefore contribute to the research on gaming by creating a comprehensive list of potential outcomes from excessive use of video games, similar to the work of Langham et al. (2015) in gambling research. A list of acronyms used throughout this thesis is shown in Table 1.1.

Table 1.2.

Table of Acronyms

Acronym	Definition
27-MCQ	Monetary Choice Questionnaire
ADHD	Attention Deficit Hyperactivity Disorder
AI	Artificial Intelligence
APA	American Psychiatric Association
AUD	Australian Dollars
AUDIT	Alcohol Use Disorders Identification Test
BIS-11	Barratt Impulsivity Scale
CPT	Continuous Performance Task
DSM-III / IV / 5	Diagnostic and Statistical Manual of Mental Disorders 3rd / 4th / 5th Edition
DUDIT	Drug Use Disorders Identification Test
GASC	Game Addiction Scale for Children
GD	Gaming Disorder
GD-4	Gaming Disorder Scale (Dichotomous 4-Item Measure)
GED	General Educational Development Certificate
I7	Impulsiveness Questionnaire (Eysenck)
ICD-11	International Classification of Disease 11th Edition
IGD	Internet Gaming Disorder
IGD-9	Internet Gaming Disorder Scale (Dichotomous 9-Item Measure)
ISS	Impulsive Sensation Seeking Measure
MMO	Massively Multiplayer Online Game
MMORPG	Massively Multiplayer Online Role-Playing Games
MMPI-2	Minnesota Multiphasic Personality Inventory
MOBA	Multiplayer Online Battle Arena
NHS	National Health Service
NS-SEC	National Statistics Social Economic Status Measure
OCD	Obsessive Compulsive Disorder
PCA	Principle Component Analysis
PGSI	Problem Gambling Severity Index
PICO	Patient/Population, Intervention/Interest Area, Comparison/Context, and Outcome
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analysis
RADIATE	Racially Diverse Affective Expression Face Set
SD	Standard Deviation
SUD	Substance Use Disorder
UK	United Kingdom
UPPS-P	Urgency, Premeditation, Perseverance, Sensation Seeking, and Positive Urgency
US	United States (of America)
USD	United States (of America) Dollars
VLT	Video Lottery Terminal
WHO	World Health Organisation

1.1.1 Humble Beginnings

The origins of video gaming can be traced back as far as 1940 when Dr. Edward Uhler Condon revealed a mathematics-based game at the New York World's Fair (Norman, 2022). Over the next few years, this early concept was built upon, and just three decades later Ralph Baer and his team introduced the first commercially available gaming system. Although it wasn't a huge success this simple console was the first example of gaming at home (Baer, 1968). Since these early innovations, video gaming has continued to develop at an impressive speed. The concept of Accelerating Change means that as each generation of technology is developed, it improves upon the previous generation, and can therefore be used to build new technology at a faster pace. This can be seen within the gaming industry, where the increasingly sophisticated storylines, realistic graphics, and variety of genres available today provide a vastly different experience from those simplistic beginnings. This rapid growth of the industry means that understanding the relationship between gaming and individual well-being is an important and current public health issue.

The idea that video games could be addictive was most likely introduced in the 1980s, when the first few studies on the potentially negative impacts of gaming began to emerge. While some of these early researchers argued that violent themes in video games encouraged aggression in impressionable minds (Anderson & Ford, 1986), others focused on the concept of games as addictive (Soper & Miller, 1983). This was a period of time where arcade gaming was popular, and Ross et al. (1982) reported that Americans were caught up in a "craze" centred around the game 'Space Invaders'. Similarly, Dr. Koop argued that young people were becoming addicted to arcade machines "body and soul" (Koop, 1982). While Dr. Koop had no evidence of his claim, Soper and Miller (1983) argued that they had directly observed students displaying compulsive behaviours, a lack of interest in other activities, physical and mental symptoms, and friendships that were entirely focused on an interest in arcade gaming. Soper and Miller in particular warned counsellors to look out for potential negative outcomes from gaming in school students.

Research into gaming continued with a focus on arcade machines. However, several studies found little evidence of harmful gaming. McClure and Mears (1984) described the young male gamers in their study as bright people who liked a challenge. Similarly, Egli and Meyers (1984) found that while approximately 10% of their sample displayed some compulsions related to gaming, no identifiable problems correlated with time spent playing games. Shotton (1989) also described gamers in their study as intelligent, motivated, and misunderstood. In addition, while the gamers in Shotton's sample described themselves as

"hooked," no standardised measure of addiction was used. Some early researchers even argued in favour of the educational benefits to gaming (Silvern, 1986).

Regardless, as the gaming industry developed, research into gaming addiction continued. Researchers began to include both arcade games and home consoles in their research, and in the early nineties Fisher (1994) developed a scale to measure gaming addiction. The scale assigned the label "addict" to any individual who answered yes to four or more of the nine survey questions. Internal consistency of the scale was acceptable for a nine-item inventory at α = .71, however it was only applicable to arcade machines. Fisher used this scale to analyse secondary school children in the UK, finding that arcade "addiction" may be characterised by an overwhelming need to play, and negative behaviour or emotional states related to this need. They suggested that since popular arcade games were being reproduced on home consoles, console gaming may be similarly addictive. Despite console gaming not including the repetitive financial burden of public arcade machines, this suggestion was supported by researchers such as Rutkowska and Carlton (1994). They found compulsive behaviour, withdrawal, and irritability in children who were not permitted to play games, and Keepers (1990) conducted a case study on a 12-year-old boy who stole to support his gaming.

Sources from the gaming industry claimed that by 1998, video games were part of a daily routine for 65% of all households in the United States (US; Kline, 2000). However, it wasn't until the 2000s that research into gaming as an addiction saw substantial growth, with around sixty published studies between 2000 and 2010 (Kuss & Griffiths, 2011). This growth in research interest coincided with the beginnings of online gaming. Although the launch of the internet took place in 1983, affordable internet was not available until Windows '95 was released. From 1995-1996 the percentage of internet-using households in the UK jumped from 1.9% to 4.1% (Johnson, 2021). This number continued to steadily increase each year, finally making online gaming commercially viable. In 1999 Nintendo created the Nintendo 64 gaming console, with an add-on that allowed for online play, and from the early 2000s onwards gaming consoles would be developed with built-in internet capabilities.

As online gaming developed a large majority of studies focused on online play. Newer genres such as Massively Multiplayer Online Role-Playing Games (MMORPG) were of particular interest to researchers (Kuss & Griffiths, 2012), and these studies suggested that excessive internet use, and online gaming, could lead to a number of negative outcomes. At this point in the developmental history of video games a large and varied list of game genres has been created, introducing additional complications to the classification and analysis of games as addictive (Table 1.2). However, in response to research on MMORPGs and similar game types, Block (2008) suggested that excessive gaming should be included in the upcoming DSM-5 to encourage high quality, standardised research.

In 2013, just five years later, the APA listed IGD within the DSM-5 as a potential disorder requiring more research (American Psychiatric Association, 2013). The proposed symptoms for IGD include preoccupation with gaming, withdrawal symptoms when abstaining, increasing use needed to satisfy urges, inability to reduce play time or quit, loss of interest in other hobbies, continuing to play despite problems, lying about gaming, gaming to relieve negative moods, and relationship issues.

Table 1.2.

An Overview of Videogame Genres

Category	Gameplay Elements
Action	Challenging player reflexes, hand-eye coordination, and reaction times
Adventure	Player explores the world and story through the eyes of a character
Driving	Players drive ground and water vehicles with realistic physics
Educational	Players learn information or develop practical skills
Exergaming	Players perform a physical activity to complete objectives (exercise)
Fighting	Player characters fight in real-time against one or more enemies
Flying	Players fly a vehicle, object, character, or creature with realistic physics
MMO	Multiplayer online games where several players interact online
Music/Rhythm	A player manipulates and composes music or performs or dances
Party	Multiple players in a social gathering play cooperatively or competitively
Platform	Players traverse between platforms avoiding obstacles and pitfalls
Puzzle	Players use problem-solving skills to complete various challenges
Racing	Vehicles, characters, creatures, or objects race in various environments
Real-World	Digital adaptations of real-world games like boardgames, pinball, etc.
Role-Playing	Control one or more characters, upgrading skills to beat challenges
Shooter	Players aim and shoot at objects or enemies
Simple Activity	Players repeat simple activities such as drawing, dressing up, cooking
Simulation	Individual tasks or events are realistically modelled
Sports	Virtually playing real or fictional sports and managing related activities
Strategy	Players employ tactical decisions to defeat opponents or achieve goals
Trivia	Players answer various questions on different subjects and themes
Virtual Life	Mundane day-to-day activities are simulated to reflect real-life

Notes: Video game genre is a term used to summarise core gameplay elements. Since the original classification of the 1980s terminology and genre lists have expanded and changed significantly. Multiple genres and sub-genres have been introduced by various stakeholders with some overlap between each category. This list of main game genres is sourced from the Gameopedia (2021) game taxonomy and does not reflect all available lists or explore deeper sub-genres and overlap between each of these categories.

1.1.2 Criticising the Formal Recognition of Gaming Addiction

"Nothing leads the scientist so astray as a premature truth."

Rostand (1973, p.89)

The introduction of IGD into the DSM lead some researchers to fully adopt the idea of gaming as an addiction and begin conducting research in support of the diagnosis. However,

many were still sceptical and offered some criticisms. These researchers argued that by including IGD within the DSM-5, some individuals might prematurely accept IGD as a behavioural addiction, believing the symptom criteria to be true without empirical support (Dowling, 2014; King & Delfabbro, 2014). In addition, it has been argued that recognising gaming as addictive could depreciate the value of the term addiction (Heller, 2008; Pies, 2009), and treatment models based on the theory of addiction could reduce self-efficacy by suggesting that individuals are not in control of their own behaviour (Van Rooij & Prause, 2014).

Several researchers have also offered specific criticism of the suggested IGD symptom criteria. Preoccupation with gaming has been criticised for being complex, and King and Delfabbro (2014) argued that preoccupation should be assessed in terms of cognitive content rather than time. Similarly, withdrawal symptoms in behavioural addiction can be considered as complex in nature. While some research has noted symptoms such as sadness, restlessness, and irritability as indicative of withdrawal (Petry et al., 2014), there is no clear physiological input to stimulate the reward pathway. Consequently, whether our internal neural system can produce a similar withdrawal effect is highly debated (Van Rooij & Prause, 2014). In addition, these negative mood states are not reflective of the withdrawal typically observed in substance addiction (Tapert et al., 2002). In response, Ko et al. (2005) argue that emotions felt after two weeks without gaming should be considered as cravings, and emotions felt in response to an external force preventing gameplay (such as an angry caregiver) should not be attributed to withdrawal either. The final contested criteria, lying about gaming, displayed the lowest diagnostic accuracy in a study of IGD (Ko et al., 2014). It could be argued that gaming is largely accepted within society as a normal activity, and therefore the need to lie about the behaviour may be less prevalent than in substance use, or even gambling which is now widely recognised as addictive.

In light of these issues, it is clear that more research is needed to understand gaming and avoid over pathologizing the behaviour. Pathologizing is when we view a symptom as indicative of a disease or disorder or regard a subject as "psychologically unhealthy or abnormal" (Oxford Languages, 2005). The concern when over pathologizing a potentially addictive behaviour is that it assumes the root cause of related issues lies with the behaviour itself, rather than acknowledging any potential underlying causes of the possible overconsumption. This could have the negative affect of unnecessarily restricting an activity which has positive benefits for some individuals, whilst providing ineffective treatment to people through ignoring the true cause of their problems.

Despite the valid comments made against prematurely recognising gaming as addictive (Dowling, 2014; Heller, 2008; King & Delfabbro, 2014; Pies, 2009; Van Rooij & Prause, 2014), in May 2019 the World Health Organization (WHO) classified Gaming

Disorder (GD) as an officially recognised medical illness within the International Classification of Diseases (ICD-11; World Health Organization, 2020). Many researchers have raised similar issues with the diagnosis and feel that its inclusion was inappropriate at this time.

In an open debate paper addressed to the WHO, several researchers discussed their belief that while problematic gaming behaviours need to be addressed, it is not yet clear whether these problems can or should be attributed to a new disorder (Aarseth et al., 2017). Within the paper the authors list a number of key concerns with the inclusion of GD in the ICD-11. Firstly, they argue that the quality of research in the field is not of a high enough standard, pointing out that there is no current consensus between scholars on the existence of GD. They next argue that the construct of GD relies too heavily on criteria from substance use and gambling. Comparison to established addiction disorders can be useful in research, however there are differences that should be recognised within diagnostic tools. Applying symptoms from other addiction disorders to gaming may pathologize thoughts, feelings, or behaviours that are not problematic in gamers, and criteria that are not specific to gaming may lead to falsely classifying gamers as having problems when they suffer little to no functional impairment or harm. Finally, the authors argue that there is no consensus on the symptomology of GD, or the assessment of problematic gaming. In particular they explain that a few studies involving patients found high comorbidity between gaming behaviour and other disorders. They state that it has therefore not been convincingly demonstrated that problematic gaming behaviour could not be better viewed as a coping mechanism associated with other underlying issues.

1.2 WORKING TOWARDS A CONSENSUS

With such a heated debate on whether gaming can be addictive, the question becomes, how do we decide? In other words, how do we measure whether an activity is harmful? In a book on the subject, Loftus and Loftus (1983) wrote that one concept of health that we can use asks, is the behaviour good for the person, is the person in touch with reality, and is the person's behaviour markedly different from the accepted norm?

Using Loftus and Loftus' explanation, the behaviour is bad for the gamer if it gets in the way of an individual's ability to deal with the world. Examples they give include feelings of self-hatred, isolation, and anxiety, and actions that interfere with schooling or other duties. The second question, has the gamer lost touch with reality, does not suggest that healthy people always view reality accurately. Rather, they state that the behaviour under consideration (in this case gaming) would need to consistently impact perceptions of reality,

to the extent where functioning is affected. They give the example of a gamer who believes that all other gamers steal to finance their gaming. Finally, on the question of socially acceptable norms, the literature on smoking suggests that social norms are commonly defined as perceived approval by friends, family, important peers, and society (East et al., 2018). However, in the 16th century smoking tobacco quickly spread across Europe as a socially acceptable behaviour. Smoking was an accepted social norm, but the substance was addictive. This final point is therefore perhaps an odd criterion on which to judge addiction. Instead, this point may reflect a risk factor for additional harm, as when behaviours are uncommon the associated stigma may increase.

Despite this, Loftus and Loftus argue that it is hard to assess whether gaming behaviour could be considered as markedly different from the norm. At the time of their book, they acknowledged that some people never play games, while others play for many hours. They therefore argued that it is difficult to confidently state whether the behaviour deviates from a social norm. Current estimates from Statista (2024) suggest there are now approximately 1.3 billion gamers globally. Regardless, social norms are applicable to a specific social group, rather than society as a whole. Despite this, even within the gaming community there is a wide range of experiences, where casual gamers who play a couple of hours a week, gamers who play daily, those who play for 24-hours in a row, and well-known figures in the industry who play for several days in aid of charity, are all viewed as equally "normal."

An alternative method to research the validity of gaming as addictive is analysing the behaviour for the presence of fundamental features of addiction. In other words, by comparing gaming to established addiction disorders are we able to see patterns in terms of the aetiology, progression, or outcomes of the behaviour? In order to achieve this several researchers have compared gaming against established addiction disorders and additionally made use of features that are known to strongly correlate with addiction, such as trait impulsivity.

1.2.1 Comparison to Established Disorders

Early researchers often used gambling and substance use to better understand gaming. In particular, gambling has been used as a comparable disorder due to being the only officially recognised behavioural addiction within the DSM-5. Despite this, when gambling was first introduced as a disordered behaviour in the Diagnostic and Statistical Manual (3rd Edition; DSM-III) it was listed as an impulse control disorder (American Psychiatric Association, 1980). This categorised gambling under the same section as

Kleptomania and Pyromania. Gambling was then reclassified as a behavioural addiction until the Diagnostic and Statistical Manual (4th Edition; DSM-IV; American Psychiatric Association, 1994).

Brown and Robertson (1993) attempted to measure addiction to gaming using questions from Gamblers Anonymous, finding a positive correlation between apparent gaming addiction and available money spent at arcades. Similarly, Rozin and Stoess (1993) attempted to understand a range of potentially addictive substances and activities using well-known components of addiction. They assessed participants for craving, tolerance, withdrawal, and lack of control, finding positive but low correlations with a range of behaviours, including gambling and gaming. Gupta and Derevensky (1996) argued that video games and gambling shared similar reward structures, explaining that both are exciting, include random chance, and intermittent reinforcement. In addition, they reported similar motivations to gamble and game, such as excitement, enjoyment, and passing the time.

This method of analysing gaming is still applied today, such as by Spekman et al. (2013), who made use of the Minnesota Multiphasic Personality Inventory (MMPI-2) to search for features of substance use in potentially problematic gaming behaviour. The relevant subscales were all developed to measure substance use, and include the MacAndrew Alcoholism Scale, the Addiction Potential Scale, and the Addiction Acknowledgment Scale. They found "problematic gaming" to be associated with all three subscales and concluded that gaming could become pathological for some individuals.

While criticism of using substance use and gambling criteria to formulate the GD and IGD symptomology is valid, it is also important to acknowledge the similarities between substance and behavioural addiction disorders. Recognising the individual differences between addiction disorders is important to fully understand each source of addiction, however we can also learn by comparing the similarities. For example, gambling has been shown to share many similarities to drug addictions, including poor performance on neurocognitive tasks and dysfunction in similar brain regions (Leeman & Potenza, 2012). Specifically, Leeman and Potenza found similarities in impulsive choice and response tendencies. Both behavioural and substance use addictions have been shown to involve deficits in impulsive choice in several other studies (Grant & Chamberlain, 2014b; Robbins & Clark, 2015), suggesting that aspects of impulsivity may be a key similarity between different addiction disorders.

Expanding on this, Fauth-Bühler and Mann (2015) reported that both IGD and problematic gambling were related to reduced loss sensitivity, increased reactivity to gaming/gambling cues, increased impulsive choice, and aberrant reward-based learning. They conclude that there is evidence to suggest similarities between IGD and gambling, but

that more research is needed to justify the inclusion of IGD within the DSM. Similarly, both Sanders and Williams (2019a) and Walther et al. (2012) found that potentially problematic gamblers and gamers were more likely to be males with higher impulsivity than non-problematic consumers.

In order to contribute towards bettering our understanding of gaming and whether it may constitute a behavioural addiction, this thesis will therefore begin by examining gaming in comparison to established addiction disorders. From chapter 2 onwards I will discuss ways to compare gaming against substance use and gambling disorder, and in chapter 3 I will focus on aspects of impulsivity in gaming. Using the proposed questions from Loftus and Loftus (1983), chapter 4 will then outline the importance of harm in addiction, examining some of the harmful outcomes observed in gambling research. Chapter 5 will review the research on various potential outcomes of gaming. These outcomes will be joined to form a taxonomy of harms and benefits in chapter 6, with the intention of supporting future research to answer the first of Loftus and Loftus' posed questions, is the behaviour good for the person? Specifically, this taxonomy will allow researchers to use a standardised list to determine whether there is a significant real-world negative impact from gaming.

CHAPTER TWO

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COMPARING GAMING TO ADDICTION

2.1 INTRODUCTION

There is considerable debate about how to define addictions (Shaffer et al., 2000; Shaffer & Kidman, 2003; Shaffer et al., 2004), and most researchers studying computer or video game use have developed definitions similar to the DSM-5 criteria for Gambling Disorder. Both IGD and Gambling Disorder are assumed to be behavioural addictions (Salguero & Morán, 2002) and are included in the DSM-5 under the relevant category. There is also a clear overlap between gambling and gaming since both activities involve consideration (deciding the wager or deciding the character/weapon), risk (chance or random number generators in-game), and reward (a prize/profit or winning the game/achievement). In light of these similarities, the inclusion of IGD in the DSM-5 calls for further research into the potential similarities between gaming and gambling addiction.

Early studies on arcade machines adopted gambling questionnaires for assessments (Fisher, 1994) and Mallorquí-Bagué et al. (2017) found that both gamblers and gamers in a Spanish population had higher psychopathological scores and less functional personality traits than a normative control group. Similarly, Fauth-Bühler and Mann (2017) found that the neurobiological underpinnings of IGD and Gambling Disorder were similar. Specifically, both groups displayed decreased loss sensitivity, enhanced reactivity to associated cues, enhanced impulsive choice behaviour, and aberrant reward-based learning. This suggests some key similarities between gambling and gaming; however, they also highlighted the need for more research to strengthen these findings.

There is also evidence of similarities between the diagnostic criteria of IGD and Substance Use Disorder (SUD). Neuroscientific research conducted by Hoeft et al. (2008) suggested a similar reward system between gaming and substances, with computer games that have a specific goal being associated with the activation of the reward systems in the brain. Reward-related brain areas such as the amygdala are known to be associated with substance addiction (Volkow et al., 2003). Reilly and Smith (2013) found that both SUD and gaming involved cravings and "highs," and some studies have suggested that both gaming and substance use stimulate dopamine release from the striatum (Koepp et al., 1998; Luscher & Malenka, 2011; Sulzer, 2011). Some suggestion has been made that this

increased dopamine release is a trigger for brain changes that lead to the development of addictive behaviour (Everitt & Robbins, 2005).

In light of these similarities, I decided to conduct an exploratory study on whether gaming shares sociodemographic and psychological predictors of behavioural and other forms of addiction. However, I needed to decide which specific psychological predictors to research. I therefore examined the literature on SUD and Gambling Disorder.

Wareham and Potenza (2013a) wrote a review paper on the shared features of Pathological Gambling and SUD and found similarities in specific features such as tolerance and withdrawal, the relationship to neurotransmitters such as dopamine, and the results of brain imaging studies. One key similarity identified was potential endophenotypes for gambling and SUD that include facets of impulsivity. In other words, both gambling and SUD were related to higher scores on self-reported and behavioural measures of impulsivity. This suggests that impulsivity may be a consistent factor between different addiction disorders.

The disease model of addiction reflects the importance of impulsivity, suggesting that addiction is a disease of the brain that prevents voluntary and rational decision making (Racine et al., 2017). Addiction to substances has been described as a "diminished ability to control drug use, even in the face of factors that should motivate cessation" (Hyman, 2007). This characterisation aligns with the conceptual view that an underlying dysfunction must be present in the individual to constitute disorder.

In comparison, the choice-based model defines addiction as a voluntary choice. The individual doesn't rationally choose to become an addict, but the transition to addiction is formed as an unexpected consequence of poor decision making. Like the disease model of addiction, this theory aligns closely with impulsivity in the relationship between impulsive decision making and addiction (Heyman, 2009). The effectiveness of contingency management supports this model because rewards like vouchers are thought to motivate individuals to make healthy, addiction-free lifestyle choices (Higgins et al., 2019). Contingency management is a type of behavioural intervention where wanted behaviours are reinforced by rewarding the individual for showing positive behaviour change, such as reducing intake of substances and spending less time gambling or gaming (Petry, 2011).

Impulsivity is a component in both of these approaches, suggesting it may be a key factor of addiction. Therefore, I decided to include impulsivity as the potential psychological predictor in an exploratory study of gaming. Comparing the relationship to impulsivity between established addiction disorders and potentially maladaptive adult choices such as gaming may help us to better understand gaming and provide evidence for or against the inclusion of GD and IGD within diagnostic materials.

2.2 STUDY ONE

WHAT IS THE RELATIONSHIP BETWEEN IMPULSIVITY, SCARCITY, AND
MALADAPTIVE COGNITIVE-BEHAVIOURAL CHOICES IN ADULTS?

2.2.1 Introduction

Impulsivity is understood to be a construct that is multidimensional in nature
(MacKillop et al., 2016; Reynolds et al., 2006). Research into addiction and impulsivity has
consistently found evidence that a relationship exists, however, scholars do not agree on
how many facets of impulsivity there are, or which of these facets are related to addiction. It
is therefore the aim of this study to explore the relationship between factors of impulsivity
and different maladaptive choice behaviours.

Several studies have suggested that trait impulsivity can reliably predict problems
with substance use (Crews & Boettiger, 2009; Dawe & Loxton, 2004; Moffitt et al., 2011;
Nigg et al., 2006) and individual factors such as impulse control (Congdon & Canli, 2008;
Evenden, 1999), behavioural inhibition, and poor attention (de Wit, 2009), have been found
to relate to SUD. Gambling has also been linked to impulsivity through measures such as
delay-reward discounting (Audrain-McGovern et al., 2009; Daugherty & Brase, 2010;
Rasmussen et al., 2010). This is a cognitive task that can be useful in measuring impulsive
choice, or lower tolerance for delayed rewards (Hamilton et al., 2015). In addition, Ioannidis
et al. (2019) found that Gambling Disorder was associated with increased motor impulsivity,
attentional impulsivity, and discounting, as well as poorer performance on decision-making
tasks. Together, these studies evidence how complex the relationship between addiction
and impulsivity can be.

Despite this, there is evidence of similarities in the relationships between addiction
and impulsivity. Leeman and Potenza (2012) reported that both gambling and SUD involved
poor performance on neurocognitive tasks related to impulsive choice and response
tendencies. Similarly, Grant and Chamberlain (2014b) found that behavioural addiction was
associated with impulsive action in a manner that was similar to chronic SUD. These
similarities have also been reflected in research on gaming, with Sanders and Williams
(2019b) finding that both gaming and gambling related to high impulsivity, while Choi et al.
(2014) reported that IGD and Alcohol Use Disorder both lead to fewer successful stops on a
stop-signal test, and higher scores on the Barratt Impulsivity Scale (BIS-11).

Further research into potential similarities and differences may increase our
understanding of gaming. This study therefore aims to answer the question, how does
impulsivity relate to established addiction sources in comparison to maladaptive, or
excessive, gaming?

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2.2.2 Method

Participants

Five-hundred participants (Table 2.1) were recruited remotely through prolific.co, in return for £7.50 (US$10.02). Two-hundred and fifty participants responded on 02/04/2020 and a further 250 responded on 15/04/2020. All participants completed the survey in full. The mean age of the sample was 29.67 (*SD* = 10.04), there were 244 female participants, 250 males, and 6 who identified as neither. The socioeconomic qualities of the sample are detailed in Table 2.1.

Table 2.1.

Sample Analysis

	Category	Count	Frequencies
	1 – Managerial, admin or professional	221	44.2
	2 – Intermediate	33	6.6
	3 – Small Employers or Own	26	5.2
	Account	46	9.2
NS-SEC Group	4 – Lower Supervisory or Technical	98	19.6
	5 – Semi-Routine or Routine	3	.6
	6 – Disabled Non-Working	18	3.6
	7 – Long-Term Unemployed	54	10.8
	8 – Full-Time Student	1	.2
	0 – Not Disclosed		
	1 – Least Affluent	3	.6
	2	7	1.4
	3	35	7.0
	4	64	12.8
MacArthur Group	5	105	21.0
	6	127	25.4
	7	119	23.8
	8	38	7.6
	9	1	.2
	10 – Most Affluent	1	.2

Notes: NS-SEC groups categorised using the five-category system with additional groups to represent disabled non-working, full-time student, and full-time unemployed participants.

Materials

Socioeconomic status was measured using the MacArthur Scale of Subjective Socioeconomic Status (Adler & Stewart, 2007) and the National Statistics Social Economic Status measure (NS-SEC; Rose & Pevalin, 2003). The MacArthur scale asks participants to

rate their subjective status on a ladder, where rung 1 represents the least affluent and rung 10 represents the most affluent members of society. The measure was found to have internal consistency and reliability across a range of populations (Amir et al., 2019).

The NS-SEC provides an indication of socioeconomic status based around occupational factors. In this study participants were categorised into eight groups, following the five-category coding system with three additional groups to represent disabled, long-time unemployed, and student participants. The measure has been consistently found to have strong construct validity (Evans and Mills, 2000; McGovern et al., 2007).

Alcohol use was measured using the Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001). The AUDIT is a comprehensive list of ten questions assessing risk for alcohol dependence. Participants respond to statements like "*How often do you have a drink containing alcohol*" and "*Have you or somebody else been injured as a result of your drinking*" on a five-point Likert scale where 0 represents Never, No, or 0-2 Units and 4 represents Daily or Almost Daily, 4 or More, 10 or More, and Yes During the Last Year on relevant questions. A total score between 0-7 indicates low risk, 8-15 increasing risk, 16-19 higher risk, and 20 or more possible dependence. An acceptable Cronbach's alpha score was found in this sample (α = .82).

Substance use was measured using the Drug Use Disorders Identification Test (DUDIT; Berman et al., 2005). The DUDIT is an eleven-item tool assessing risk for drug-related problems. Participants respond to statements like "*How often are you influenced heavily by drugs*" on a five-point scale from 0 (Never) to 4 (4 or More, 7 or More, Daily or Almost Every Day) and the statements "*Have you or anyone else been hurt internally or physically because you used drugs*" and "*Has a relative or a friend, a doctor, or a nurse, or anyone else, been worried about your drug use or said to you that you should stop*" on a three-point scale of 0 (No), 2 (Yes but Not Over the Past Year), or 4 (Yes Over the Past Year). Total scores range from 0-44, with a score above 6 in biological males and 2 in biological females indicating potential drug-related problems while a score over 25 in either sex indicates high risk of drug dependence. An acceptable Cronbach's alpha score was found in this sample (α = .93).

Gambling behaviour was measured using the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001). The PGSI consists of nine items assessing risk for problem gambling. While considering the past 12 months, participants respond to statements like "*Have you bet more than you could really afford to lose*" and "*Have you felt guilty about the way you gamble or what happens when you gamble*" on a four-point scale from 0 (Never) to 3 (Always). Total scores range from 0-27, with 0 representing non-problem or non-gamblers, 1-2 indicating low risk, 3-7 moderate risk, and 8 or more high risk of problematic gambling. An acceptable Cronbach's alpha score was found in this sample (α = .91).

Gaming behaviour was measured using a 9-item dichotomous measure of the Diagnostic and Statistical Manual (DSM-5) Internet Gaming Disorder criteria (IGD-9; American Psychiatric Association, 2013). Participants respond to statements like "*in the past year have you been preoccupied by or obsessed with games*" and "*in the past year have you lost interest in other life activities or hobbies*" by indicating Yes (1) or No (0). Possible scores range from 0-9 with scores of 5 or more indicating potential problematic gaming as per the suggested clinical cut-off point of the DSM-5 IGD criteria. An acceptable Cronbach's alpha score was found in this sample (α = .80).

Impulsivity was measured using the BIS-11 (Patton et al., 1995) and the 27-Item Monetary Choice Questionnaire (27-MCQ; Kirby & Marakovic, 1996). The BIS-11 is a multifaceted measure that includes six first-order factors and three second-order factors of trait impulsivity. In the present study the first-order factors were used. Participants respond to 30 statements like "*I plan tasks carefully*" and "*I change hobbies*" on a four-point Likert scale from 1 (Rarely/Never) to 4 (Almost Always/Always). Total impulsivity scores range from 30-120 and were found to have an acceptable Cronbach's alpha (α = .82). In the present study, relevant questions were summed to provide scores of Attention Impulsivity (α = .66), Cognitive Instability (α = .50), Motor Impulsivity (α = .69), Perseverance (α = .18), Self-Control (α = .72), and Cognitive Complexity (α = .37) which had a range of scores from acceptable to unacceptable.

The 27-MCQ is a measure of delay discounting, a type of impulsivity where the individual is unable to delay gratification. Participants respond to 27 statements like "*would you prefer £34 now or £55 in 117 days*" and "*would you prefer £15 now or £50 in 13 days*" by indicating whether they would take the smaller immediate reward (0) or larger delayed reward (1). Scores are then inputted into the 27-Item Monetary Choice Questionnaire Automatic Scorer by Kaplan et al. (2016). Cronbach's alpha was acceptable for this sample (α = .92).

Procedure

Participants provided demographic information and responded to the MacArthur Scale (Adler & Stewart, 2007), and NS-SEC (Rose & Pevalin, 2003) for both current and childhood socioeconomic status. Participants then responded to a series of standardised questionnaires on potentially maladaptive behaviours, including the AUDIT (Babor et al., 2001), DUDIT (Berman et al., 2005), PGSI (Ferris & Wynne, 2001), and IGD-9 (American Psychiatric Association, 1994) followed by the BIS-11 (Patton et al., 1995) and the 27-MCQ (Kirby & Marakovic, 1996) measures of impulsivity.

2.2.3 Results

Non-normal distribution was found in the 27-MCQ scores using Shapiro-Wilk (W_{500} = .605, p = .000), with a skewness of 3.628 (SE = .109) and kurtosis of 17.275 (SE = .218). I therefore used transformation for analysis, calculated using the 27-MCQ Automated Scoring System (Kaplan et al., 2014).

I conducted bivariate correlation to determine whether significant relationships existed between measures of behaviour (AUDIT, DUDIT, PGSI, & IGD-9) and impulsivity (BIS-11 & 27-MCQ). I excluded participants who scored 0 from each measure of behaviour, since these represent no use or extreme low risk of problematic use (Table 2.2).

Table 2.2.

Bivariate Correlations: Adult Choice Behaviour and Factors of Impulsivity

	Gaming (non-zero IGD-9)	Gambling (non-zero PGSI)	Alcohol Use (non-zero AUDIT)	Drug Use (non-zero DUDIT)
BIS - Attention	.158**	.054	.164**	.233*
BIS - Cognitive Instability	.202**	.200*	.179***	.140
BIS - Motor	.173**	.067	.227***	.208*
BIS - Perseverance	-.021	-.004	.138**	.150
BIS - Self-Control	.141*	.223**	.195***	.298***
BIS - Cognitive Complexity	.011	.155	.153**	.231*
27-MCQ Log Transformed	.014	.110	.031	.147

Notes: p < .05*; p< .005**; p<.001***

All four measures appear to be related to self-control on the BIS-11. In contrast, only the SUD measures are related to cognitive complexity, and only alcohol use is related to perseverance. Interestingly all measures except for gambling are related to attention and motor impulsivity, and all measures except for drug use are related to cognitive instability.

I next conducted block-wise regression on the same set of variables (AUDIT, DUDIT, PGSI, & IGD-9) to determine strength of contribution for each impulsivity factor (BIS-11 & 27-MCQ.) I again excluded zero scores on measures of behaviour and determined block order by the strength of r from bivariate correlation, with impulsivity factors that had the largest values in block one. Non-significant factors were excluded from analysis. Table 2.3 displays the last model that provided a new significant relationship, with adjusted R^2 for the model and beta coefficients for factors. Therefore, I report model 1, including only cognitive instability for gaming (IGD-9), model 2 consisting of self-control and cognitive instability for gambling (PGSI), model 3 consisting of motor impulsivity, self-control, and cognitive

instability for alcohol use (AUDIT), and model 1 consisting of only self-control for drug use (DUDIT).

Table 2.3.

Block-Wise Regression Analysis: Adult Choice Behaviour and Factors of Impulsivity

Measure	Model	Coefficients	
Gaming (IGD-9)	*Model 1* $F_{1,266} = 11.251$, $R^2 = .037$, $p = .001$**	Cognitive Instability	$β = .202$, $t = 3.354$, $p = .001$**
Gambling (PGSI)	*Model 2* $F_{2,130} = 5.500$, $R^2 = .065$, $p = .005$*	Self-Control Cognitive Instability	$β = .200$, $t = 2.334$, $p = .021$* $β = .173$, $t = 2.015$, $p = .046$*
Alcohol (AUDIT)	*Model 3* $F_{3,426} = 11.210$, $R^2 = .067$, $p = .000$***	Motor Self-Control Cognitive Instability	$β = .146$, $t = 2.737$, $p = .006$* $β = .113$, $t = 2.187$, $p = .029$* $β = .103$, $t = 2.053$, $p = .041$*
Drugs (DUDIT)	*Model 1* $F_{1,133} = 12.862$, $R^2 = .082$, $p = .000$***	Self-Control	$β = .298$, $t = 3.586$, $p = .000$***

Notes: p < .05*; p< .005**; p<.001***

These results suggest that cognitive instability and self-control are significant common factors in addiction. However, self-control was no longer significant for gaming after block-wise regression analysis, and cognitive instability was not found to be significant for drug use at all. Gambling and Alcohol use were both related to self-control and cognitive instability, and alcohol use was additionally related to motor impulsivity (Figure 2.1.)

Figure 2.1.

Path Analysis of Impulsivity and Choice Behaviours
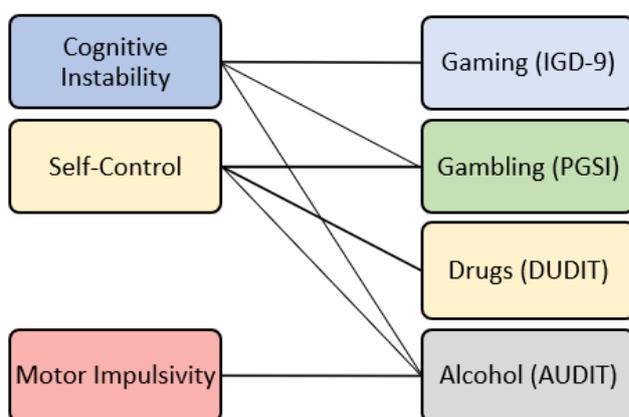
Notes: Relationships between Impulsivity and Choice Behaviours with Standardised Beta Coefficients to show path strength.

To examine the data further I next analysed relationships between adult choice behaviour and measures of socioeconomic status. Since the NS-SEC is nominal, I dummy coded the data into eight dichotomous variables, including the five self-coded categories and an additional three categories of "full time student," "disabled non-working," and "long-term unemployed." In each case the relevant category was assigned value 1, while all other categories were null (0). The reference category was group 1 (Tables 2.4 & 2.5). I found that none of the adult choice measures were significantly related to either of the socioeconomic measures for both current and childhood status.

Table 2.4.

Regression Analysis: Adult Choice Behaviour and Current Socioeconomic Status

	Current NS-SEC		Current MacArthur	
	Model	**Coefficients**	**Model**	**Coefficients**
Gaming (IGD-9)	$F_{8,266} = 1.390$, $R^2 = .012$, $p = .201$	*1 - β* = -.206, *t* = -.424, *p* = .672 *2 - β* = -.079, *t* = -.308, *p* = .759 *3 - β* = -.087, *t* = -.367, *p* = .714 *4 - β* = -.252, *t* = -.866, *p* = .387 *5 - β* = -.264, *t* = -.637, *p* = .525 *6 - β* = -.133, *t* = -1.267, *p* = .206 *7 - β* = .000, *t* = .000, *p* = 1.000 *8 - β* = -.142, *t* = -.403, *p* = .687	$F_{1,266} = .032$, $R^2 = -.004$, $p = .858$	*β* = -.011, *t* = -.179, *p* = .858
Gambling (PGSI)	$F_{7,130} = .646$, $R^2 = -.019$, p = .717	*1* - No data *2 - β* = -.094, *t* = -1.015, *p* = .312 *3 - β* = -.026, *t* = -.283, *p* = .777 *4 - β* = -.021, *t* = -.222, *p* = .824 *5 - β* = -.167, *t* = -1.730, *p* = .086 *6 - β* = -.065, *t* = -.733, *p* = .465 *7 - β* = -.089, *t* = -.989, *p* = .324 *8 - β* = -.026, t = -.280, *p* = .780	$F_{1,130} = 2.333$, $R^2 = .010$, $p = .129$	*β* = -.133, *t* = -1.527, *p* = .129
Alcohol (AUDIT)	$F_{6,426} = .863$, $R^2 = -.003$, p = .548	*1 - β* = .558, *t* = 1.119, *p* = .264 *2 - β* = .269, *t* = 1.049, *p* = .295 *3 - β* = .300, *t* = 1.298, *p* = .195 *4 - β* = .326, *t* = 1.101, *p* = .272 *5 - β* = .443, *t* = 1.095, *p* = .274 *6 - β* = .022, *t* = .327, *p* = .744 *7 - β* = .080, *t* = .482, *p* = .630 *8 - β* = .363, t = 1.134, *p* = .258	$F_{1,426} = .992$, $R^2 = .000$, p = .320	*β* = -.048, *t* = -.996, *p* = .320
Drug Use (DUDIT)	$F_{7,133} = 1.455$, $R^2 = .023$, p = .189	*1* - No data *2 - β* = .001, *t* = .009, *p* = .993 *3 - β* = -.138, *t* = 1.580, *p* = .117 *4 - β* = -.142, *t* = -1.591, *p* = .114 *5 - β* = -.153, *t* = -1.638, *p* = .104 *6 - β* = -.084, *t* = -.971, *p* = .333 *7 - β* = -.084, *t* = -.971, *p* = .333 *8 - β* = -.117, t = -1.275, p = .205	$F_{1,133} = 3.026$, $R^2 = .015$, $p = .084$	*β* = -.150, *t* = -1.739, *p* = .084

Notes: $p < .05$*; $p < .005$**; $p < .001$*** NS-SEC Categories: 1 – Managerial, admin or professional; 2 – Intermediate; 3 – Small Employers or Own Account; 4 – Lower Supervisory or Technical; 5 – Semi-Routine or Routine; 6 – Disabled Non-Working; 7 – Long-Term Unemployed; 8 – Full-Time Student

Table 2.5.

Regression Analysis: Adult Choice Behaviour and Childhood Socioeconomic Status

	Current NS-SEC		Current MacArthur	
	Model	**Coefficients**	**Model**	**Coefficients**
Gaming (IGD-9)	$F_{6,266}$ = 1.687, R^2 = .015, p = .124	*1 – No data* *2 - β = .002, t = .038, p = .970* *3 - No data* *4 - β = -.172, t = -2.705, p = .007*** *5 - β = -.029, t = -.458, p = .648* *6 - β = -.040, t = -.659, p = .510* *7 - β = -.072, t = -1.176, p = .241* *8 - β = -.072, t = -1.176, p = .241*	$F_{1,266}$ = 1.925, R^2 = .003, p = .166	*β = .085, t = 1.387, p = .166*
Gambling (PGSI)	$F_{4,130}$ = 1.369, R^2 = .011, p = .249	*1 - No data* *2 - β = -.027, t = -.308, p = .759* *3 - No data* *4 - β = -.013, t = -.141, p = .888* *5 - β = -.111, t = -1.229, p = .221* *6 - β = .167, t = 1.905, p = .059* *7 - No data* *8 - No data*	$F_{1,130}$ = 1.695, R^2 = .005, p = .195	*β = -.114, t = -1.302, p = .195*
Alcohol Use (AUDIT)	$F_{6,426}$ = .694, R^2 = -.004, p = .654	*1 - No data* *2 - β = -.004, t = -.084, p = .933* *3 – No data* *4 - β = .008, t = .158, p = .875* *5 - β = -.058, t = -1.142, p = .254* *6 - β = -.032, t = -.662, p = .509* *7 - β = .042, t = .854, p = .394* *8 - β = .057, t = 1.181, p = .238*	$F_{1,426}$ = .077, R^2 = -.002, p = .781	*β = .013, t = .278, p = .781*
Drug Use (DUDIT)	$F_{4,133}$ = 1.444, R^2 = .013, p = .223	*1 - No data* *2 - β = -.082, t = -.933, p = .353* *3 – No data* *4 - β = .040, t = .454, p = .651* *5 - β = -.055, t = -.622, p = .535* *6 – No data* *7 - No data* *8 - β = .173, t = 2.008, p = .047**	$F_{1,133}$ = 1.008, R^2 = .000, p = .317	*β = -.087, t = -1.004, p = .317*

Notes: p < .05*; p< .005**; p<.001*** NS-SEC Categories: 1 – Managerial, admin or professional; 2 – Intermediate; 3 – Small Employers or Own Account; 4 – Lower Supervisory or Technical; 5 – Semi-Routine or Routine; 6 – Disabled Non-Working; 7 – Long-Term Unemployed; 8 – Full-Time Student

2.2.4 Discussion

The results suggest that some similarities exist between gambling, SUD, and gaming in terms of their relationship to impulsivity. Specifically, with the exception of drug use, cognitive instability may be an important common factor between the measures. Despite this, both the alcohol and drug use SUD measures and gambling were related to self-control, while the IGD measure of gaming was no longer related after block-wise regression analysis.

In contrast to previous studies on addiction (Audrain-McGovern et al., 2009; Daugherty & Brase, 2010; Rasmussen et al., 2010), I found no significant relationships to the measure of delay discounting. In addition, previous studies have reported relationships between addiction and impulsivity that are not consistent with these findings. For example, Choi et al. (2014) found that motor, non-planning, and total impulsivity scores were significantly higher in IGD compared to Gambling Disorder, de Wit (2009) found that poor attention was related to SUD, and Ioannidis et al. (2019) found that gambling was related to motor impulsivity, attention, and delay-discounting. This disparity may be due to the relatively small sample sizes when eliminating zero-scores, suggesting that a large, targeted sample might be more appropriate for analysis.

In addition, I found no significant associations between socioeconomic status and the SUD, Gambling, or Gaming measures. Substance-based addictions and maladaptive behaviours such as Gambling have been found to associate with socioeconomic factors in previous studies (ASH, 2019; Cerdá et al., 2011; El-Sayed et al., 2012). Additionally, the sample was made up of a large number of participants (102) from the NS-SEC class 1, managerial, admin or professional occupation.

Together, the key limitations of this study are therefore the relatively small sample sizes for each behaviour and the large number of participants from class 1 of the NS-SEC. Further to this, the internal validity, as determined by Cronbach's alpha, for impulsivity factors was below acceptable values in some cases. Since the BIS-11 is a commonly used and validated scale, this might suggest that participants in the current sample were not answering honestly or carefully. Future research may benefit from including attention checking questions, specifically targeting a wider range of socioeconomic statuses, and targeting participants based on their involvement in the behaviours of interest.

Although these results are interesting and suggest similarities between gaming and established measures of addiction, it is clear that further research is needed to understand the relationship between impulsivity and gaming. With that in mind, I decided to continue exploring gaming as an addiction through its relationship to impulsivity.

CHAPTER THREE

IMPULSIVITY AND GAMING

3.1 INTRODUCTION

Impulsivity is a key feature of addiction (Grant et al., 2010; Perry & Carroll, 2008) and studies that directly compare SUD, gambling, and gaming in terms of impulsivity can offer some useful insights into whether gaming shares this key feature. However, as I have shown, opportunity sampling can lead to a loss of power in analysis, resulting from the need to remove participant data that is not relevant to the individual measure being analysed. By focusing on gaming specifically, we are able to recruit a targeted sample of participants and maximize power. The results of studies that specifically examine gaming in terms of impulsivity can then be compared against previous research into addiction and impulsivity to identify commonalities or differences.

Several studies report a relationship between gaming and impulsivity. Gentile et al. (2010) conducted a longitudinal study that found impulsivity was a risk factor in developing a potentially maladaptive relationship with gaming. Similarly, Hyun et al. (2015) reported that impulsiveness was related to online gaming addiction and Nuyens et al. (2016) reported links between impulsivity and excessive involvement in Multiplayer Online Battle Arena (MOBA) games. This is a useful starting point in acknowledging that gaming is related to impulsivity at some level. It can also inform us on specific features of the relationship, such as the findings of Ryu et al. (2018) that high impulsivity predicted difficulty with interpersonal relationships, which in turn increased the risk of IGD symptoms.

Examining specific factors of impulsivity can offer deeper insights into the behaviour. However, some scholars have found different factors of impulsivity to be significant than others. For example, Yu et al. (2021) found that gaming was related to the motor impulsivity subscale of the BIS-11, while Ryu et al. (2018) reported that IGD was related to cognitive impulsivity and non-planning impulsiveness, but not related to motor impulsivity. Azizi et al. (2018) also found no evidence of motor impulsivity in multi-genre gamers, instead reporting that impulsive responses might be the result of a speed-accuracy trade-off in the go/no-go task that was used. However, Irvine et al. (2013) used multiple measures of impulsivity in their study and reported that potentially pathological gamers did display impaired motor response inhibition. In addition, they preferred smaller immediate rewards on a delay

discounting task and displayed reflection impulsivity by sampling less evidence, making faster decisions with more sampling errors, on an information sampling task.

In contrast to these findings, some researchers have reported similar results to others, even when using different measures of impulsivity. For example, while Bargeron and Hormes (2017) found higher motor and attentional impulsivity from the BIS-11, Billieux et al. (2015a) used the Urgency, Premeditation, Perseverance, Sensation Seeking, and Positive Urgency scale (UPPS-P; Whiteside & Lynam, 2001) and found significance for lack of premeditation and lack of perseverance. Both attentional impulsivity and lack of perseverance reflect an inability to focus attention, while motor impulsivity and lack of premeditation both refer to a tendency to act without thought. This relationship to attention and motor impulsivity (or impulse control) has been replicated in several studies (Bioulac et al., 2008; Chan & Rabinowitz, 2006; Gentile et al., 2010). Gentile et al. (2012) further reported that while children with pre-existing attention problems tended to play video games, children in general could also develop attention problems due to the amount of time they spent gaming. Table 3.1 summarises some of the impulsivity factors that have been linked to gaming.

Table 3.1.

Factors of impulsivity that have been linked to gaming within the research.

Impulsivity Factor	Factor Description	Evidence of Relationship to Gaming
Motor Impulsivity	Acting without thinking. Having low impulse control.	(Yu et al., 2021: Irvine et al., 2013: Bargeron & Hormes, 2017: Bioulac et al., 2008; Chan & Rabinowitz, 2006; Gentile et al., 2010)
Cognitive Impulsivity	An inability to consider the consequences of a decision.	(Ryu et al., 2018)
Non-Planning Impulsivity	Acting without pre-planning or consideration of the future.	(Ryu et al., 2018)
Delay Discounting	The tendency to prefer immediate but smaller rewards over larger long-term ones.	(Irvine et al., 2013)
Reflection Impulsivity	The tendency to gather less information than others before making decisions.	(Irvine et al., 2013)
Attentional Impulsivity	An inability to focus attention or to concentrate.	(Bargeron & Hormes, 2017: Gentile et al., 2012)
Lack of Premeditation	The tendency to make decisions without considering the consequences.	(Billieux et al., 2015a)
Lack of Perseverance	The tendency to stop a task that is considered difficult or boring.	(Billieux et al., 2015a)

In contrast, some researchers find positive relationships between gaming and impulsivity. For example, Müller et al. (2016) reported that sensation seeking, a factor commonly associated with impulsivity, was actually lower in gamers. Similarly, Colzato et al. (2013) found that experienced gamers who played first-person shooters were more accurate than inexperienced/non-gamers in a stop-signal paradigm, with faster responses to go signals and similar responses to stop signals. However, while Müller et al. (2016) included a measure of potential gaming addiction, Colzato et al. (2013) did not and therefore the results may show potential benefits of gaming at a casual level, without considering maladaptive use.

So, with such differing results, and multiple possible factors and measures of impulsivity, what is a useful way to analyse the relationship between impulsivity and gaming? In previous studies on addiction, researchers have adopted a factor analysis approach. This involves modelling several measures into individual factors that are potentially contributing to the behaviour. Dawe et al. (2004) proposed a two-factor model of impulsivity in SUD, consisting of '*Heightened Sensitivity'* to rewarding stimuli and '*Rash Impulsivity*,' or acting without thought. Similarly, Gullo et al. (2011) found a two-factor model, with '*Reward Drive'* reflecting sensitivity to rewarding stimuli, and prompting an approach, while '*Rash Impulsiveness'* reflected an inability to inhibit this approach.

The emerging consensus is that impulsive drug use involves a two-factor model of impulsivity has also been reflected in gambling research. Hodgins and Holub (2015) described a two-factor model in gambling, with a '*General Impulsivity'* factor and a '*Sensation Seeking'* factor. They found that '*General Impulsivity'* was made up of self-reported impulsivity factors, while '*Sensation Seeking*' included self-reported sensation seeking and high scores on a task measuring attention. Since these studies suggest that both SUD and Gambling Disorder may involve a two-factor model of impulsivity, it would be worthwhile checking for a similar model within potentially addictive gaming.

3.2 STUDY 2

THE IMPULSIVE GAMER: FACTOR ANALYSIS OF IMPULSIVITY IN POTENTIALLY PROBLEMATIC GAMING

3.2.1 Introduction

Several studies have attempted to further our understanding of impulsivity through factor analysis. Some have proposed more than two-factors of impulsivity, such as the Whiteside and Lynam (2001) four-factor model that was later extended to five factors and

used to develop the UPPS-P Impulsive Behaviour Scale. However, when discussing a specific model of impulsivity in addiction, Gullo et al. (2014) make the argument that theoretically driven, bottom-up models that propose two factors deliver the best balance between explanatory power, parsimony, and evidence. Using the emerging empirical evidence around SUD they described a heightened propensity to approach drugs *('Approach Impulse')* and reduced ability to inhibit, or stop, this approach *('Inhibitory Control')*. This study therefore aims to explore whether a similar two-factor model of impulsivity exists for gaming.

Several studies have identified two potential factors of impulsivity that overlap with these two processes. '*Reward Sensitivity'* from Dawe and Loxton (2004), '*Delay Discounting'* from de Wit and Richards (2004), '*Sensation Seeking'* from Steinberg (2008) and Woicik et al. (2009), and '*Appetitive Motivation'* from Wiers et al. (2007), all share commonalities with '*Approach Impulse.*' Similarly, '*Rash Impulsivity'* (Dawe & Loxton, 2004), '*Motor (Dis)inhibition'* (de Wit & Richards, 2004), '*Impulsivity'* (Steinberg, 2008; Woicik et al., 2009), and '*Poor Self-Regulation'* (Wiers et al., 2007) overlap with '*Inhibitory Control.'* In addition, several studies have suggested that the two impulsivity factors each contribute to a distinct aspect of substance use issues. For example, in several of the cited studies, the equivalent '*Approach Impulse'* factor was predictive of substance use, while the '*Inhibitory Control'* factor was predictive of problematic use, or SUD.

Other scholars have labelled these two broadly defined components as '*Impulsive Action*' (failure to inhibit an inappropriate response) and '*Impulsive Choice*' (preference for small immediate rewards over larger delayed rewards; Herman et al., 2018; Jupp & Dalley, 2014; Nautiyal et al., 2017). A review by Grant and Chamberlain (2014a) used this model to explore the phenomenon in behavioural addiction. They found a focus on '*Impulsive Action*' within the literature, with results suggesting that the factor predicted high involvement in the measured behaviours. Similarly, Hodgins et al. (2012) found that different factors of impulsivity were predicting high levels of activity compared to those that predicted actual addiction to gambling.

Hodgins and Holub (2015) also found that the two factors in their study on gambling uniquely contributed to the behaviour. '*General Impulsivity'* was found to correlate with gambling severity, while '*Sensation Seeking'* was related to general gambling activities. Interestingly, '*General Impulsivity*' consisted of self-reported trait impulsivity factors and a measure of Attention Deficit Hyperactivity Disorder (ADHD), while '*Sensation Seeking*' included a self-reported sensation seeking measure and Continuous Performance Task (CPT) measuring motor response inhibition. This indicates a potential difference from the SUD findings, where self-reported impulsivity was grouped with motor response inhibition, rather than being spread across the two factors. However, aspects of ADHD have also been found to relate to '*Inhibitory Control*' (Lipszyc & Schachar, 2010) and the CPT could be

considered as a measure of attentional impulsivity (a lack of sustained attention). Therefore, depending on how you interpret the measures, '*General Impulsivity*' and '*Sensation Seeking*' from Hodgins and Holub (2015) may overlap with either '*Approach Impulse*' or '*Inhibitory Control*' from Gullo et al. (2014).

Combining these findings, it is clear that a two-factor model of impulsivity may be most appropriate for addiction. In addition, while one factor is predictive of use, the other may predict addiction, or problematic use. The empirical evidence suggests that in SUD the factor predicting addiction is likely to be related to *'Inhibitory Control.'* However, the evidence on behavioural addiction is less clear. Grant and Chamberlain (2014a) suggested that '*Impulsive Action,*' which overlaps with '*Inhibitory Control,*' may predict high involvement rather than addiction, while '*Impulsive Choice'* ('*Approach Impulse*') may be associated with maladaptive behaviour. Despite this, the evidence on '*Impulsive Choice*' was minimal and more research is necessary to confirm the association. In contrast, Hodgins and Holub (2015) found that '*General Impulsivity*' was predictive of severity in gambling. As discussed, this '*General Impulsivity*' factor may overlap with either '*Approach Impulse*' or '*Inhibitory Control*,' depending on how you interpret the ADHD and CPT measures.

Despite this uncertainty within behavioural addiction, the results do indicate that a specific grouping of impulsivity facets may relate to the transition from unproblematic to problematic behaviour and substance use. This model may be suitable for the relatively new concept of gaming addiction. In Raybould, Larkin, et al. (2022) different aspects of impulsivity were related to the whole sample than those that predicted scores above the suggested symptom thresholds of IGD and GD. Here I aim to test this assumption by conducting a factor analysis on the data from this previous study. I hypothesize that a similar two-factor model of impulsivity will be found for gaming, lending weight to the argument that gaming can be addictive. I further hypothesize that one factor from this model will predict general gaming involvement, while the other predicts potentially problematic use.

3.2.2 Method

Participants

A targeted sample of 397 participants was recruited, with 196 from gaming forums on Reddit and Facebook (r/gamers and RT UK Chat), and 201 from the recruitment website prolific.co. Five participants withdrew and 20 failed attention checks, leaving 372 survey responses for analysis. In addition, 328 of those participants went on to complete a Go/No-Go task hosted online at Pavlovia.org. There were 183 male participants, 184 females, and 5 who identified as neither of those genders. The mean age was 26.23 years (*SD* = 6.843).

Materials

Socioeconomic status was measured using the MacArthur Scale of Subjective Socioeconomic Status (Adler & Stewart, 2007) which asks participants to rate their subjective status on a ladder, where rung 1 represents the lowest status and rung 10 represents the highest status in society. High internal consistency and reliability of the measure have been reported in different populations (Amir et al., 2019).

Impulsivity was measured using the BIS-11 (Patton et al., 1995) and the UPPS-P (α = .75; Whiteside & Lynam, 2001). These measures share some overlap that can be used to sanity check the results. The six first-order factors of the BIS-11 were used in this study. Participants respond to 30 statements like "*I concentrate easily*" and "*I get easily bored when solving thought problems*" on a four-point Likert scale from 1 (Rarely/Never) to 4 (Almost Always/Always). Participants total impulsivity is scored between 30-120 (α = .82) and relevant questions are summed to provide scores of the first-order factors; Attention Impulsivity (α = .62), Cognitive Instability (α = .52), Motor Impulsivity (α = .54), Perseverance (α = .44), Self-Control (α = .72), and Cognitive Complexity (α = .40). Cronbach's alpha scores were mostly acceptable, with some questionable results on individual factors.

The UPPS-P is a measure of impulsivity with similar factors to those in the BIS-11 measure. Participants respond to 20 items like "*my thinking is usually careful and purposeful*" and "*I quite enjoy taking risks*" on a four-point Likert scale from 1 (Agree Strongly) to 4 (Disagree Strongly). Items are then totalled into five subscales: negative urgency (α = .58), positive urgency (α = .73), lack of perseverance (α = .58), lack of premeditation (α = .73), and sensation seeking (α = .61). Total scale Cronbach's alpha was acceptable (α = .75), and individual scores were mostly acceptable with questions over some factors.

The 27-MCQ (α = .88; Kirby & Marakovic, 1996) was used to analyse delay discounting. Participants respond to 27 statements like "*would you prefer £31 now or £85 in 7 days*" and "*would you prefer £40 now or £55 in 62 days*" by indicating whether they would take the smaller immediate reward (0) or larger delayed reward (1). Scores are inputted into the automatic scorer by Kaplan et al. (2016). Cronbach's alpha was acceptable (α = .88).

Inhibitory control was measured using a hot and cold Go/No-Go task (Casey et al., 2011). Participants were asked to press the space bar of their keyboard when viewing neutral faces of a specific gender (cold) or faces showing a specific emotion (hot). In the no-go condition participants are asked to withhold a button press in response to the opposite gender (female: go, male: no-go) or emotion (happy: go, angry: no-go). Faces for the task stimuli were taken from the RADIATE racially diverse affective expression face set (Conley et al., 2018). Image order was randomised, and participants viewed 60 go and 20 no-go

occurrences per run. Cues were shown for 2 seconds, or until a button was pressed. Number of false button presses was recorded for analysis.

Frequency of gaming was measured by asking participants to report their average hours of play within a week. Potential problematic use of games was measured using two dichotomous measures based on the DSM-5 (IGD-9; American Psychiatric Association, 2013) and ICD-11 Gaming Disorder (GD-4; World Health Organization, 2020) symptom criteria. The IDG-9 lists nine symptom criteria from the DSM-5 as statements like "*in the past year have you tried to stop playing games, or to play less, but failed*" and "*in the past year have you lied to others about your gaming.*" Participants answer by indicating Yes (1) or No (0), with total scores ranging from 0-9. Scores of 5 or more indicate potential problematic gaming following the suggested clinical cut-off in the DSM-5. An acceptable Cronbach's alpha score was found in this sample (α = .67). The GD-4 lists four symptom criteria from the ICD-11 as statements like "*I have had difficulty controlling my gaming*" and "*I have continued to game despite negative consequences.*" Participants answer by indicating Yes (1) or No (0), with total scores ranging from 0-4. Scores of 3 or more indicate potential problematic gaming following the suggested clinical cut-off in the ICD-11. An acceptable Cronbach's alpha score was found in this sample (α = .67).

Procedure

Data was collected online using the survey hosting website, Qualtrics and the online experiment platform, Pavlovia. Participants provided demographic data (age and gender) and responded to the MacArthur scale before completing a simple attention check where they were asked "*for this question please answer purple. What colour is your favourite*" and given the options of plum, puce, purple, and peach. Participants then answered the self-report measures of impulsivity (BIS-11, UPPS-P, & 27-MCQ) before repeating the attention checking question with the new correct response of plum. Participants next completed the measures of gaming (IGD-9 & GD-4) before being redirected to Pavlovia.org to complete the hot and cold Go/No-Go tasks.

3.2.3 Results

To confirm the suitability of the data from Raybould et al. (2022) for factor analysis I used Kaiser-Meyer-Olkin and found sampling accuracy of .81. The Bartlett's Test of Sphericity (χ^2_{91} = 1085.673, *p* < .001) indicated good factorability of the data and the PCA yielded five Eigenvalues greater than one, accounting for 68.72% of the variance. Table 3.2 shows the factor loadings and communalities after a direct oblimin rotation. This method,

unlike varimax rotation, allows for correlation between latent factors and is therefore most appropriate for this dataset. High factor loadings were defined as data above .4 or below -.4 in value. The second order factors of the BIS-11, five UPPS-P factors, 27-MCQ proportion scores, and number of false Go/No-Go presses were included.

Table 3.2.

Rotated Factor Loadings from Analysis of Trait Impulsivity Factors

	1	2	3	4	5
UPPS-P (Lack of) Premeditation	.811	.262	.269	.338	.103
BIS-11 Self-Control	.768	.513	.230	.304	-.029
UPPS-P (Lack of) Perseverance	.582	.146	.347	.308	-.160
BIS-11 Perseverance	.597	.301	.348	.315	-.040
BIS-11 Cognitive Complexity	.495	.406	.159	.058	-.313
BIS-11 Motor	.535	.438	.288	.427	.241
27-MCQ Proportion Sooner	.184	.569	.059	.091	.130
UPPS-P Negative Urgency	.265	.568	.155	.313	.085
UPPS-P Positive Urgency	.472	.779	.298	.252	.202
Hot False Presses	.238	.128	.748	.142	-.051
Cold False Presses	.320	.151	.857	.224	.002
BIS-11 Cognitive Instability	.220	.129	.179	.678	.103
BIS-11 Attention	.557	.416	.216	.791	-.079
UPPS-P Sensation Seeking	.072	.237	.003	.083	.641

Notes: Highest loaded items highlighted in grey. High loading refers to any factor over .4 or below -.4.

The first rotated factor accounted for 32.4% of the variance and included *motor impulsivity, (lack of) perseverance* from two scales*, self-control, cognitive complexity,* and *lack of premeditation*. These BIS-11 and UPPS-P factors were expected to load together due to the overlap between the measures. The second factor, accounting for 11.24% variance, included *negative urgency, positive urgency,* and *delay discounting*. The third factor accounted for 9.32% of variance and had high loadings from *false presses on the go/no-go* tasks. The fourth factor (8.6%) contained *attention* and *cognitive instability* and the fifth factor (7.18%) only had high loading from *sensation-seeking*. The factors were labelled as '*General Impulsivity*' (Factor 1), '*Urgency*' (Factor 2), '*Inhibitory Control*' (Factor 3), '*Attention*' (Factor 4), and '*Sensation Seeking*' (Factor 5).

Relationship to Gaming

Bivariate correlation indicated that '*Attention*' and '*Sensation Seeking*' were related to lower age, '*Sensation Seeking*' and '*Urgency'* were positively correlated with male gender identity and negatively correlated with a female identity, and '*Urgency*,' '*Inhibitory Control*,' and '*Sensation Seeking*' were related to higher perceived social status. In addition, all

factors were positively related to at least one measure of gaming, suggesting that higher impulsivity in all areas was related to higher symptom counts or play frequency (Table 3.3).

Table 3.3.

Correlations between Demographic and Clinical Characteristics of the Sample and Factors of Impulsivity

	General Impulsivity	Urgency	Inhibitory Control	Attention	Sensation Seeking
Age (246)	-.093	-.081	-.044	-.169**	-.132*
Gender (Female) (184)	-.018	-.159*	.049	.060	-.180**
Gender (Male) (183)	.019	.156*	-.028	-.078	.173**
Gender (Third Gender) (5)	-.003	.010	-.084	.071	.028
MacArthur (247)	.110	.189**	.203**	-.003	.143*
DSM-5 Score (247)	.197**	.433**	.131*	.153*	.101
ICD-11 Score (247)	.265**	.235**	.173**	.116	.135*
Hours Gaming (247)	.157*	.325**	.173**	.150*	.068

Notes: p<.001*** p<.01** p<.05*

Binary logistic regression was then performed to determine whether specific factors were predictive of potentially problematic use as per the suggested clinical cut-off points from the DSM-5 (5+) and ICD-11 (3+). I found a significant model for the DSM-5 ($\chi^2_5 = 34.495$, $R^2 = .177$, $p < .001$) and for the ICD-11 ($\chi^2_5 = 17.086$, $R^2 = .100$, $p = .004$). Both measures were significantly related to '*Urgency*,' however only the DSM-5 measure was related to '*Inhibitory Control*' (Table 3.4).

Table 3.4.

Binary Logistic Regression of Diagnostic Symptom Cut-Offs Against Measures of Impulsivity

	DSM-5 (5+)	ICD-11 (3+)
1	*ExpB* = 1.183, *SE* = .209, *W* = .649, *p* = .421	*ExpB* = 1.201, *SE* = .231, *W* = .630, *p* = .427
2	*ExpB* = 1.983, *SE* = .205, *W* = 11.198, *p* < .001***	*ExpB* = 1.828, *SE* = .213, *W* = 7.989, *p* = .005**
3	*ExpB* = 1.444, *SE* = .167, *W* = 4.807, *p* = .028*	*ExpB* = 1.030, *SE* = .182, *W* = .027, *p* = .869
4	*ExpB* = .982, *SE* = .189, *W* = .009, *p* = .925	*ExpB* = .934, *SE* = .213, *W* = .103, *p* = .748
5	*ExpB* = 1.134, *SE* = .202, *W* = .389, *p* = .522	*ExpB* = 1.292, *SE* = .226, *W* = 1.286, *p* = .257

Notes: p<.001*** p<.01** p<.05* 1 – General Impulsivity, 2 – Urgency, 3 – Inhibitory Control, 4 – Attention, 5 – Sensation Seeking

In examining a more conservative cut-off point for the DSM-5 (7+), as suggested by Raybould, Watling et al. (2022), I found a significant model (χ^2_5 = 42.229, R^2 = .285, $p <$ .001) where like the ICD-11, only '*Urgency*' was related ($_{Exp}B$ = 4.976, SE = .310, W = 26.823, $p <$ .001). '*General Impulsivity*' ($_{Exp}B$ = 1.027, SE = .313, W = .007, p = .932), '*Inhibitory Control*' ($_{Exp}B$ = 1.064, SE = .236, W = .069, p = .792), '*Attention*' ($_{Exp}B$ = .936, SE = .289, W = .053, p = .819), and '*Sensation Seeking*' ($_{Exp}B$ = .929, SE = .329, W = .050, p = .823) were not significant.

3.2.4 Discussion

While I initially found a model of impulsivity that related to recreational gaming across five factors, it is important to note that factor analysis is not an objective method (Meehl, 1992). The results are determined by what measures are used, and a variety of models from 2-5 factors have been found (Carver & White, 1994; Cyders et al., 2007; Dawe et al., 2004). The key question here is therefore not how many factors are found, but which factors relate to potentially problematic gaming.

In examining the suggested clinical cut-off point for IGD a two-factor model was a significant fit. '*Inhibitory Control*' reflects an inability to inhibit or prevent impulsive movement and may overlap with the '*Inhibitory Control*' factors identified within SUD research (Gullo et al., 2014). In contrast, the '*Urgency*' factor, characterised by UPPS-P urgency and delay discounting, reflects a tendency to act quickly or prefer immediate rewards, overlapping with '*Approach Impulse*.' This result is also similar to the models proposed by Grant and Chamberlain (2014a) and Hodgins and Holub (2015), suggesting that the relationship between impulsivity and gaming may be similar to that of impulsivity and SUD or gambling. This lends some weight to the argument that addiction to gaming is possible (Table 3.5).

Table 3.5.

Comparison between Two-Factor Models of Impulsivity in Addiction and Gaming

	Present Study	Gullo et al. (2014)	Hodgins and Holub (2015)	Grant et al., (2010)
	Gaming	Substance Use	Gambling	Behaviour
Factor 1	Urgency	Approach Impulse	Sensation Seeking	Impulsive Choice
	Positive Urgency Negative Urgency Delay Discounting	Heightened propensity to approach drugs	ISS – Sensation Seeking I$_7$ – Venturesomeness CPT – Reaction Times CPT – Commissions	Preference for immediate smaller rewards (Delay Discounting)
Factor 2	Inhibitory Control	Inhibitory Control	General Impulsivity	Impulsive Action
	Inhibitory Control (Go/No-Go Tasks)	Reduced capacity to inhibit approach	I$_7$ – Impulsiveness BIS-11 non-Planning ISS – Impulsivity BIS-11 Attention BIS-11 Motor ADHD – Impulsivity ADHD – Hyperactivity	Poor response inhibition

Notes: Factor One is predictive of high involvement. Factor Two is predictive of potential problematic use/ higher symptom counts. I$_7$ = Impulsiveness Questionnaire (Eysenck), ISS = Impulsive Sensation Seeking Measure

Using a more conservative cut-off for IGD I found that only '*Urgency*' remained significant, suggesting that it may be associated with the highest levels of potentially maladaptive use. In contrast, '*Inhibitory Control*' may reflect borderline or potentially high-level but non-problematic gaming. '*Urgency*' was also significant for the ICD-11 GD measure, suggesting that a more conservative cut-off point for IGD might lead to the ICD-11 and DSM-5 identifying a similar group of potentially addicted gamers. There are several criteria to help determine what the most appropriate cut-off value is in a diagnostic test. However, rigid adherence to diagnostic manuals can oversimplify human behaviour and increase the risk of misdiagnosis (Peeters et al., 2019). Further research into this potential two-factor model of impulsivity would therefore benefit from comparing a clinical sample against a control group.

Alongside this limitation, the factor identified as potentially predicting maladaptive gaming was '*Urgency*,' rather than the '*Inhibitory Control*' factors identified by previous SUD and behavioural addiction research. Interestingly however, Stautz and Cooper (2013) found a very similar result to mine in their literature review of alcohol use. All the impulsivity traits measured in their study were found to relate in some way to alcohol consumption, while positive and negative urgency from the UPPS-P were most strongly associated with

problematic use. This could imply that gaming is most similar to alcohol addiction, where socially acceptable and mostly healthy levels of consumption are related to impulsivity at some level, but '*Urgency*' may be a key factor in transitioning to potentially unhealthy use.

Despite this, exploring addiction through impulsivity alone is not sufficient to form strong conclusions. The results connecting impulsivity to gaming are complex and not yet conclusive. In addition, impulsivity is known to be related to several symptoms and conditions, including mania and ADHD (Winstanley et al., 2006). Previous research has found a link between ADHD and IGD symptom criteria (Stavropoulos et al., 2019), suggesting an interplay that would benefit from further analysis. Because of these weaknesses, I decided that another approach was needed to understand gaming as a disordered behaviour. By combining different approaches together, this can help us to form a stronger framework for understanding gaming as a maladaptive behaviour.

CHAPTER FOUR

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HARMS IN ADDICTION

4.1   OTHER WAYS TO MEASURE DISORDER

Thinking back to the words of Loftus and Loftus (1983), one important question that they posed was, is the behaviour good for the person? In order to answer this question, we can consider what potential harmful outcomes may result from the behaviour. Understanding these outcomes provides a concrete, real-world representation of disorder. This can allow us to better understand the potential impacts of a disorder and the associated consequences or symptoms that may need to be addressed during treatment.

Several scholars have discussed the importance of using harm to identify mental disorder. Wakefield and First (2013) explain that the DSM-5 requires symptoms of a disorder to cause significant distress or impairment, otherwise referred to as harmful outcomes. In their review, they refer to Bolton (2013) and Cooper (2013). Bolton (2013) argued that harm in the form of distress or role impairment is closely tied to the concepts of disorder and treatment, while Cooper (2013) argued that without harm, any disliked anomaly could be labelled as a disorder, harkening back to the issue of over-pathologizing behaviour.

Previous research into Gambling Disorder has suggested that the real-world implications of behavioural addiction can be significantly harmful. Fong (2005) discussed the large range of biopsychosocial consequences of gambling in their review, including stress, sleep deprivation, cardiovascular disease, depression and anxiety, substance use, involvement in the legal system, and relationship conflicts. Similarly, Ferland et al. (2008) wrote about the potential consequences of gambling on both the gambler and their spouse, specifically referencing their different perspectives on the harmful outcomes. Both the gamblers and their partners reported financial outcomes most frequently, however spouses were more likely to recognise and report the social consequences such as self-isolation and relationship conflict. In comparison, gamblers were more likely to report internal, psychological harms such as stress, depression, guilt, and suicidal ideation.

Despite the intuitive connection between harm and disorder, Neal et al. (2005) argued that the absence of an explicit definition for gambling harm made it difficult to operationalise the concept and measure the severity of harmful impacts. In response to this,

Langham et al. (2015) identified a comprehensive list of potential outcomes from gambling. This taxonomy included a range of items categorised into financial harm, relationship conflicts, emotional or psychological distress, decrements to health, cultural harm, reduced work or study performance, criminal activity, and life-course or general harms. This list helps create a more cohesive dialogue between scholars, treatment providers, and policy makers. As an example, I made use of Langham's taxonomy to evaluate the literature on gambling harm in terms of potential health inequalities within society.

4.2 STUDY THREE
IS THERE A HEALTH INEQUALITY IN GAMBLING RELATED HARMS? A SYSTEMATIC REVIEW

4.2.1 Introduction

Currently there is an estimated two-million adults experiencing gambling harm in the UK (Gambling Commission, 2019a). We know that many people will experience harmful consequences from maladaptive gambling behaviour (Abbott et al., 2018) and the need for better understanding of these consequences has been acknowledged by policy makers within the UK (Wardle et al., 2018). The exposure hypothesis states that increased availability of gambling tools will increase harm (Abbott, 2006), however global data has indicated that while participation rates in mature gambling markets have dropped, harm has plateaued (Abbott et al., 2018). In order to promote further reduction in harm the Conceptual Framework of Harmful Gambling has therefore suggested that interventions need to address a larger range of risk, such as socioeconomic factors (Hilbrecht et al., 2020). This study will therefore explore the relationship between socioeconomic factors and harm.

Using the taxonomy of harmful outcomes developed by Langham et al. (2016) it is possible to analyse the presence of harmful consequences within different populations. This can help us to better understand how harm presents in different demographic groups, identifying potential risk factors for increased or sustained harm. A number of systematic reviews into gambling have explored topics such as crime (Adolphe et al., 2019; Banks et al., 2019), socioeconomic factors (Sharman et al., 2019), comorbid conditions (Marchetti et al., 2019), harm minimisation tools (Maynard et al., 2015; Quilty et al., 2019), and impulsivity (Ioannidis et al., 2019; Lee et al., 2019). However, a systematic review of harm distribution across society has not yet been done.

I predict that harmful outcomes of maladaptive gambling are not evenly distributed across the population. Specifically, I predict that certain demographic and socioeconomic factors increase the risk of experiencing harm or maintaining harm despite reductions in play. This finding would suggest that a health inequality exists that needs to be addressed. A health inequality is an unfair and avoidable difference in health between groups (NHS England, 2020). In other words, one individual or group may experience more harmful outcomes from gambling than another, despite gambling at the same frequency. An initial search of the literature indicates that while gambling harm may affect all types of people (Browne et al., 2018; Shaffer et al., 2004), economically and socially disadvantaged groups are at an increased risk of harm (Sharman et al., 2019).

The National Strategy to Reduce Gambling Harm states that prevention plans need to identify and implement an effective mix of interventions at a population and individual level (Gambling Commission, 2019b). The results of this review could support scholars to identify potentially at-risk groups for further study, providing evidence to inform future policies and interventions. For example, public health campaigns could be targeted towards vulnerable groups, promoting effective harm reduction in those populations (Horvath et al., 2018). I therefore aim to answer the question of how harm differs in key demographic and socioeconomic categories.

4.2.2 Method

Search Strategy

I followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA; Appendix 1; Shamseer et al., 2015) to search for studies discussing harm within different populations. Search terms were chosen and developed with the support of an Aston University subject librarian. On 18th August 2020 Web of Science (Appendix 2) and Scopus were searched using the criteria; *gambl* AND (harm* OR "negative impact" OR "adverse impact" OR "detrimental impact" OR "negative ?ffect" OR "adverse ?ffect" OR "detrimental ?ffect" OR consequence.)* Due to time constraints the search was restricted to titles, yielding 384 studies for analysis (Web of Science 189; Scopus 195).

Inclusions and Exclusions

Studies were included that; 1) discussed gambling harms to the individual and 2) listed a minimum of one identified harm from Langham's taxonomy. Studies were excluded

that; 1) were unrelated to gambling, 2) did not discuss harms, 3) were not available in English, 4) only investigated harms to others or from other related sources, and 5) only discussed harm minimisation rather than harm measurement.

Data Management

Data was managed using Covidence and EndNote software. Duplicate studies were removed using Covidence (147), and manually during title/abstract screening (15). Study analysis and data extraction were conducted by one researcher, quality assessment was conducted by two researchers using Standard Quality Assessment Criteria (Kmet et al., 2004; Appendix 3). Disagreements of more than one degree were discussed to reach a consensus and scores were then combined to create an average for each study.

Data Analysis

Study design, country, sample, measures, funding, and harmful outcomes were extracted. These are displayed in brief in Table 4.1 (Appendix 4). Common categories were identified for discussion and relevant harms were identified using Langham et al. (2016)'s 73-item taxonomy. Delfabbro and King (2019) argue that certain items within the list are behaviours that lead to harm, rather than harms themselves. For example, chasing losses, gambling to obtain more excitement, and betting above affordable means. Schellinck et al. (2015) also identified items such as borrowing money as non-harms that are predictive of actual harms such as debt and relationship conflict. Critical consideration of the identified outcomes was therefore necessary during analysis.

Table 4.1.

A Brief Summary of Extracted Data

Study	Design	Sample	Funding	General Harms	Age	Gender	Socioeconomic Status	Culture	Clinical Groups	Military Personnel	Criminality	Risk Severity	Gambling Behaviour	Online vs. Offline	Sense of Coherence
Anderson et al. (2018)	Qualitative – Interview	Seniors	University		x										
Angus et al. (2019)	Case-Control Study	Clinical	Government						x			x			
Apinuntavech et. al. (2012)	Cross-Sectional	Students	Psychiatric Foundation					x							
Bergh and Kuhlhorn (1994)	Qualitative – Interview	General Population	Research Fund		x	x							x		
Binde (2016)	Qualitative – Narrative Review	Gamblers & Professionals	Responsible Gambling Foundation	x											
Bramley et al. (2019)	Qualitative – Interview	Medical Professionals	Company						x						
Bramley et al. (2020)	Qualitative – Focus Group	Migrants	College Research Fund					x							

Study	Design	Sample	Funding	Results Categories											
				General Harms	Age	Gender	Socioeconomic Status	Culture	Clinical Groups	Military Personnel	Criminality	Risk Severity	Gambling Behaviour	Online vs. Offline	Sense of Coherence
Breen et al. (2011)	Qualitative – Interview	Indigenous	Gambling Research Fund										x		
Browne and Rockloff (2018)	Secondary Data Analysis	Gamblers	Responsible Gambling Foundation									x			
Browne et al. (2018)	Cross-Sectional	Gamblers	Responsible Gambling Foundation		x	x	x					x			
Browne et al. (2019)	Cross-Sectional	General Population	Gambling Research Fund		x	x	x						x		
Browne et al. (2017)	Cross-Sectional	Gamblers	Not Stated									x			
Browne et al. (2020)	Secondary Data Analysis	General Population	Government									x			
Canale et al. (2016)	Secondary Data Analysis	General Population	None		x	x							x		
Castren et al. (2018)	Secondary Data Analysis	General Population	Government		x	x							x		

Study	Design	Sample	Funding	Results Categories											
				General Harms	Age	Gender	Socioeconomic Status	Culture	Clinical Groups	Military Personnel	Criminality	Risk Severity	Gambling Behaviour	Online vs. Offline	Sense of Coherence
Currie et al. (2006)	Secondary Data Analysis	General Population	Gambling Research Fund		x	x	x	x					x		
Delfabbro et al. (2020)	Cross-Sectional	Gamblers	Not Stated									x			
Estevez et al. (2015)	Cohort or Case-Control	Clinical & Non-Clinical	Research Fund Contest						x						
Ferrara et al. (2018)	Qualitative – Narrative Review	Adolescents	None		x	x	x					x	x		
Fulton (2019)	Qualitative – Interview	Recovering Gamblers & Social Circle	Research Fund Contest											x	
Goh et al. (2016)	Qualitative – Interview	FEO Applicants	Government		x	x		x							
Heiskanen and Matilainen (2020)	Qualitative – Focus Group	"Baby Boomers"	Alcohol Foundation		x										
Hing et al. (2014)	Cross-Sectional	Indigenous	Research Fund					x				x			
Hing and Breen (2015)	Qualitative - Interview	Indigenous	Gambling Research Fund					x							
Hubert and Griffiths (2018)	Cohort Study	General Population	None											x	

Study	Design	Sample	Funding	General Harms	Age	Gender	Socioeconomic Status	Culture	Clinical Groups	Military Personnel	Criminality	Risk Severity	Gambling Behaviour	Online vs. Offline	Sense of Coherence
								Results Categories							
Jeffrey et al. (2019)	Cohort Study	Gamblers	Responsible Gambling Foundation	x											
Kildahl et. al. (2020)	Cross-Sectional	Gamblers	Research Fund										x		
Kolandai-Matchett et al. (2017)	Mixed Methods	Gamblers & Professionals	Government					x							
Langham et al. (2017)	Secondary Data Analysis	General Population	Responsible Gambling Foundation												x
Langham et al. (2016)	Qualitative – Multiple Methods	General Population	Responsible Gambling Foundation	x											
Larsen et al. (2013)	Cross-Sectional	General Population	None		x							x			
Lee et al. (2014)	Cross-Sectional	Online Gamblers	Not Stated										x	x	
Li et al. (2017)	Cohort Study	General Population	Responsible Gambling Foundation	x								x			

Study	Design	Sample	Funding	Results Categories											
				General Harms	Age	Gender	Socioeconomic Status	Culture	Clinical Groups	Military Personnel	Criminality	Risk Severity	Gambling Behaviour	Online vs. Offline	Sense of Coherence
Lloyd et al. (2016)	Cross-Sectional	General Population	Responsible Gambling Foundation		x	x	x						x		
Mageau et al. (2005)	Cross-Sectional	General Population	Not Stated										x		
May-Chahal et al. (2017)	Cross-Sectional	Prisoners	Research Fund								x	x			
McCarthy et al. (2019)	Qualitative – Narrative Review	Women	None		x	x		x					x		
Melendez-Torres et al. (2019)	Secondary Analysis	Students	Charitable Foundation		x	x	x	x							
Mihaylova et al. (2013)	Cohort Study	Students	University										x	x	
Paterson et al. (2020)	Qualitative – Systematic Review	Military	None							x					
Pitt et al. (2017)	Qualitative – Interview	Children	Research Fund		x										
Raisamo et al. (2019)	Secondary Analysis	Adolescents	Government			x									

Study	Design	Sample	Funding	Results Categories											
				General Harms	Age	Gender	Socioeconomic Status	Culture	Clinical Groups	Military Personnel	Criminality	Risk Severity	Gambling Behaviour	Online vs. Offline	Sense of Coherence
Ricijas et al. (2016)	Cross-Sectional	Male Students	Not Stated									x	x		
Rintoul et al. (2017)	Qualitative – Multiple Methods	General Population	Government	x									x		
Salonen et al. (2017)	Secondary Analysis	General Population	Government		x	x									
Salonen et al. (2018)	Secondary Analysis	General Population	Government		x	x	x								
Samuelsson et al. (2018)	Qualitative – Interview	General Population	Government										x		
Shannon et al. (2017)	Case-Control Study	General Population	Gambling Authority					x							
Skaal et al. (2016)	Cross-Sectional	General Population	Responsible Gambling Foundation					x				x			
Splevins et al. (2010)	Cross-Sectional	Students	Casino		x	x						x			
Wardle et al. (2019)	Qualitative – Rapid Review	Migrants	College Research Fund					x							
Yani-de-Soriano et al. (2012)	Mixed Methods	Students	Business School									x		x	

4.2.3 Results

The 384 papers identified from database searching were reviewed, leading to 162 excluded duplicates. Analysis of titles and abstracts identified 9 studies not discussing gambling and 20 not discussing harms. Full text analysis identified 52 studies that discussed harms in general or conflated severity scores with harm, 9 that only discussed harm to others, and 57 that only discussed harm minimisation. Eight studies were not available in English, 2 were short letters, 3 were abstracts, 2 could not be accessed in full and 1 was a study protocol. After excluding these studies there were 59 remaining for review. These included 22 qualitative studies, 36 quantitative studies, and 2 mixed methods (Figure 4.1.)

Figure 4.1.

PRISMA-P Flowchart of Exclusions
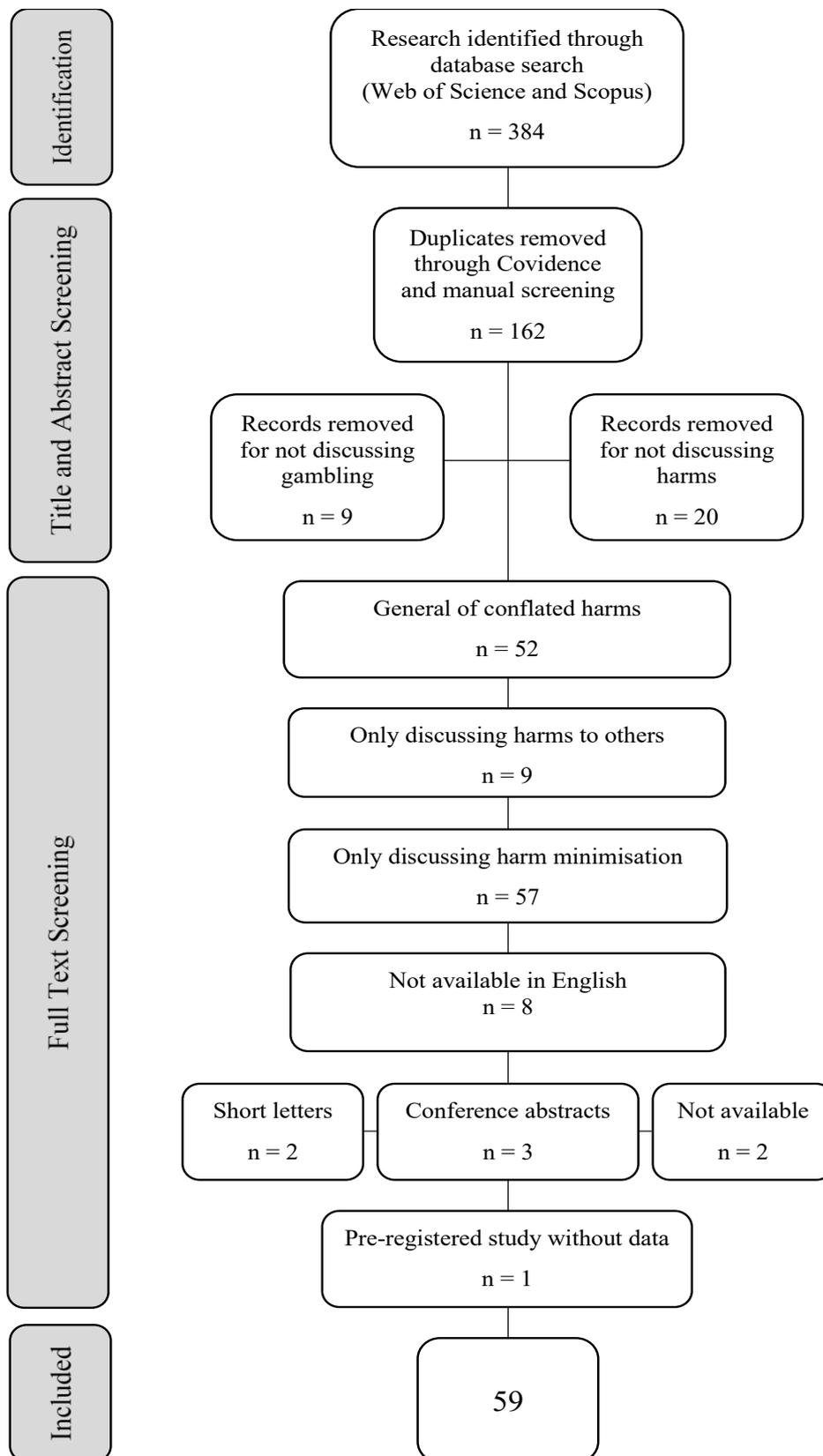
Description of Studies

Included within the 59 identified studies were 5 cohort studies, 2 case-control studies, 16 cross-sectional studies, and 13 secondary analyses. Of the 21 qualitative studies, 2 used multiple methods, 11 were interviews, 2 focus groups, 4 narrative reviews and 2 systematic reviews. The most common funding sources were the Victorian Responsible Gambling Foundation (6) and the Ministry of Social Affairs and Health Helsinki (5). Government agencies funded 12 studies, responsible gambling foundations funded 9, general research funds and gambling research funds each covered 5 studies, schools, colleges, and universities funded 5 studies, contest awards funded 2 studies, and alcohol foundations funded 2 studies. A casino, a non-gambling charity, an information company, a gambling authority, and a psychiatric association funded 1 study each, and 8 studies received no funding. The remaining 6 studies did not declare their funding status.

General Harms

Five studies include data on gambling harms generally, with some investigating specific harm locations, such as casinos or the workplace. Ricijas et al. (2016) reported that inappropriate social behaviour such as shouting at machines, aggression towards other patrons, appearing depressed, being withdrawn and excessive sweating were observed at all of the gambling venues included in their study. And Binde (2016) found that participants identified gambling during work breaks and during work hours, poor work performance and lateness, depression and anxiety, tiredness and irritability, absences from work, tax authorities investigating staff wages, poor standards of self-care and belongings, and crimes such as embezzlement.

Jeffrey et al. (2019) investigated how gamblers report and recognise harms in comparison to other individuals in their lives. They found that gamblers were more likely to report problems which impacted them individually such as lack of money, using work or study time to gamble, alcohol use, suicide attempts, hygiene issues, sleep problems, and feelings of shame or worthlessness. In comparison, spouses of gamblers reported shared harms such as missed bill payments and relationship tension or conflicts. The researchers suggested that this may mean gamblers are less aware of relationship dysfunctions. Another study (Li et al., 2017) reported that harms in all domains accumulated more quickly in gamblers than in affected others.

Langham et al. (2016) developed a taxonomy of gambling harms and found that many of the category domains interacted or had individual specific outcomes. For example, cultural and relationship harms often appeared together due to the link between family and culture. They also reported that emotional harms were affected by all other domains, and

criminality was often a second-order harm to address a primary harm such as financial issues. Financial harms reportedly led to a change in behaviour, however the crisis point was dependent on individual tolerance for deprivation. The level and type of relationship harm experienced appeared to be dependent on how the non-gambling person viewed gambling, and health harm was found to occur in recreational gamblers but was not well documented. Finally, criminality was only found within those individuals who scored highly on risk severity measures.

Age

Twenty-two studies include data on age, and several of these found that being younger was associated with a higher risk of experiencing gambling harms (Canale et al., 2016; Castren et al., 2018; Currie et al., 2006; Ferrara et al., 2018; Raisamo et al., 2015; Salonen et al., 2018). One study found that younger age groups (16-34) were at risk of dependence and social harms (Canale et al., 2016), and Ferrara et al. (2018) found younger age groups showed higher rates of "problematic gambling" and a higher comorbidity with other addictions. In Breen (2012) it was found that youths who were exposed to card gambling were more likely to gamble later in life to increase their income, and those who missed school had reduced lifelong aspirations and reduced opportunities. Salonen et al. (2018) reported that financial harm, work and study harm, health harms, and emotional harm all tended to decline within the older age groups, and financial harm in particular was most common in the younger participants, and Splevins et al. (2010) reported that students spent their pocket money or part-time job wages on gambling. Bergh and Kuhlhorn (1994) reported that gamblers aged 20-34 spent more time gambling than those over 35, and Salonen et al. (2017) also reported that females aged 18-24 increased their occasional gambling and consequently reported more harms.

In contrast, Raisamo et al. (2013) reported that gambling involvement increased with age, and some studies found that younger gamblers were less at risk of financial harms (Bergh & Kuhlhorn, 1994; Raisamo et al., 2013). Larsen et al. (2013) found that alcohol use increased with age in lifetime problem gamblers, as defined by the DSM-IV criteria for 'pathological gambling', in opposition to the trend seen in a general population. Whereas Pitt et al. (2017) found that children aged 8-16 showed little or no current harms as they were gambling at home with their families, spending small amounts of pocket money, or betting with activities such as push-ups against family members. Despite this, children developed false beliefs around gambling, such as that skill can be used to win, or that it is necessary for everyone to gamble at least once. Similarly, Melendez-Torres et al. (2019) found that harms increased with age; however, they only researched participants attending school who would be categorised in the younger age groups of other studies.

Livazovic and Bojcic (2019) found that older participants scored higher on risk severity measures, however they did not report a difference in harms. Browne et al. (2018) found that age had no impact on harm profiles, and Lloyd et al. (2016) found no association between age and gambling-induced thoughts of self-harm. Browne et al. (2019) found that although younger age appeared to correlate with harm this was not statistically significant, and Raisamo et al. (2015) reported that guilt was not associated with age.

The remaining studies researched the distribution of harms within a single age group. Anderson et al. (2018) reported that seniors who gambled experienced arguments, broken relationships, anxiety, debt, exhausted pensions or savings, and shame. Heiskanen and Matilainen (2020) found that gamblers from the generation categorised as 'Baby Boomers' had difficulty walking past a machine without gambling and spent excessive time and money both online and offline, and some participants reported that they felt unable to 'meddle' in another person's gambling problems, suggesting there may be less peer support within this age group.

Further research is needed to understand the distribution of harms across age groups as it was found by Estevez et al. (2015) that sensation seeking, and impulsivity were high in young gamblers. Anxiety, depression, and psychoticism were partially mediated by impulsivity, and somatisation, obsessive-compulsive behaviour, interpersonal sensitivity, paranoid ideation, and hostility were perfectly mediated.

Gender

Nineteen studies examined gender, and 5 of these found no difference between men and women (Bergh & Kuhlhorn, 1994; Browne et al., 2018; Browne et al., 2019; Castren et al., 2018; Goh et al., 2016). Despite this, several studies showed that men have a higher prevalence of harms than women (Canale et al., 2016; Currie et al., 2006; Ferrara et al., 2018; Livazovic & Bojcic, 2019; Lloyd et al., 2016; Melendez-Torres et al., 2019; Raisamo et al., 2013; Raisamo et al., 2015; Salonen et al., 2018), however Canale et al. (2016) and Raisamo et al. (2015) found that men gamble more frequently and spend more money when gambling. Raisamo et al. (2015) in particular found that when controlling for frequency and spends, gender was no longer significantly related to harm. And in complete contrast Salonen et al. (2017) reported that while gambling was more common in young males, women displayed an increase in specific harms between 2011 and 2015 where men did not.

Breen et al. (2011) found that women from small villages and men from towns were both more likely to be heavy commercial gamblers, however harms were the same and so this was likely due to usage level rather than gender. Livazovic and Bojcic (2019) found that males in Croatia scored significantly higher on psychological, social, and financial consequences than females. However, they also scored significantly higher on risk

behaviour and were more likely to score as a problem gambler on the Canadian Adolescent Gambling Inventory. Splevins et al. (2010) found that men started gambling earlier than women did and found it more exciting. This led to increased spending and therefore an increased risk of harms such as substance use and interpersonal conflicts.

Despite this some studies suggested differences in how gambling harms present between genders. In Singapore, Goh et al. (2016) reported that "tentative evidence… points to the risk of child neglect when the problem gambler is the mother." They also found that verbal abuse was most commonly males towards their mother but found no difference in cases of physical abuse between genders. McCarthy et al. (2019) found that women were more likely to report mental health comorbidity than males, however causality was not discussed, and Raisamo et al. (2019) found that while the most common harm was guilt for both genders, the second was disrupted schoolwork for females and conflict with friends for males.

Socioeconomic Status

There were ten studies examining socioeconomic factors, and more than half of these studies concluded that less affluent socioeconomic groups are more at risk of experiencing harms than more affluent groups (Angus et al., 2019; Apinuntavech et al., 2012; Currie et al., 2006; Lloyd et al., 2016; Skaal et al., 2016; Tu et al., 2014). Angus et al. (2019) found that clinical participants had significantly lower incomes than a community sample and a higher proportion of them reported harms. Currie et al. (2006) concluded that participants who reported harms were more likely to be in a lower income bracket, and to have received no further education than high school. Similarly, Lloyd et al. (2016) found that gambling related thoughts of self-harm, as well as acts of self-harm were more frequently found among the unemployed, although were not related to marriage status. Gambling related thoughts of self-harm were also found to be associated with parents gambling behaviour. And Skaal et al. (2016) reported that urban residents were more likely to report psychological distress and those that scored as high risk of problem gambling on the PGSI were more likely to use alcohol.

Apinuntavech et al. (2012) examined education level and found that the average GPA of gambling participants was lower than non-gamblers. Gamblers subsequently had a higher risk of smoking, abusing alcohol and energy drinks, and reporting harms. The most common of which were psychological, in particular guilt, depression, anxiety, and considering suicide. These individuals also reported lying, perceived poor health, insomnia, debt, selling possessions, substance use, and school absence. Livazovic and Bojcic (2019) found that lower achievers in school reported more psychological harms, however there was no difference between school types. However, Melendez-Torres et al. (2019) reported that

more harms and increased gambling behaviour were a result of feeling less school belonging.

Interestingly, Tu et al. (2014) found that people in managerial or professional occupations were more likely to participate in gambling than people in routine (semi-skilled or unskilled) occupations. Melendez-Torres et al. (2019) also found that participants from more affluent households were participating in more gambling than those from less affluent households. In light of this, they highlighted that more affluent individuals were reporting more harms, however Tu et al. (2014) reported that although gambling rates in the most affluent groups dropped during times of recession, the rates within deprived communities did not. This suggests that less wealthy people may be more likely to gamble in times of economic stress. When controlling for confounding variables the most deprived groups were 4.5 times as likely to experience arguments or money issues.

The remaining studies found little to no effect from socioeconomic factors, with Browne et al. (2018) reporting a difference of less than 5 points between individuals earning $15-30k AUD and those earning $101-150k AUD. Browne et al. (2019) reported that part time work, unemployment, marriage status, lower education, and lower income all had large correlations, but these were statistically insignificant. And Livazovic and Bojcic (2019) found that family life and parent's education level had no significant effect on harms.

Culture

Twelve studies include data on culture and five of these discuss Australia and New Zealand (Breen, 2012; Hing et al., 2012; Hing et al., 2015; Hing et al., 2014; Kolandai-Matchett et al., 2017). The included studies largely focus on single groups or comparing indigenous people and migrants to a society, so there are significant gaps that future studies may address.

Hing et al. (2012) interviewed Indigenous Australians and reported that female gamblers from small villages and male gamblers from towns both experienced similar harms. However, they were also heavy commercial gamblers, meaning they played at casinos and other commercial establishments. Hing et al. (2015) interviewed counsellors who noted that cultural acceptance for gambling within Indigenous Australian communities was high, and so a strong support network was in place for individuals with a problem. Despite this, Indigenous participants' highlighted isolation from the community as a key harm in a few studies (Breen, 2012; Hing et al., 2015; Hing et al., 2014), and missing key community events, neglecting children, lying, arguments, violence, and breakups were found to lead to social isolation. Gamblers also admitted to hiding their losses due to shame, guilt, and low self-esteem, which meant they were reluctant to seek help. In addition, they reported financial problems, and outside criticism or lack of support (Hing et al., 2015; Hing et al.,

2014), as well as debt, lack of resources (Breen, 2012; Hing et al., 2015), distress, cut off utilities, crime, loss of employment, and homelessness (Hing et al., 2015). Breen (2012) also noted that many people would gamble within a group, increasing their behaviour, but also feelings of shame from losses and potential gossip. Similarly, Hing et al. (2014) reported that participants were betting above their means, felt the need to spend more, borrowed or sold, and had health problems.

Goh et al. (2016) found that families in Singapore were at risk of acute financial harms when the problem gambler was a parent, with households suffering double financial harms through loss of income and debt. When the gambler was a mother without income, they found that the father would leave employment to care for the children, resulting in an income reduction for the entire household. They also found that many people in Singapore viewed gamblers as self-centred, and siblings would often give up on them.

Kolandai-Matchett et al. (2017) found that Pacific New Zealand people experienced similar gambling harms to other populations. However, the context of collectivist cultural values meant that additional harm dimensions were present, such as a loss of belonging or isolation, shame, loss of the community's respect, disruption of trusting relationships, transference of communal responsibilities, and an overall loss of social cohesion. In a quotation from one of the interviewed participants, the researchers noted that the wider collective might exclude non-present or non-contributing members of the society. Similarly, Bramley et al. (2020) found that migrants in the UK reported similar harms to the general population, including selling possessions, relationship breakdown, mental health problems, drug use and sale, homelessness, domestic violence, sex work and suicide. Despite this, participants felt that harms were exacerbated by a lack of 'safety net' and difficulty accessing informal support. Sub-Saharan African men in particular felt that when they lost money, they lost community status.

McCarthy et al. (2019) conducted a worldwide study which suggested that women from ethnic minorities, indigenous communities and specifically Maori and Pacific women in New Zealand were more vulnerable to gambling harms than European women were. Melendez-Torres et al. (2019) also found that participants from white ethnicities were less likely to feel guilt from gambling, and a non-white British background was associated with more harms. Ferrara et al. (2018) found that non-white males were most at risk of developing a gambling problem and addiction comorbidity, and Wardle et al. (2019) found that although migrants were less likely to gamble, they were more likely to experience harms than individuals born in the country. They found minimal evidence on specific harms experienced but did report that Spanish migrants tended to spend over 300 euros daily and claim losses as wins, and Australian migrants experienced financial harm, shame, relationship issues, suicide, mental health issues, isolation, and prostitution. Similarly, Currie

et al. (2006) found that in Canada, non-white men were more likely to have reported two or more harms in the last year.

Clinical Groups

Five studies reported on a clinical sample, and all of these found more harms within a clinical population compared to the general community. Angus et al. (2019) reported that 100% of their clinical sample reported psychological harms, compared to only 14.85% of the non-clinical participants. And while they found a greater severity of harm in all domains for the clinical sample, they specifically found a 97.98% response on financial harms compared to 23.33% in the non-clinical sample. Similarly, Bramley et al. (2019) reported that a clinical sample with habitual gambling showed high levels of anxiety, financial difficulties, and depression.

Salonen et al. (2018) reported that while 11% of a general sample experienced at least one harm of any domain, they found that 88% of the clinical sample reported emotional harms, 87% financial or health, and 81% experienced relationship harms. The specific harms reported were similar for all domains apart from emotional harm, where the clinical sample reported more anger, as well as being more likely to promise to pay debts without intending to, more likely to steal, and more likely to feel like an outcast.

Shannon et al. (2017) found that the highest rated harms within their clinical sample were reduced savings, going without, worry, frustration, and debt. The lower rated consequences included drug use, suicide, bankruptcy, self-injury, and educational problems. In contrast the general population rated debt, relationship issues, feeling constrained, going out less, poor self-control and lowered pride highest. Despite these different results the averaged distribution of harm was consistent across both samples, excluding reduced savings and decreased happiness.

Finally, Estevez et al. (2015) reported that young adults within their clinical sample had more dysfunctional symptomology. Specifically, anxiety, depression, hostility, out of character behaviour, and somatisation. They also found high comorbidity for alcohol, drug, gaming, shopping, and sex 'addiction'. Despite this they found no significant differences for eating behaviour or internet use, and when repeating the analysis discovered that impulsivity partially mediated anxiety, depression, and psychoticism. While perfectly mediating somatisation, Obsessive Compulsive Disorder (OCD) symptoms, interpersonal sensitivity, paranoid ideation, and hostility.

Military Personnel

Only one study reported on a military population (Paterson et al., 2020), however this was a systematic review of existing literature. One examined study found that individuals

would be quickly reprimanded for gambling, but meaningful assistance was slow to come, whereas another found that 21/25 active personnel who received treatment were retained in the military, compared to the 4 who lost their jobs. Several of the investigated studies highlighted comorbid mental health problems with gambling in the military, including suicide. It was also found that 9/35 gamblers receiving treatment had depressive disorder, 20% endorsed suicidal ideation and 3 participants had made actual attempts on their life.

Criminality

May-Chahal et al. (2017) investigated harms within the British prison population and found that although the prevalence of gambling was higher in prisons, the prevalence of gambling behaviour prior to incarceration was significantly lower. They found that high-rate offenders in their mid-20s were 5.3 times more likely to be frequent loss chasers than other categories, and occasional gamblers were less likely to use alcohol or drugs in prison, with nearly 2/3 of the problem-gambling group abstaining completely from substance use. The researchers suggest that this may be because the individuals' 'addiction needs' are being met by their gambling behaviour.

Risk Severity

Nineteen studies include data on risk severity, which is the measure of behaviour that puts someone at risk of developing a problem with gambling or experiencing harms from gambling. Angus et al. (2019) found that the number of harms experienced increased with PGSI classification, and significantly less low-moderate risk gamblers reported harms compared with problem gamblers. Problem gamblers were also more likely to come from the clinical sample, who had significantly greater severity of harms in all domains. Similarly, Delfabbro et al. (2020) reported that 'problem gamblers' experienced more harm in general than lower risk groups. In fact, the number of gambling harms within the lower risk categories was close to zero in all but the financial and psychological domains. Ricijas et al. (2016) also found that social gamblers had no consequences, moderate risk occasional gamblers experienced low-moderate harms, and high-risk frequent gamblers suffered serious consequences. Specifically in terms of delinquency and cognitive distortions.

In contrast, Browne et al. (2018) reported that the prevalence of harm within a non-problem gambling group was twice that of the problem category, and Raisamo et al. (2015) found that most of the harms reported originated from low-moderate risk participants. However, when scaling for severity of harms, Delfabbro and King (2019) reported that low and moderate risk participants experienced only a low-medium severity of harm. Interestingly, more severe financial harms, such as selling belongings, were found in the lowest risk group even when scaling. However, there was a significant number of

participants from less affluent socioeconomic backgrounds, which the researchers suggest may impact these results.

In considering scaling, Browne et al. (2020) reported that all individuals in the high-risk category reported at least one harm, and while mild harms were broadly distributed across all risk groups, severe harms were repeatedly more prevalent in the highest risk group. Hing et al. (2014) found that 93.8% of high-risk gamblers spent more than they could afford to lose, and 92.9% felt the need to bet more each time for the same thrill. Family arguments were experienced by 18% of moderate risk gamblers, compared to only 0.9% of low-risk participants, and 94.9% of high-risk participants had a gambling related health issue. Browne et al. (2018) found that only 10% of financial harms across the study population were in the problem gambling or pathological gambling groups and that more than 50% of cases where someone sold their belongings to fund their gambling were in recreational or low risk gamblers. In contrast to this, they found that more than 50% of social deviance harms are found within problem gamblers, and the remaining categories of harm were evenly distributed across the severity groups.

Langham et al. (2016) reported that criminality was only found within high-risk participants, and Skaal et al. (2016) found psychological distress was only associated with problem gambling. Similarly, Splevins et al. (2010) reported that high scoring participants were more likely to miss school, sell their personal property, commit illegal acts, and use cigarettes or drugs. Larsen et al. (2013) found that harmful alcohol and marijuana use were common among high-risk scorers, and Yani-de-Soriano et al. (2012) reported the highest degree of harm across all domains was found in high-risk participants. Specifically reporting that as risk scores increased, so did physical, mental health, social, and academic harms.

Browne et al. (2017) conducted their study using disability weights, a health-related measure of quality of life which uses a ratio scale between 0 and 1, representing ideal health and death. They found that problem gamblers show similar disability weights to those of Bipolar-Disorder or alcohol dependence, whereas the low-risk group show disability weights equal to moderate anxiety. In addition, they reported that the less severe harms were experienced by a large proportion of the population, compared to the intense harms, such as suicide attempts, which were mostly confined to the highest risk participants.

Li et al. (2017) found that selling personal items, absence from work or study, reduced performance, poor sleep, and extreme distress had the highest correlation with PGSI categories. They also found that reduced spending on essentials, absence from work or study, feelings of worthlessness, relationship conflict, and feeling like an outcast were the most effective discriminators between the low and high-risk groups. Similarly, Ferrara et al. (2018) found that participants rated as high risk were more likely to use alcohol or substances, have depression, dysthymia, anxiety, phobia, and anger, resentment,

headaches, gastrointestinal problems, eating disorders, and criminality, as well as family conflict, less independence, less engagement in intellectual or cultural activities, and reduced expression of emotion.

In contrast, Livazovic and Bojcic (2019) reported only a weak correlation between success in school and risk score, and May-Chahal et al. (2017) found that nearly two thirds of high-risk participants in the prison system were actually abstaining from drugs and alcohol.

Gambling Behaviour

Thirteen studies include data on gambling behaviours and many of these studies agreed that a higher frequency of play, and higher amount of spending per session, leads to more harms (Bergh & Kuhlhorn, 1994; Canale et al., 2016; Castren et al., 2018; Currie et al., 2006; Kildahl et al., 2020; Raisamo et al., 2013; Raisamo et al., 2015; Rintoul et al., 2017; Samuelsson et al., 2018). In particular, Castren et al. (2018) found that spending at least 1% of your monthly income increased harms, and daily gambling doubled them. Kildahl et al. (2020) also reported that overconsumption of money and time, social consequences, and emotional consequences all increased linearly with gambling frequency.

Samuelsson et al. (2018) found that low frequency stable gamblers only reported mild harms such as shame or guilt, whereas high frequency gamblers with decreasing use experienced substantial financial losses, frustration, alcohol use, and isolation. They also noted that periodic gamblers experienced financial, psychological, and relationship harms, including insomnia, isolation, and low self-esteem. The most severe harms, such as irrational thought and increasing spends, were found in the high frequency gamblers with increasing use. However, they did find that financial harms and psychological distress could lead to a period of reduced play depending upon an individual's support network.

Like participation frequency, Lloyd et al. (2016) reported that number of years gambling was associated with thoughts of self-harm, and Rintoul et al. (2017) found that gambling fast and intensely lead to more harm. Specifically highlighting multiple machine use, skipping meals, withdrawing money multiple times and betting over $3 per spin. Interestingly, Canale et al. (2016) reported that most of the identified harms in their study were reported by non-high time and spend regular gamblers. Despite this, harm odds increased with greater frequency of play individually, suggesting a higher individual risk in high volume play, but a larger proportion of at least one harm among low volume players.

Five studies looked at motivations for gambling, and although Browne et al. (2019) found no link between motivation of play and harms, Lee et al. (2014) found that excitement, escape, and challenge motives were linked with positive outcomes, but financial motivation led to harms. Lloyd et al. (2016) also found that self-harm thoughts were associated with

money as a motivator but was negatively associated with enjoyment motivations, and Kildahl et al. (2020) reported individuals who were influenced by reward frequency were more likely to swap card decks rather than persevere with the same cards. This led to overconsumption of time and money, and negative social and emotional consequences.

Similarly, Mageau et al. (2005) found that harmonious passion was related to positive emotions and thoughts, whereas obsessive passion lead to harms. Harmonious passion is when an individual chooses to gamble, whereas obsessive passion is when someone feels compelled to gamble. Mageau et al. (2005) reported that in comparison to harmonious passion, obsession was strongly related to feelings of guilt, anxiety, and negative emotions, and negatively correlated with feeling in control and having fun.

Game choice also affected harms, and nine studies reported on this relationship. Breen et al. (2011) found that card games led to financial losses and lost welfare benefits, whereas commercial gambling (I.e., Casinos, EGMs) led to financial hardship, family and relationship issues, mental health issues, crime, eviction, homelessness, domestic violence, neglect, relationship breakdown, depression, suicidality, theft, and sold belongings. Hing et al. (2012) reported that heavy card players spent their pensions, borrowed money, and played all day and night. Similarly, heavy commercial players gambled alone, spending their whole pay, and playing all day and night. They experienced debt, relationship issues, lost home, overcrowded housing, missed bills, lack of resources, abuse, neglect, self-esteem issues, depression, suicidality, theft, selling belongings and crimes against their workplace. Ferrara et al. (2018) also found that sports betting was associated with high rates of addiction comorbidity, Mihaylova et al. (2013) found that online poker players had higher annual debts, and Ricijas et al. (2016) reported that sports bettors, Video Lottery Terminal (VLT) users, and virtual bettors showed severe psychosocial consequences.

When considering casino gambling Mageau et al. (2005) also found more negative consequences than in lottery players. However, they also reported more positive outcomes overall in casino gamblers. Similarly, McCarthy et al. (2019) found that older women believed electronic gaming machines were less harmful than other games as they were able to socialise while gambling.

Castrén et al. (2017) found that six out of twelve game type predictors were associated with more harmful consequences, including scratch games, betting, slot machines, non-poker online games, online poker, and non-monopoly games. They found that lottery play caused the lowest number of harms, and this finding is consistent with findings reported by Currie et al. (2006) who found that frequency of play on lottery games did not increase the harms experienced, whereas electronic gambling machines, ticket gambling, bingo and casino games did.

Online vs. Offline Gambling

As well as specific game type six studies look at the broader categories of online or offline gambling. Castrén et al. (2017) found only a weak link between online gambling and an increase in harms, however Mihaylova et al. (2013) found that online poker players had a greater risk of alcohol dependency, illicit drug use, family issues, studying issues and financial issues in comparison to offline poker players.

Yani-de-Soriano et al. (2012) found that online gambling was associated with binge drinking but not smoking, and around 60% of online gamblers scored as high risk for gambling problems. These increased risk severity scores in turn led to increased physical, mental health, social, and academic harms. Hubert and Griffiths (2018) also found a link between online gambling and alcohol dependence, and they discovered that online gamblers were less likely to have jobs, children, and a stable relationship, leading to unemployment and less money later in life. They further found that online gamblers were less able to control impulsivity and frustration, but despite this, they had fewer suicidal thoughts than offline gamblers, although actual suicide attempts were comparable in both groups.

Feelings of anxiety and guilt appeared to be higher in online gamblers relative to offline gamblers (Lee et al., 2014). However, Fulton (2019) observed that secretive gambling increased financial harms due to the likelihood of concealed debt; and by living a double life, secretive gamblers experienced increased stress, relationship conflicts, and emotional deterioration.

Sense of Coherence

Langham et al. (2017) found that an individuals' sense of coherence correlated strongly with gambling harms in all domains. Sense of coherence is the extent to which someone feels confident in the predictability of his or her environment, and that things will generally turn out as expected. They reported specifically that a stronger sense of coherence meant fewer harms, and that a weaker sense specifically led to reduced spending on essential items, increased negative health behaviour such as lost sleep, reduced physical activity, and poor nutrition, as well as stress related illness and depression. Weaker sense of coherence also resulted in feelings of failure, worthlessness, hopelessness, shame, anger and feeling the need to run away. Despite this, a weaker sense of coherence was not related to increased risk of suicide.

4.2.4 Discussion

In applying the Standard Quality Assessment Criteria (Kmet et al., 2004) I found that several studies were not robust in their quality control. In particular, studies scoring below 0.5 on the assessment may not be an accurate representation of gambling harms, whereas studies that scored above 0.9 may present the most reliable data on harm distribution. Despite this, the results suggest that gambling outcomes present differently in individuals depending upon specific biopsychosocial criteria. Some of the reviewed studies presented evidence that particular groups were experiencing more harms than others, even when gambling less frequently. This indicates a potential health inequality that needs to be understood and addressed.

A majority of the included studies were cross-sectional, meaning that we cannot confidently determine causal relationships. Some studies may ask participants to consider gambling harms specifically, however human error and individual perception is likely to impact participant responses. It is also important to note that a key limitation of this systematic review is its small scale. One researcher conducted the search and all data management and screening. A larger scale review of the literature may capture further important studies that were not identified here.

Despite this, the current systematic review does indicate that multiple studies have shown differing outcome presentations, using a standardised list of potential outcomes to ensure that results could be comparable (Langham et al., 2015). This practical application of Langham's work shows how interpreting disorder through lived outcomes can help us to better understand the disorder and how it presents. There is evidence to suggest a health inequality is present, where some individuals will suffer more harms than others, despite equivalent exposure to gambling. With this in mind, primary care workers and policy makers will be better equipped to identify those who are most at risk, or who are showing signs of Gambling Disorder, and to target prevention and intervention programmes appropriately.

Taking this concept forward and applying it to gaming, we can conclude that by creating a taxonomy of harmful outcomes of gaming disorder, we will be able to evaluate what, if any, real world consequences of excessive gaming exist, and how these compare to the harms associated with established addiction disorders like gambling. I therefore decided to work towards creating a taxonomy that can then be used to analyse how prevalent these negative outcomes are within the gaming community, whether particular individuals may be more at risk of harm than others, and more. This list would allow scholars, practitioners, and policy makers to use a consistent approach to evaluating gaming outcomes, strengthening research into gaming, improving the replicability of studies, and subsequently improving our understanding of the behaviour.

CHAPTER FIVE

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HARMFUL GAMING

5.1 WORKING TOWARDS A TAXONOMY OF GAMING OUTCOMES

To justify the creation of a taxonomy of gaming outcomes we can look towards the symptom criteria listed by diagnostic manuals. The ICD-11 (World Health Organization, 2020) criteria for GD suggest that the continuation or escalation of gaming despite negative consequences is an indication of disordered involvement. Similarly, the DSM-5 (American Psychiatric Association, 1994) lists continued use despite impairment or distress. These symptom criteria would indicate that a potentially addicted gamer should be experiencing a significant number of harms, and harm analysis may therefore be a worthwhile aspect of gaming research. However, without a comprehensive taxonomy of the potential outcomes from gaming, researchers may rely on a variety of different, non-comparable, tools. For example, outcomes from associated disorders, which may not be applicable, qualitative data, which can be time-consuming and subjective, or proximal measures such as the severity of excessive gaming. A taxonomy of gaming outcomes could therefore provide opportunity for comparable, objective measurement of harms.

In order to create a comprehensive list of the potential negative outcomes from gaming it is important to make use of the existing literature. This helps us to quickly gather data on the types of outcomes that have been observed across a range of different participant samples, and different levels of involvement in gaming. I therefore decided to conduct a systematic review of the literature on gaming harms. However, there is still significant debate over whether the behaviour can be addictive at all. Deleuze et al. (2018) suggested that distinguishing between high engagement without negative life-impact and addiction is a necessary step in refining the diagnostic approach to gaming. It is therefore reasonable to consider both the harmful outcomes and positive benefits of the behaviour in comparison. This supports both researchers and clinicians in evaluating whether the net negative impact is outweighed by the net benefits of the behaviour in individuals who may be at-risk of diagnosis.

5.2 STUDY FOUR

A SYSTEMATIC REVIEW OF THE CONSEQUENCES OF GAMING: EVIDENCE FOR OR AGAINST BEHAVIOURAL ADDICTION

5.2.1 Introduction

Gaming is viewed as a meaningful and rewarding activity in many gamers' lives (Shi et al., 2019). Underestimating the potential dangers of gaming would be harmful, however an overestimation of the potential consequences from gaming could lead to excessive restrictions and deprive healthy gamers of these positive impacts. Understanding the balance between positive and negative outcomes of gaming, as well as what potential outcomes are common, rare, or not associated with gaming, can also support improvements to the diagnostic criteria and identification of at-risk individuals. This review therefore aims to gather research on the beneficial and harmful outcomes of gaming.

Starcevic and Billieux (2018) noted that countries that perceive gaming as particularly harmful tend to implement stricter restrictions. Several East Asian countries have identified gaming as a potential public health threat, leading to more attempts at regulating the behaviour than Western societies (Király et al., 2018). This is evident in China's policy to limit children to three hours of gameplay per week (Feng et al., 2017), a policy that has been criticised for being "arbitrary" and "unnecessary" by some. Further to this, Király et al. (2018) and Dillio (2014) have found that previous regulations of gaming have not been effective. Further supporting the need to understand the lived-experience and real-world consequences of high involvement in gaming.

In conducting this systematic literature review I aim to follow the PICO model (Eriksen & Frandsen, 2018) to assess the current evidence on gaming outcomes. This is a widely used format for defining and structuring questions in systematic reviews and clinical research since it captures key elements required (patient/population, intervention/interest area, comparison/context, and outcomes). I will include participants from all ages, genders, and cultural backgrounds, with no intervention due to the interest area being focused on outcomes of a behaviour. I will compare potential outcomes in terms of additional factors that may influence them, such as gender. The intended aim of the study is to identify a list of outcomes from high involvement in gaming. This list will then be used to inform the development of a taxonomy of gaming outcomes with a balanced approach examining both harms and benefits.

5.2.2 Method

Search Strategy

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA; Appendix 5; Shamseer et al., 2015). A search for studies that reported outcomes from gaming was conducted within Scopus, Web of Science, and PubMed. The keywords were chosen by screening relevant articles from a basic search of Scopus, using the search terms 'gaming' and 'consequences.' The following search string was modified for each database and used on 23rd February 2022; *(problem* gaming OR excessive gaming OR internet gaming disorder OR gaming disorder OR gaming addiction) AND (consequences OR outcomes OR harms)*.

Inclusions and Exclusions

Studies were included that; 1) researched video-gaming and 2) mentioned specific harmful outcomes, or 3) beneficial outcomes from gaming. Studies were excluded that were; 1) not available in English, 2) not available as a full article, and 3) not original data sources.

Data Management

EndNote software (The EndNote Team, 2013) was used to organise the bibliography and screen for duplicates. Data extraction was conducted by one researcher and extracted information included the study design, sample characteristics, measurement tools or techniques, funding, and outcomes. Outcomes were categorised into positive or negative. Studies were assessed using the Standard Quality Assessment Criteria (Kmet et al., 2004; Appendix 6). Study assessment was assigned to two authors, with final scores discussed until a consensus could be reached.

Data Analysis

The search returned 682 results (Scopus (236), Web of Science (296), PubMed (150)), and after removing duplicates (316) 366 results remained for review. A search in titles and abstracts led to 301 studies being removed because they were not relevant (276), were not available in English (5), or were not original data sources (22). The remaining 63 studies were reviewed in full and a further 21 were excluded for not mentioning specific outcomes of gaming. One final study was removed as it had been redacted by the publishing journal following serious concerns regarding the statistical analyses (Sosso et al., 2020). This left 41 studies for analysis (Figure 5.1.) A short breakdown of each study is shown in Table 5.1, including sample notes and whether outcomes were positive, negative, or both (Appendix 7.)

Figure 5.1.

PRISMA-P Flowchart of Exclusions
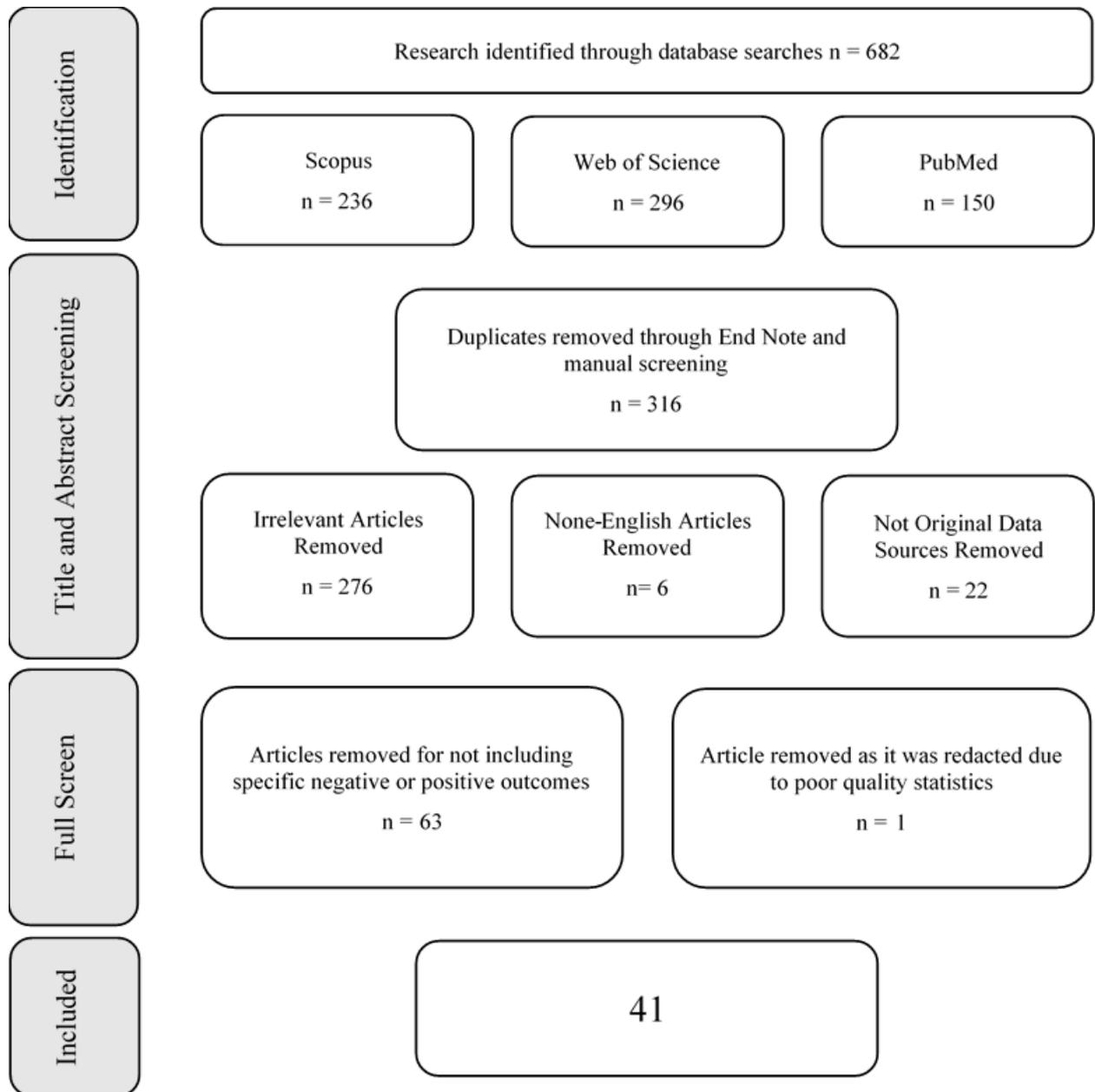
Table 5.1.

Brief Summary of Data Extracted

Study	Sample	Age Group	Outcomes Listed
Altintas et al., 2019	Online Gamers	Adults	Negative
Ariatama et al., 2019	Internet Café Users	Adults	Negative
Beranuy et al., 2012	Hospital Patients	Adults & Teenagers	Both
Borgonovi, 2016	PISA Survey	Teenagers	Both
Charmaraman et al., 2020	Students	Teenagers	Both
Coyne et al., 2020	Flourishing Families Project	Adults & Teenagers	Negative
De Pasquale et al., 2020	Unemployed	Adults	Negative
Dredge & Chen, 2020	Students	Teenagers	Both
Erevik et al., 2019	Students	Adults	Both
Farchakh et al., 2020	Students	Children	Negative
Fazeli et al., 2020	Students	Teenagers	Negative
Giardina et al., 2021	Pre & Post COVID	Adults	Positive
Griffiths, 2010	Males	Adults	Both
Guo et al., 2020	Students	Adults	Negative
Ivory et al., 2017	Students	Adults	Both
Jeong et al., 2020	Students	Teenagers	Negative
Kaptsis et al., 2016	Gamers	Adults	Both
Kleinman & Das, 2020	Males	Adults	Negative
Kök Eren & Örsal, 2018	Students	Children	Negative
Krossbakken et al., 2018	General Population	Adults	Negative
Latinsky & Ueno, 2020	Students	All Ages	Both
Lianekhammy & van de Venne, 2015	Gamers' Wives	Adults	Negative
Mandryk et al., 2020	WoW Players	Adults	Both
Männikkö et al., 2015	General Population	Adults & Teenagers	Negative
Matali et al., 2020	Outpatients	Teenagers	Negative
Milani et al., 2018	Students	Children	Negative
Özçetin et al., 2019	Gamers and Controls	Children & Teenagers	Both
Satghare et al., 2016	Gamers	Adults & Teenagers	Negative
Sioni et al., 2017	Forum Users	Adults	Negative
Snodgrass et al., 2017	Gamers	Adults	Both
Snodgrass et al., 2018	Gamers	Adults	Both
Snodgrass et al., 2019	Gamers	Adults	Positive
Stockdale & Coyne, 2018	Gamers and Controls	Adults	Negative
Stockdale & Coyne, 2020	Parents	Adults	Negative
Tham et al., 2020	Students	Adults	Both
van den Eijnden et al., 2018	Students	Teenagers	Both
Wang et al., 2019	Students	Children & Teenagers	Negative
Wong & Lam, 2016	Male Students	Teenagers	Both
Yeh et al., 2017	Gamers and Controls	Adults	Negative
Zahra et al., 2020	Students	Adults	Negative
Zhai et al., 2020	Gamers	Teenagers	Negative

5.2.3 Results

Of the 41 studies included, there were 27 cross-sectional, 4 longitudinal, 8 qualitative, 2 case studies, 2 matched pairs, 1 between subjects, 1 repeated measures design, and 1 mixed methods design. Of these studies there were 32 using self-report measures, 1 using observation, 2 using reports from participant's parents, 3 using clinical interview, 1 using forum scraping, 4 using interviews and 1 using school reports.

The study samples were mostly adults (27), followed by teenagers (18), and then children (6), with a few studies covering multiple age ranges. Most studies included a mix of genders (36), followed by only males (4), and only females (1). There were a range of countries represented (Australia (1), China (4), Finland (1), France (1), Hong Kong (1), Indonesia (1), Iran (1), Italy (3), Korea (1), Lebanon (1), Netherlands (1), Norway (2), Pakistan (1), Singapore (1), Spain (2), Turkey (1), USA (9)), as well as 9 studies that covered multiple countries.

Overview

Once the data was extracted from individual studies, I combined similar outcomes into single items. I then compiled a list of all highlighted outcomes and categorised these into groups. Some items identified within the reviewed studies may not constitute actual outcomes of gaming. It could be argued instead that these items lead to harms or benefits, rather than being harms or benefits in their own right. For example, in (Snodgrass et al., 2017), spending a lot of time playing and thinking about online games may not be harmful, but could lead to neglect of other responsibilities. Since there may be no inherent harm to playing games frequently, I did not list this as an outcome. On the other hand, while involvement in "toxic" gaming communities could lead to emotional distress or bullying of others, it could be argued that it is not a pure harm in its own right. However, it could also be argued that since the community is "toxic" it is inherently harmful on the attitudes and mental wellbeing of the community members. In cases such as this I therefore listed the item so as not to undervalue the potential outcomes (Table 5.2.)

Table 5.2.

Positive and Negative Outcomes from Gaming Categorised

Categories	Negative Outcomes	Positive Outcomes
Health – Mental	Depression (15) Anxiety/ Stress (10) Poor Mental/Emotional Health (5) Withdrawal Symptoms (4) Aggression (3) Irritability/ Frustration (2) Paranoia (2) Psychoticism (2) More Easily Bored (2) Suicidal Ideation (2) Suicide Attempts (2) Guilt (1) Suicide Plan (1) Difficulty Relaxing (1) Less Likely to Seek Support (1) Less Confident (1) Poorer Life Satisfaction (1) Feeling Hopeless (1) Risk of Serious Mental Illness (1)	Escapism (3) Entertainment/ Fun (3) Improved Overall Wellbeing/ Mood (3) Less Likely to be Depressed (2) Feelings of Calm/ Control (1) Less Likely to be Anxious (1) Lower Levels of Emotional Distress (1) Increased Self-Esteem (1) Less Frequent Suicidal Ideation (1) Less Frequent Suicide Attempts (1) Fewer Purges (Vomit/Laxative) (1) Fewer Diet Pills Used (1) Decreased Loneliness (1) More able to Cope with Loneliness (1) Increased Confidence (1)
Health – Physical	Poor Quality/ Disturbed Sleep (6) Insomnia/ Missed Sleep (4) Fatigue (3) Musculoskeletal Discomfort (2) Dry Eyes (2) Later Bedtime than Usual (1) Increased Somatization (1) More Likely Overweight (1) Blurred Vision (1) Dizziness (1) Headaches (1)	Adrenaline Rushes/ Positive Rush (1) Less Likely to Abuse Alcohol (1) Improved Coping Skills (1) Less Likely to be Underweight (1) Reduced CTRA (Better immunity) (1)
Personal Safety / Wellbeing	Skipping Meals (2) Hospitalised/ Injured by Fighting (2) More Likely Involved in Fights (2) More Likely to Carry a Weapon (2) Risky Sexual Behaviour (1) More Likely Sexually Victimised (1) More Likely to be Bullied (1) Involved in Toxic Communities (1) Feeling Unsafe (1) Weapon Threats/Injury (1)	None Reported
Responsibilities	Skipping School or Work (3) Easily Distracted/ Procrastination (3) Poor Academic Performance (2) Lost Time (1) Neglected Housekeeping (1) Less Feeling of Parental Efficacy (1) Rushed/ Poor Quality Homework (1)	Improved Daily Routine (2) Feelings of Life Purpose (1) More Likely to Live Independently (1) Positive Social Obligations (1)

Categories	Negative Outcomes	Positive Outcomes
Relationships	Feelings of Loneliness/ Isolation (6) Lost/Less Friendships (4) Poorer Relationships (4) Avoiding Socialisation/ Isolated (3) Social Anxiety/ Shyness (3) Less time with Family/ Friends (2) Poor Social Adaptation/ Competence (2) Lying (1) Relationship Breakdown/ Divorce (1) Disputes at Work (1) Lost Partner's Trust (1) Poor Communication (1)	Increased/ New Friendships (4) Community/ Social Support (3) Increased Social Interactions (2) Strengthened Friendship Bonds (1) More Likely to have a Partner (1) Feelings of Belonging (1) Expanded Points of View (1) Increased Social Competence (1) Increased Teamworking Skills (1)
Finances	Spending Above Means (2) Less Likely Full-time Employed (2) Strained Finances (2) Lost Job (1) Spent Shared Funds Without Consent (1)	More Likely Full-time Employed (1)
Abilities	Poorer Reading Skills (2) Poorer Memory (2) Poor Cognitive/ Functional Ability (2) Less Likely to be Higher Educated (1) Poorer Writing Skills (1) Slower Processing Speeds (1) Poor Visual-Spatial Organisation (1) Poorer Sequential Processing (1) Poorer Problem-Solving Skills (1) Worse Coping Strategies (1) Poor Clinical Attention (1) Internalisation & Externalisation (1) Poorer Emotional Intelligence (1)	Improved Memory (2) Feeling Challenged/ Engaged (2) Improved Reading Skills (1) Improved Computer Skills (1) Improved Spatial Skills (1) More Likely to be Higher Educated (1) Career Advancement (1) Better Reasoning Ability (1) Improved Creativity (1) Increased Intelligence (1) Improved Intellectual Agility (1) Faster Processing Speed (1) Personal Growth/ Evolution (1)
Effects on Others	Neglect of Dependants (2) More Likely to Sexually Victimise (1) Partner Feeling Angry/ Fed-Up (1) Negative Anonymity (1)	None Reported

Notes: The number of studies that identified each outcome is included in brackets

We found more negative outcomes (81) than positive ones (47) overall, with the most common negative outcomes being depression and anxiety, while the most common positive outcomes were new friendships, escapism, fun, and improved mood. This disparity was reflected in all of the categories apart from 'Abilities', which had an equal number of negative and positive outcomes.

Physical Health

Of the 10 studies that discussed physical health outcomes, five were negative, 1 positive, 3 balanced, and 1 reported finding no physical outcomes (Männikkö et al., 2015). Snodgrass et al. (2017) reported that gamers often felt physically drained, while Wong and Lam (2016) found evidence of dry eyes, blurred vision, dizziness, back pain, exhaustion, and musculoskeletal strain. In contrast, Erevik et al. (2019) found that highly involved gamers were less likely to consume alcohol in a harmful way than non-gamers, even when demographics, personality, and mental health factors were controlled for.

Several of the identified studies discussed issues around sleep, with Kök Eren and Örsal (2018) finding that poor sleep was related to gaming, and this in turn increased loneliness. Charmaraman et al. (2020) also reported that 'high-risk' gamers typically had less sleep than lower-risk categories, as well as more depressive symptoms. Similarly, Satghare et al. (2016) found sleep issues were related to gaming. Female gamers with lower levels of education were more at risk, and sleep issues led to mental health harms.

Altintas et al. (2019) also found that duration of gameplay and intensity were related to poor sleep, however, they noted that this did not lead to daytime functioning issues. In addition, they found that good mental health acted as a protective factor against poor sleep quality and found no direct relationships between gaming and physical or mental health. Fazeli et al. (2020) also reported that psychological distress was a strong mediator in the relationship between gaming and poor sleep. Similarly, Jeong et al. (2020) found that associations between high IGD scores, musculoskeletal discomfort, and dry eyes were only present in gamers who had pre-existing psychological or social issues.

Mental Health

Of the 23 studies that discussed mental health outcomes, 18 were negative, 1 was positive, and 3 were balanced. The remaining study by van den Eijnden et al. (2018) concluded that heavy gaming did not appear to have a negative impact on the psychosocial wellbeing of adolescents in their study, but they did not report any positive outcomes either.

In contrast, Satghare et al. (2016) reported that sleep issues from gaming led to an increase in psychological distress and lower life satisfaction. Further to this, Stockdale and Coyne (2018) reported increased ADHD symptoms, anxiety, depression, aggression, and lower positive affect and wellbeing, while Wang et al. (2019) found that mobile gamers had higher reported depression, social anxiety, and loneliness. Similarly, Zahra et al. (2020) found that psychological distress in University students increased as level of involvement in gaming increased. Interestingly, the relationship between gaming and psychological distress was affected by time of day. Gamers that mostly played after mid-night were more distressed than those who played at any other time.

Kök Eren and Örsal (2018) reported that high levels of loneliness in gamers was related to anxiety, and a quarter of respondents in Snodgrass et al. (2018) reported struggling with the emotional experience of loneliness. Despite this, gaming was found to improve socialising for the majority of these participants. Similarly, Mandryk et al. (2020) reported that 'harmonious passion' (choosing to play games) was related to decreased loneliness and increased overall wellbeing in participants, however 'obsessive passion' (internal pressure to play games) was related to increased loneliness.

Ariatama et al. (2019) found a relationship between gaming and depression, however all of their participants reached the diagnostic cut-off for depression, suggesting their sample may not be representative and the causal relationship between the two could not be established. Männikkö et al. (2015) found that participants with an existing disorder were more likely to engage in dysfunctional features of gaming and this was associated with a range of harmful outcomes. This prompts the question of whether gaming causes mental health outcomes, or pre-existing conditions encourage involvement in, or overconsumption of, gaming. Several studies that found similar outcomes were cross-sectional and therefore could not determine causality (De Pasquale et al., 2020; Dredge & Chen, 2020; Guo et al., 2020; Ivory et al., 2017; Milani et al., 2018; Snodgrass et al., 2017; Tham et al., 2020). While depression may be a harmful outcome, individuals who suffer from a mood disorder may also be more likely to use gaming to help regulate their poor mood. For example, Beranuy et al. (2012), reported that MMORPG players used gaming as a form of escapism and to self-medicate against low moods. However, escape through gaming was then found to lead to other harmful outcomes such as skipped meals, lying, and relationship conflicts.

Despite this, some studies were able to establish causality. Coyne et al. (2020) found a group of participants with increasing symptoms in their longitudinal study. This group of participants had higher levels of depression, aggression, shyness, and anxiety even when controlling for initial levels of each variable. In addition, Krossbakken et al. (2018) found that depression, loneliness, and verbal aggression were consequences after one year of gaming, while anxiety tended to occur after two years.

In their study, Kaptsis et al. (2016) found that withdrawal from gaming was often reported as anxiety symptoms, moodiness, sadness, and irritability. They also noted that some researchers argued that withdrawal may be an emotional reaction to threats on self-concept. Other researchers have suggested that these symptoms may be a normal reaction to outside stressors that were otherwise being managed by gaming. This is consistent with Giardina et al. (2021), who found that during the recent COVID-19 pandemic highly involved gamers were more able to manage emotional distress and had lower depression and anxiety levels. However, these positive effects were not seen in the pre-COVID group, suggesting

that the protective effect of social gaming may only be relevant when face-to-face socialisation was not a viable option.

Interestingly, some mental health outcomes may present differently within different cultural situations. For example, Snodgrass et al. (2019) reported that while regret for North American and European gamers reflects the idea that gaming can feel like a waste of time, in China it is more closely connected to feeling psychosomatically "drained."

Personal Safety and Wellbeing

Two studies discussed safety and wellbeing outcomes, and both were negative. As well as finding associations between gaming and mental ill health, Ivory et al. (2017) reported relationships between video game use, risky sexual behaviour, and interpersonal violence. Similarly, Zhai et al. (2020) reported that gamers who endorsed at least one symptom criteria on a gaming measure were more likely to carry a weapon, feel unsafe, experience weapon related threats and violence, get into fights, and experience injuries from fights. However, as with many studies the causal relationship was not established in either paper.

Responsibilities

Four of the 5 studies that discussed responsibilities were negative, and 1 reported finding no connection between gaming and responsibilities. In a study of gamers' partners, women noted that their spouse would neglect housework and childcare in favour of gaming (Lianekhammy & van de Venne, 2015). Similarly, Stockdale and Coyne (2020) found that parents may be distracted from childcare duties due to gaming. They noted that parents who are distracted by gaming may miss early cues from infants and may not intervene until infant behaviour has escalated and become harder to attend to. As a result, they found that these parents often felt less effective or capable.

Yeh et al. (2017) also found evidence that gaming was related to increased procrastination, and therefore neglect of responsibilities. Wong and Lam (2016) found that gamers in internet cafes specifically would often neglect responsibilities, leading to unsatisfactory school results. In contrast, Matali et al. (2020) found no connection between gaming and school absences.

Relationships

Of the 12 studies that discussed relationship outcomes, 3 were negative, 2 were positive, and 5 were balanced. The final 2 studies provided interesting observations but did not offer categorizable outcomes. Stockdale and Coyne (2018) found no differences in social support or feelings of companionship for "addicted" gamers compared to non-addicts. Highly

involved gamers in their study reported feeling that they had a good support system, though it was unclear whether these relationships were online or not. This could be an important factor, because the second uncategorised study found that online relationships were not as successful in protecting against depression and anxiety as real-world support (Tham et al., 2020).

Charmaraman et al. (2020) reported that 'high-risk' gamers were less likely to play alone, while van den Eijnden et al. (2018) found that adolescent gamers developed and maintained social relations through gaming. Similarly, Beranuy et al. (2012) found that playing together in MMORPGs led to the formation of highly valued friendships. However, conflicts across a range of relationships arose due to dishonesty and neglected obligations, which in turn led to feelings of guilt.

Snodgrass et al. (2019) found that relationship conflict was a shared outcome across North America, Europe, and China. Similarly, Dredge and Chen (2020) found that gamers of any involvement level had more negative relationships with classmates or parents than non-gamers. Despite this, 'heavy gamers' were also more likely to socialise with strangers online, providing the opportunity to form new social bonds. Gaming was shown to improve socialising for the majority of participants who expressed feeling lonely in Snodgrass et al. (2018). One gamer explained how he strengthened bonds with friends and family through gaming, while another expressed how gaming helped them cope with life stressors and had stopped them taking their own life due to meeting other people with depression online. Despite this, some participants expressed how gaming had caused their loneliness. They explained that while heavily involved gamers may form strong bonds online, more casual gamers did not and were instead socially isolated due to spending so much time gaming.

Lianekhammy and van de Venne (2015) found that the female spouses of male gamers reported conflict between them and their spouse, as well as being ignored and losing out on quality time with their partner due to gaming. In addition, Milani et al. (2018) found that gaming was associated with lower quality interpersonal relationships and increased social problems at both the clinical and non-clinical level. Similarly, Sioni et al. (2017) found that higher scores on diagnostic gaming measures was related to increased social phobia. However, stronger identification with in-game avatar was related to a more stable social identity and therefore enhanced self-esteem.

These contrasting experiences of social gaming have been observed by Griffiths (2010) who reported that a 21-year-old male gamer met "countless new friends" and experienced a self-esteem boost due to gaming after losing his immediate social circle at the end of university. In contrast, a second case study reported a breakdown in the individual's relationship and less time spent with his children.

Three studies listed outcomes that specifically affected others, and these were all negative in nature. Lianekhammy and van de Venne (2015) found that female spouses of gamers felt hopeless and, along with Stockdale and Coyne (2020), reported that gamers neglected their dependents in favour of gaming, while Zhai et al. (2020) found that some gamers were more likely to sexually victimise others.

Finances

All 3 studies that discussed finances reported negative harms without considering any potential positive outcomes. In their case study, Kleinman and Das (2020) found that one individual interviewed had spent up to 40% of his monthly income on microtransactions within a mobile phone game. In addition, Lianekhammy and van de Venne (2015) found that women who had a partner who gamed reported that the gamer spent shared funds without consent, and Wong and Lam (2016) reported that several internet café gamers had financial issues due to 'over-spending' on games. This suggests that financial issues may be found across a range of different gaming sources and styles.

Skills and Abilities

Of the five studies that discussed skill and ability outcomes, 2 were negative and 3 were balanced. Latinsky and Ueno (2020) found that low-to-moderate involvement in gaming increased the likelihood that participants would have a General Educational Development certificate (GED) or high school diploma. Gaming between 1-4 hours on average in a week was related to achieving a bachelor's degree, however 14 hours or more gaming decreased the likelihood of this. They also found gender differences, specifically noting that women who gamed were more likely to be employed, while men were more likely to be unemployed. Borgonovi (2016) reported differences between types of game. Specifically, they found that single-player games were related to improvements in both paper and computer-based reading skill, while collaborative games were related to poorer reading ability.

Farchakh et al. (2020) measured gaming 'addiction' using the Game Addiction Scale for Children (GASC; Yılmaz et al., 2017), that measures seven criteria including salience, tolerance, mood modification, withdrawal, relapse, conflict, and problems. They found that higher gaming salience was related to poorer episodic memory, problem solving, basic reading skills, written expression, and clinical attention. Higher tolerance was related to poorer problem solving and attention, while higher withdrawal was related to poorer attention, factual memory, processing speed, working memory, problem solving and written expression.

Matali et al. (2020) reported that functional deterioration was related to "addicted" use of games rather than gaming itself and noted that the greater the seclusion of the gamer the

worse their global functioning. Whereas Özçetin et al. (2019) found that the length of time spent gaming was related to poor performance on tests of attention and response inhibition. Interestingly, they also found that the gamers had faster reaction times and better visual memory, but poorer total recall than non-gamers.

5.2.4 Discussion

In reviewing the literature, I identified eight outcome categories with positive and negative outcomes for inclusion in the comprehensive taxonomy of gaming harm and benefits. However, I identified almost twice as many harms as benefits. This could suggest that gaming is a significantly harmful behaviour, however it is important to consider whether the studies reviewed were biased. Many of the studies exploring gaming as a potential addiction may focus their attention on the negative outcomes only, dismissing or not measuring potential positives. I found 23 studies that only focused on the negative outcomes of gaming, 16 that examined both positive and negative outcomes, and only 2 studies that focused on the benefits alone. More research that explores both harms and benefits equally and in comparison, would therefore be beneficial in furthering our understanding of gaming.

Some researchers have criticized studies that narrowly focus on the harms, rather than applying a balanced approach to assessment of gaming (Charlton & Danforth, 2007). Snodgrass et al. (2017) in particular argued in favour of considering the balance of harmful and beneficial outcomes in gaming research. They suggested that gamers who report more negative outcomes than beneficial ones may benefit from interventions, while those who demonstrated balance would not require the same level of support. They additionally suggested that including potential benefits in research could signal to gamers that the researcher is respectful of all gaming experiences, therefore encouraging more honest and valid responses with less resistance from potential participants.

Despite this, many researchers continue to focus on negative outcomes, and a balanced taxonomy could be useful in discouraging this narrow approach. I intend to use the results of this literature review to develop a pilot taxonomy for testing in a small sample of gamers. This taxonomy could be used within research to allow for a balanced, replicable, and comparable study of gaming outcomes. This is particularly important considering the speed at which technology has changed, with the rapid development of new methods such as motion detection and virtual reality gaming. These new forms of play could potentially have different outcomes to more traditional gameplay, and a consistent approach to gaming research will allow researchers to focus on these newer developments within the industry.

Throughout this development process the potential outcomes will need to be carefully considered. Delfabbro and King (2019) criticized Langham et al.'s taxonomy of gambling harm for incorrectly labelling certain items as harms. They argued that items such as chasing losses, gambling for more excitement, and betting above affordable means, lead to harm rather than being harmful themselves. For example, betting above affordable means may lead to debt or not being able to afford necessities. I will therefore be excluding several items from the final taxonomy that may not themselves be harmful. For example, unemployment, which can lead to financial strain, or fewer opportunities for social interaction, which can lead to loneliness. I include discussion of items for completeness.

We also need to be considerate of the fact that there was a relatively small number of studies available for review. This could suggest that additional items may be missing from the taxonomy and many items may still be considered as inappropriate by some scholars. Continuous assessment, development and amendment of the taxonomy may therefore be appropriate. However, my aim in this thesis is to provide a strong starting point for the process. To achieve this goal, I began to analyse and refine the purpose, current form, and application of the taxonomy further in a larger sample of targeted gamers.

CHAPTER SIX

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A TAXONOMY OF OUTCOMES

6.1 WHAT IS A TAXONOMY?

According to the Oxford English Dictionary, a taxonomy is "the classification of something" (Simpson & Weiner, 1989). In other words, grouping items together into a single category based on their similarities. Disease taxonomy, or diagnostic taxonomy, helps us to categorise disorders so that we better understand them and can therefore provide better medical care. For example, the DSM-5 category 'Substance Related and Addictive Disorders,' includes addiction to alcohol, caffeine, cannabis, hallucinogens, inhalants, opioids, sedatives, hypnotics, anxiolytics, stimulants, tobacco, and gambling (American Psychiatric Association, 2013). These disorders have been grouped because they share similarities across diagnostic, clinical, physiological, and behavioural factors (Leeman & Potenza, 2012; Wareham & Potenza, 2013b). One of the main aims of research into gaming has therefore been to establish whether potential addiction to videogames shares these similarities as well.

To help answer this, categorisation can be taken further to improve our understanding of the individual disorders within a category. For example, Langham et al. (2015) used the concept of taxonomy to create a comprehensive list of the potential harmful outcomes of gambling. When they began the project, harmful outcomes from gambling were accepted as an established reality, but there were no comprehensive measurement tools, or lists, of the common negative outcomes associated with gambling. This meant that replicable and consistent research into gambling harm was difficult. Langham et al. (2015) explained that this lack of consensus on harm lead to inadequate proxy measures, negatively impacting the ability of research to address gambling as a public health issue.

In comparison, the concept of gaming as a potential source of harm, specifically addiction, is relatively new. Our understanding of gaming is therefore not as developed and the idea that games may be addictive is still debated between scholars (Wang et al., 2019). Following many years of research into gambling a group of researchers created a comprehensive framework of harmful gambling (Hilbrecht et al., 2020). This piece of work reflects on up-to-date knowledge around gambling and is reviewed and revised every few

years. Included in the most current version of this framework is a section titled "Convergence of gaming and gambling." This section discusses the specific features of video games that are reflective of gambling and may therefore contribute to gambling-like harm. In addition, the suggestion is made that the framework could be used as a template for developing frameworks for other behavioural addictions in the future.

While a comprehensive framework of harmful gaming may be several years away, needing a larger selection of high-quality studies to draw from, Wang et al. (2019) have begun by writing an article that considers our current understanding of gaming disorder. In this they discuss diagnostics, treatment, prevention, and current debate around gaming. However, there is no discussion of the specific harmful outcomes of excessive gaming. Further to this, Wang et al. (2019) point out that scholars are still not aware of the actual magnitude of potential harm, and there are few studies on the positive effects that gaming can have. Reflecting on this piece of work, we can further our understanding of gaming and contribute towards the development of a gaming framework by creating comprehensive measurement tools for the real-world outcomes of gaming. In other words, using the research identified in my systematic review of gaming outcomes I can begin to develop a taxonomy of harms and benefits.

Like the work of Langham et al. (2015), this gaming taxonomy may contribute towards more replicable and comparable research into the real-world consequences and benefits of gaming while discouraging inadequate proxy measures. This could then lead to a better understanding of gaming outcomes overall, eventually contributing towards a framework of harmful gaming, or alternatively the understanding that harmful outcomes attributed to gaming are the result of associated risk factors rather than games themselves.

6.2   STUDY FIVE
A PILOT STUDY TOWARDS CREATING A TAXONOMY OF OUTCOMES FROM GAMING INVOLVEMENT

6.2.1 Introduction

Using the results of my systematic literature review I created a list of the potential outcomes of gaming. Unlike Langham et al. (2015)'s taxonomy of gambling harm, I began the process of creating this taxonomy by including both harmful and beneficial outcomes of the behaviour. This decision was made because of the debate around gaming as an

addiction and the need for more research into the positive effects of gaming (Wang et al., 2019). Inclusion of both harms and benefits may encourage researchers to take a holistic and objective approach to measuring the real-world impacts of gaming. Specifically allowing researchers to compare the consequences and benefits for individuals to determine whether the harms are prevalent and severe enough to consider gaming as disordered. In this study, I aimed to test this provisional taxonomy of gaming outcomes.

Many individuals view gaming as a meaningful and rewarding activity in their lives (Shi et al., 2019) and overestimating the potential consequences of gaming could result in excessive restriction of an activity that many people find beneficial. The work of Johannes et al. (2021) has suggested that experiences of competence and social connection with others through gaming can contribute to increased well-being. In fact, they concluded that the mindset of players is key in how they approach games, and therefore the experiences that they subsequently report. Earlier in his research career, Przybylski (2014) also found that children who spend only a few hours gaming every day may be more well-adjusted than those who never play at all. More recently, research by Barr and Copeland-Stewart (2022) expanded on this general relationship between gaming and well-being by investigating the positive effect of games during the COVID-19 pandemic. They found that games were a source of cognitive stimulation, socialising, and reduced anxiety and stress.

Franceschini et al. (2022) has suggested that games considered highly fun can contribute towards enhanced visual perception and reduced sensorimotor and reading disorders in children with developmental coordination disorder and dyslexia. In addition, healthy young adults benefitted from contextual reading enhancement as well as single and pseudoword reading. Similarly, Ceranoglu (2010) found that games were an effective tool in building better patient-therapist relationships, while Donohue (2015) reported success in increasing knowledge of academia, health, and society through games. Together, these findings suggest an emergence of evidence that video games can have a profoundly positive impact on some people's lives. So, it stands to reason that understanding the balance between these positive effects and the potential negative harms reported by some studies (Anderson et al., 2008; Greitemeyer, 2018; McDougall & Duncan, 2008) is important.

Countries that perceive gaming as harmful tend to have stricter restrictions (Starcevic & Billieux, 2018) and several East Asian countries that consider gaming to be a public health threat have implemented regulations that have been criticised as not particularly effective (Király et al., 2018). A more balanced approach to gaming research can not only help us to understand the true impact of the behaviour on individuals, but it can also elicit a more

engaged and responsive participant group, potentially leading to higher quality responses (Shi et al., 2019).

Within this study I aimed to share a list of gaming outcomes created from our systematic literature review with a targeted sample of gamers. I wanted to test whether the items included were relevant and identify potential items that were missed. Using these results, I intend to refine the taxonomy further, with the understanding that this piece of work may require several revisions as the research, and therefore our understanding of gaming, improves.

6.2.2 Method

Participants

Participants were recruited through prolific.co. I identified 150 participants who selected video gaming as a hobby and these participants were paid £2.50 ($3.02 USD) for taking part in the study. The mean age of the sample was 24.81 (SD = 6.21). Most of the sample were students (85). In addition, most participants were unemployed and looking for a job (45), followed by full-time employed (28), and then others (25). The other category accounted for options not covered by part-time working (19), beginning employment soon (2), and unemployed but not looking for work (8). There were also 23 participants who did not disclose their employment status. There were 112 participants who identified as male and 38 who identified as female. No participants selected a gender outside of this binary, and no participants declined to respond.

Materials

Demographic information was measured using the pre-screening information available from prolific.co, including age, gender identity, employment status, and student status. The potential taxonomy of outcomes was developed from a systematic literature review on outcomes from gaming (Raybould et al., Subm.). The subsequent list was then categorised into nine groups for analysis, including psychological outcomes (26), physical outcomes (15), personal safety and well-being (13), responsibilities (13), relationships (29), finances (11), skills and abilities (24), culture (9), and crime (10). A final list question asking, "Have you experienced any other negative or positive consequences that were not addressed in the list?" was included to account for potential outcomes not identified within the literature search, giving a total of 151 items in the taxonomy (Appendix 8.)

Procedure

After reading the study details and giving informed consent, participants viewed the list of potential outcomes and were asked to select all options that were relevant to them. Participants were then asked to identify any additional outcomes that they experienced which were not listed and given the opportunity to include any additional comments that they felt were relevant to the study aims.

6.2.3 Results

I first calculated the mean number of outcomes selected for each category (Table 6.1). The most endorsed outcome categories in order were, skills and abilities, psychological outcomes, and relationship outcomes. The least endorsed categories were crime, financial outcomes, and cultural outcomes. There were more negative outcomes on average than positive ones within all categories except for psychological outcomes, relationships, and skills and abilities.

Table 6.1.

Means and Standard Deviations for Outcome Categories

	Total Outcomes Mean (*SD*)	Positive Outcomes Mean (*SD*)	Negative Outcomes Mean (*SD*)
Psychological Outcomes	9.09 (3.86)	5.54 (2.74)	3.55 (2.68)
Physical Outcomes	6.35 (3.15)	1.60 (1.00)	4.75 (2.75)
Personal Safety and Wellbeing	2.05 (1.70)	0.29 (0.45)	1.76 (1.91)
Responsibilities	4.57 (2.09)	1.27 (0.96)	3.30 (1.87)
Relationships	8.29 (4.48)	4.17 (2.35)	4.12 (3.57)
Finances	1.79 (1.56)	0.47 (0.73)	1.31 (1.48)
Skills and Abilities	10.05 (3.57)	8.49 (3.51)	1.57 (1.64)
Culture	1.95 (1.43)	0.57 (1.01)	1.39 (1.41)
Crime	1.20 (1.16)	0.67 (0.89)	0.53 (0.89)

The taxonomy in its current form consists of 54 positive outcomes and 96 negative outcomes. Alongside the single "other" item this gives a total of 151 taxonomy items. When examining the items endorsed by all participants together, there were 3474 (50.9%) total

positive outcomes and 3350 (49.1%) total negative outcomes endorsed by participants. More positive outcomes were selected than negative outcomes by 74 participants (49.33%), while 75 participants (50%) reported more negative items than positive ones. One individual reported an equal number of positive and negative outcomes. I next examined what percentage of items endorsed by the sample were positive and negative for each category (Table 6.2.)

Table 6.2.

Percentage Distribution of Total Category Responses

	Positive			Negative		
	Count	% Category	% Total Positive	Count	% Category	% Total Negative
Psychological	831	60.97	23.92	532	39.03	15.88
Physical	240	25.21	6.91	712	74.79	21.25
Personal Safety	43	14.01	1.24	264	85.99	7.88
Responsibilities	191	27.84	5.50	495	72.16	14.78
Relationships	625	50.28	17.99	618	49.72	18.45
Finances	71	26.49	2.04	197	73.51	5.88
Skills and Abilities	1273	84.42	36.64	235	15.58	7.01
Culture	85	29.01	2.45	208	70.99	6.21
Crime	101	56.11	2.91	79	43.89	2.36
Other	14	77.78	0.40	10	22.22	0.30

Note: Values represent total participant data, meaning some of the 166 taxonomy items are counted multiple times.

The 151 taxonomy items are divided into 26 psychological items (13 positive, 13 negative), 15 physical items (3 positive, 12 negative), 13 personal safety and wellbeing items (0 positive), 13 responsibility items (4 positive, 9 negative), 29 relationship items (10 positive, 19 negative), 11 financial items (2 positive, 9 negative), 24 skill and ability items (15 positive, 9 negative), 9 cultural items (4 positive, 5 negative), 10 criminality items (3 positive, 7 negative), and one additional question asking participants to list other harms or benefits they have experienced that are not listed. I found that, on average, more negative items were selected from physical health, safety and wellbeing, responsibilities, finances, and culture categories. In comparison, more positive items were identified within psychological outcomes, relationships, skills and abilities, crime, and other reported outcomes. Overall, there were slightly more positive items selected than negative, but this difference was small. Every item was identified by at least one participant, suggesting all items may hold relevance for the taxonomy.

Reviewing the Other Category

Several additional comments from participants were covered by existing items and were not included within category analysis. For example, one participant spent less time with friends and missed meals, which are covered by "I have skipped meals" and "I have spent less time with friends." In each case the researchers confirmed whether relevant items had been selected by the participant. Comments identified as existing items are detailed in Table 6.3. After eliminating these comments, I assessed those that may provide new information for the taxonomy (Table 6.4). For each comment I made notes on how I interpreted the information provided. This then led to fifteen additional taxonomy items (Table 6.5).

Table 6.3.

Participant Comments and the Existing Item(s) they Reflect.

Participant Comment	Existing Item(s)
The discovery of a whole new entertainment medium to explore (I've only recently become a gameplaying person)	I felt entertained and had fun while gaming
Decreased Social Awareness	I feel less able to adapt to different social situations / I have felt less able to communicate with others
Less time in person with friends	I have spent less time with my friends
Easier to miss meal	I have skipped meals
Gaming has greatly improved my social connections and relationships with people.	I have made new friends / I am more social and have formed strong bonds
Gaming has helped a lot in terms of me making friends online that I can game with.	I have made new friends / I have used social media to socialise and make friends
Found a way to cope with difficult life situations	I have felt more able to handle big life changes
Gaming helps realised stress or reduce its levels	I have played games to "escape" from life stress and to relax
Less time to learn new things	I have lost time (realised that time passed without me noticing) / I have skipped school /work I have been distracted from my responsibilities and procrastinated (avoided them)
I play games for about 12 years right now. I've met many people online. Some of them were drug dealers, alcoholics, but everyone had same passion. Same topic to talk about. They gave me life advice that came out great.	I have made new friends / I am more social and have formed strong bonds
Gaming reduces stress and keeps your mind occupied	I have played games to "escape" from life stress and to relax
I notice an improvement in my problem-solving skills.	I can think about problems and come up with solutions
I have felt aesthetically pleased	I felt entertained and had fun while gaming
In my opinion gaming these days is really good way to spend time because people can relax and improve their skills.	I have played games to "escape" from life stress and to relax / Games have improved my abilities / skills generally
spend more time gaming than i planed it	I have lost time (realised that time passed without me noticing)
I forget everything very easily. Sometimes I find it hard to understand the simplest sentence	My memory isn't very good / I believe I need more time to think about information than most people / I find reading complex text difficult

Participant Comment	Existing Item(s)
I like story-based games. Unravelling mysteries keeps me distracted and entertained. Once I start a story-based game it consumes me to the point that I get irritated by my duties. I have gotten bad anxiety from games when I couldn't win in them. I was once extremely afraid of fight the Tekken 5 boss during my early teen years. I often use games to steal time from myself.	I felt entertained and had fun while gaming / I have felt frustrated, or irritable / I have developed symptoms of anxiety or felt my symptoms worsen / I have lost time (realised that time passed without me noticing)
Personally, I have had more positive outcomes of gaming, it's something that has reduced the effects of depression and anxiety in my life. My stress levels decrease immensely, and I find it easier to relax after gaming.	I noticed I have less depression symptoms / I noticed I have less anxiety symptoms / I have played games to "escape" from life stress and to relax
I have been feeling more depressed than usual since i have started gaming.	I have developed symptoms of depression or felt my symptoms worsen
Gaming keeps me away from trouble because I spent most of time alone and indoors.	I have been less likely to take part in illegal activities
Games give me a sense of purpose	I have felt like my life has purpose

Table 6.4.

Participant Comments and the Researcher Analysis Comments

Participant Comment	Researcher Analysis
I found many friends from abroad and I would say I found friends for the rest of my life.	Could suggest improved long-distance relationships (Positive)
Positive is that I feel more relaxed after and before studying for exams at university when I play on games.	Relaxation is within an existing item. However, comment provides context on potential improvements to learning (Positive)
I have screamed and yelled out of frustration, upsetting others around me	Frustration and irritation are within an existing item. However, comment expands to disturbing others (Negative)
Better understanding of the English language compared to peers as it is not my native language	Learnt a new skill (Positive)
I feel like my surround view is better than most	May be referring to improved peripheral vision (Positive)
Gaming sometimes feels like meditation. It helps me concentrate and I think I learn better.	Relaxation while gaming improved learning (Positive)
I have experienced sexist comments while playing an online game.	Harassment/discrimination (Negative)
Sometimes I feel very proud of myself when I've done well in a mission, or my in game is improved	Feelings of pride (Positive)
I find myself driving like the way that I drive in the game and especially GTA 5...and that's not good!	Replication of criminal acts from games, could be categorised under crime or personal safety and wellbeing outcomes (Negative)
I learned new things about history	Learnt new information (Positive)
I've learned English not only by school, but by playing with others. I'm from Poland, and practically every game i want to play, is in English.	Learnt new skill (Positive)
my eyesight just started to deteriorate	Eyesight problems (Negative)
Gaming has always been a way to get my feelings out, learn and improve some skills	Learning and improving skills (Positive)
I made some money from gaming	Financial gain (Positive)
Gaming has raised my heartbeat to a point where I had to stop and properly breath.	Potential health concern with excess adrenaline/excitement (Negative)
I think I use gaming as a way to pass time, I'm avoiding facing reality? if I had something else to do, i would barely play games.	Avoiding reality rather than a healthy escape (Negative)

Participant Comment	Researcher Analysis
I do believe that gaming helped me feel more bonded with my partner, we use gaming as our casual activity to get rid of stress or other negative feelings, what's is more we treat it like some kind of date, so it's always so nice, cause it's like quality time, esspecially if we plaing cooperate games, we learnt a lot from each other and about each other.	Improved relationship / more quality time (Positive)
I've been sexually assulted, but I don't belive it was a cause of me being a gamer, it is always a ,,criminal" fault that something like that happed not mine, and esspecially it don't have anything to do with my personal life. But sometimes this kind od scenario in games trrigers me.	The commenter is correct that the assault is the fault of the attacker, perhaps reword this item. New item – triggered by game content (Negative)
I'm making a living off my gaming activity nowadays, through esports, which is the most positive consequence i've experienced.	Financial gain / Employment. Could categorise under financial or responsibilities (Positive)
Gaming helped me to learn english and Japanese	Learnt a new skill (Positive)
I learned language	Learnt a new skill (Positive)
I believe the only damaging outcome I've experienced is sexual harrassment online from men. It's stopped me from playing video games online that require vocal communication and hinders my ability to make more friends online	Harassment/discrimination (Negative)
I talk and spend time with my friends, whose live a long distance from me.	Easier to maintain long-distance relationships (Positive)
My life plans have been delayed because of all the time I've lost playing video games. I've failed a lot of college courses because of gaming.	Failure of college/school courses (Negative)
I feel spending long amounts of time in front of a bright computer monitor has damaged my eyesight	Eyesight deterioration (Negative)

Table 6.5.

New Items Identified from Participant Comments

Item	Valence	Number of Comments
I learnt a new skill or gained new knowledge (e.g., language /history)	Positive	6
I have screamed or yelled to a degree that upset others in the area	Negative	1
I have noticed improved peripheral vision	Positive	1
I have experienced harassment or discrimination (i.e., sexual/sexism)	Negative	2
I have felt a sense of pride and achievement	Positive	1
I have copied dangerous or criminal acts from a game (e.g., driving too fast)	Negative	1
I have noticed a deterioration in my eyesight	Negative	2
I have failed a school/college course	Negative	1
I have made money through gaming	Positive	1
I have noticed my heart rate increase to the point where I am breathless	Negative	1
I have avoided (rather than healthily escaped from) reality	Negative	1
I have spent more quality time with my partner/friends/family by gaming	Positive	2
I have been distressed by viewing content in-game	Negative	1
I have had new career options such as a streamer or esports athlete	Positive	1
I have been more able to maintain long-distance relationships	Positive	2

Some participants provided interesting talking points without an identifiable outcome, such as participant 020, who stated "when I sleep, my dreams/nightmares usually revolve around gaming." Because they did not indicate whether these dreams or nightmares had a positive or negative impact on their sleep or waking state no item was created from this comment. Participant 021 commented that they were having fun because they played with friends "in real life," while participant 034 stated that they believed "Gaming can be a healthy activity as long as it is balanced with the other factors in your life." Participant 051 reflected that "It used to be worse… but now whenever I deal with frustration in games, I just turn them off" and participant 077 felt that "… age restrictions should be followed, and parents should monitor the games that their kids play."

In contrast, participant 063 expressed that "even though gaming can easily become an addiction, unlike the vast majority of addictions, there are plenty of positives, not only negatives." This sentiment was shared by participant 123, who stated that "… gaming has always been a way of enjoying my time after doing what had to be done for the day, most of the time it is a reward," and participant 139 who commented, "… as time consuming gaming can be; it has great positive outcomes that have greatly impacted my life." Interestingly, participant 067 explained that "… a lot of the symptoms pertaining to stress depend heavily

on what genre of game I'd be playing," suggesting that the taxonomy might be useful in comparing outcomes from different game genres.

6.2.4 Discussion

The creation of this taxonomy of gaming outcomes is intended to improve our understanding of gaming, provide opportunities for discussion, and support the continuous development of a replicable measurement tool to support research. In conducting this pilot study, I aimed to establish whether individual items identified from a systematic literature search were not relevant, and whether some relevant items were missing from the list in its current form.

Using the additional comments provided by participants I identified fifteen new items for inclusion in the taxonomy. I also noted several comments which provide further context around gamers' experiences and suggest potential future uses for the taxonomy, such as the comment that stress levels are dependent on what type of game is being played. Despite several items being less commonly identified than others, I found that all items in the taxonomy were selected by at least one individual. This could indicate that every item holds some relevance, however the taxonomy should continue to be tested, critically appraised, and adapted based on empirical evidence and future advancements in the field.

In this paper I also conducted analysis of how commonly reported each item was. This data can help in the discussion of potential severity scores for each item. Severity scores are an important aspect of outcome taxonomy, particularly when using the list as a measurement of lived experience. To explain this point, we can use the one individual in the sample who reported an equal number of positive and negative outcomes. Using a simple count of selected outcomes, we might conclude that this person has a balanced experience of gaming, where their negative experiences and positive experiences are equal. However, this thinking is fundamentally flawed because it does not consider the different emotional, physical, and lifestyle impacts that items are likely to have. In other words, one item may have a more significant impact on an individual than another. As an example, a participant may say that they find gaming fun and entertaining, but then also indicate that they have been hurt with a weapon due to their involvement in gaming. In this case the harmful outcome is severe and for many individuals would outweigh the identified benefit. However, it is important to note that the severity of an item is likely to be rated differently by different individuals due to current life circumstances, past experiences, culture, belief systems and more. In order to assign severity scores to each item it would therefore be important to

collect an average rating from a large variety of participants with different demographic characteristics.

As a pilot study, the most significant limitation of this study is its small sample size. I therefore conducted a further study in a larger sample to develop the taxonomy further. Further to this, I intended to explore how this taxonomy may be applied in future studies to better our understanding of gaming as addictive.

6.3 STUDY SIX

THE CONSEQUENCES OF GAMING: CREATING AND TESTING A TAXONOMY OF HARMS AND BENEFITS FROM VIDEO GAMES

6.3.1 Introduction

In the following study, I aimed to explore whether the developed taxonomy could identify participants at risk of diagnosis. To achieve this, I needed to test the taxonomy in a targeted sample of gamers. I also wanted to explore additional factors that may be influencing the types of outcomes that individuals experience. I therefore included several demographic questions, including age, gender identity, relationship status, education level, and socioeconomic status.

Subjective social status can be useful as an indicator of status that is relevant to the individual rather than their geography or occupation. This adds more social and cultural context and is often a better predictor of health outcomes than objective education, income, and occupation measures (Euteneuer, 2014; Singh-Manoux et al., 2005; Zell et al., 2018). I therefore selected a common subjective measurement tool, the MacArthur Scale (Adler & Stewart, 2007). The MacArthur scale for Subjective social status has been shown to be a robust predictor health behaviour, mental and physical health (Zell et al., 2018).

6.3.2 Method

Participants

I aimed to recruit a targeted sample of around 200 participants from online gaming forums (Reddit: r/gamers, r/truegaming; Facebook; RTUK). However, due to a minimal response rate I recruited through prolific.co using 'Hobbies – Video Gaming' as a pre-screening criterion. All participants were paid £5.00 ($6.19 USD) and a total of 208

participants completed the study. Two datapoints were removed due to failing attention check questions, leaving 206 for analysis.

The mean DSM-5 score (number of criteria endorsed) was 3.40 (SD = 2.029) and the mean ICD-11 score was 1.05 (SD = 1.307). The mean MacArthur position was 5.28 (SD = 1.506). Using the suggested symptom cut-off points from the diagnostic manuals, 26.7% of the sample may be at-risk of problematic gaming according to the DSM-5 (5 criteria or more), and 28.16% according to the ICD-11 (3 criteria or more). The most selected age group was 25-34 and the most common gender identity was male. The most common education level was university, and the most common relationship status was married/civilly or domestically partnered (Table 6.6.)

Table 6.6.

Demographic Sample Analysis

		Frequency	**Percentage**
Current Gender	Female	76	36.89%
	Male	127	61.65%
	Neither	3	1.46%
Same as Birth Gender?	Cisgender	200	97.09%
	Non-Cisgender	4	1.94%
	Prefer Not to Say	2	0.97%
Highest Education Level	Secondary	17	8.25%
	College	50	24.27%
	Vocational	33	16.02%
	University	71	34.47%
	Postgraduate	35	16.99%
Relationship Status	Single	48	23.30%
	Dating	35	16.99%
	Cohabiting	47	22.82%
	Married/Partnered	67	32.52%
	Widowed	4	1.94%
	Divorced	5	2.43%
DSM-5 Group	Non-Problem	151	73.30%
	At-Risk	55	26.70%
ICD-11 Group	Non-Problem	148	71.84%
	At-Risk	58	28.16%

Materials

Demographic information was collected using simple multiple-choice questions and subjective socioeconomic status was measured using the MacArthur Subjective Scale (Adler & Stewart, 2007). This presents participants with a ladder where the rungs are numbered

from 1 to 10. Participants are asked to place themselves on the ladder while imagining number 10 as the most affluent and number 1 as the least affluent people in society.

Gaming was measured using a question on average hours of gameplay per week. This was followed by two symptom measures. The IGD DSM-5 measure using the nine listed symptom criteria presented as yes/no dichotomous statements. The maximum possible score was 9/9 and the minimum was 0/9. The clinical cut-off suggested in the DSM-5 is 5+ symptoms and so participants who endorsed 5 or more of the criteria were considered as at-risk. The same was in place for the ICD-11 where the four criteria were listed as yes/no statements, and the suggested clinical limit of 3+ was used to suggest which participants may potentially be at-risk.

The taxonomy of gaming outcomes was first developed from a systematic search of the literature. Each potential outcome identified from the literature search was categorised as either a positive benefit or negative harm outcome. These items were then separated by the subheadings and tested in a pilot study of 150 participants, leading to fifteen suggested new items. Some of these items were then separated further, such as "I have copied dangerous or criminal acts from a game (e.g., driving too fast)" becoming "I have copied dangerous acts from games" and "I have copied crimes from games such as speeding." Items are listed under the subheadings mental health (31; 14 positive, 17 negative), physical health (17; 3 positive, 14 negative), personal safety / wellbeing (14; 0 positive), responsibilities (14; 4 positive, 10 negative), relationships (31; 10 positive, 21 negative), finances (13; 4 positive, 9 negative), skills / abilities (26; 17 positive, 9 negative), culture (9; 4 positive, 5 negative), and crime (11; 3 positive, 8 negative). One additional question was also included asking participants to list any other harms or benefits they have experienced. This results in a total of 166 items, with 59 positive and 107 negative items (Appendix 9.)

Procedure

After giving their informed consent, participants answered the demographic questions and the measures of gaming involvement before being presented with the taxonomy of outcomes. Each category from the taxonomy was presented separately so that participants were not overwhelmed by the length of the measure. At the end of the taxonomy participants were presented with one final category labelled other, where they were asked "*have you experienced any other negative or positive consequences that were not addressed in the list?*"

At the start of the taxonomy the first attention checking question was presented, stating "*The colour test you are about to take is an attention check and is very simple. When asked for your favourite colour you should select the colour purple, instead of your actual favourite,*" before participants were asked "*For this question please answer purple. Choose*

your favourite colour" and presented with eight colour options, including green, blue, purple, red, yellow, orange, pink, and black. Only purple was considered as a passing response. Partway through the taxonomy, between the relationship and finance categories, the second attention check question asked participants to "*Please indicate your agreement to the statement: I swim through custard to get to work every day,*" with the multiple-choice answer options of strongly disagree, disagree, agree, and strongly agree. Both strongly disagree and disagree were considered as passing responses. Participants who failed both attention check questions were removed from the study.

6.3.3 Results

Overall Taxonomy Analysis

I began by assessing which items were most endorsed by participants. I found that "I have sexually victimised others" was selected by none of the sample. The most and least commonly endorsed items are presented in Table 6.7. Participants selected slightly more positive (52.41%) items than negative (47.59%) overall. More negative items were individually selected by 82 participants (39.81%), and more positive items by 118 participants (57.28%). An equal number of positive and negative items was selected by 6 participants (2.91%).

Table 6.7.

Most and Least Commonly Endorsed Taxonomy Items

	Item	Number of Participants
Most Endorsed	I feel entertained.	179
	I have played games as a healthy escape.	176
	I can perform daily jobs.	152
	I have lost time.	147
	I have felt frustrated or irritable.	142
	I work well in a team.	136
	I have gone to bed later than I normally would.	135
	I have socialised online.	130
Least Endorsed	I have carried a weapon.	1
	I have copied dangerous acts from games.	1
	I have attempted suicide.	2
	I have been hospitalised after a fight.	2
	I have been hurt with a weapon.	2
	I have been involved in crimes of duress.	2
	I have committed fraud.	2
	I have a criminal record.	2
	I have felt les need to use diet pills.	3
	I have been arrested.	3
	I have copied crimes from games such as speeding.	3
	I have felt less need to purge.	5
	I have felt shame due to crime.	5
	I have bullied others.	6
	I have paid off debts that otherwise would have led me to crime.	7
	My heart rate has increased, affecting my breathing.	8
	I have neglected my dependents.	8
	I have lost a job.	8
	I have poorer relationships with colleagues/teachers.	9

I next used linear regression to analyse whether any significant relationships existed between measures of gaming as a disorder and endorsement of items in the taxonomy. I found a significant model for the DSM-5 ($F_{2,205}$ = 39.783, R^2 = .275, p = .000), where number of criteria selected predicted number of negative items experienced (β = .503, t = 8.280, p = .000), but not number of positive items (β = .095, t = 1.567, p = .119). Similarly, matching more criteria on the ICD-11 measure ($F_{2,205}$ = 40.453, R^2 = .278, p = .000) predicted negative outcomes (β = .532, t = 8.773, p = .000), but not positive outcomes (β = .010, t = .162, p = .872). Interestingly, average hours of gameplay per week ($F_{2,205}$ = 6.067, R^2 = .047, p = .003) was also predictive of negative (β = .189, t = 2.717, p = .007), but not positive (β = .110, t = 1.582, p = .115) outcomes.

To further explore this, I separated participants into non-problem and at-risk groups based on the suggested clinical cut-off point for the DSM-5 (5+ criteria) and ICD-11 (3+ criteria). I then performed binary logistic regression, finding a significant model for the DSM-

5 ($X^2_{2,205}$ = 44.095, R^2 = .281, p = .000), where negative outcomes were positively related to group (β = .081, *S.E.* = .014, p = .000) and positive outcomes were not related (β = -.004, *S.E.* = .021, p = .852). Similarly, ICD-11 group ($X^2_{2,205}$ = 56.428, R^2 = .345, p = .000) was related to negative outcomes (β = .093, *S.E.* = .015, p = .000), but not positive outcomes (β = .005, *S.E.* = .022, p = .809). In both instances the direction of effect indicated that being at-risk of diagnosis was related to endorsing more negative items from the taxonomy.

Individual Category Analysis

I next used bivariate correlation to examine the relationship between the gaming measures and outcome categories in this study (Table 6.8).

Table 6.8.

Bivariate Correlation Analysis Between Measures of Gaming Involvement and Number of Positive and Negative Responses within Outcome Categories

		DSM-5 Score	ICD-11 Score	Average Play Hours
Mental Health	Positive	.196**	.114	.264***
	Negative	.495***	.525***	.190**
	Total	.494***	.470***	.298***
Physical Health	Positive	.062	.023	.006
	Negative	.447***	.382***	.166*
	Total	.434***	.361***	.156*
Personal Safety	Positive	-	-	-
	Negative	.232***	.247***	.127
	Total	.232***	.247***	.127
Responsibilities	Positive	-.002	-.065	-.009
	Negative	.454***	.485***	.089
	Total	.400***	.396***	.075
Relationships	Positive	.112	.078	.138*
	Negative	.419***	.467***	.183**
	Total	.386***	.409***	.210**
Finances	Positive	.043	-.027	-.144**
	Negative	.351***	.352***	.219**
	Total	.348***	.309***	.120
Skills and Abilities	Positive	.185**	.123	.093
	Negative	.277***	.259***	.155*
	Total	.277***	.211**	.145*
Culture	Positive	.015	.055	.040
	Negative	.350***	.345***	.091
	Total	.335***	.351***	.106
Crime	Positive	.173*	.140*	.126
	Negative	.120	.138*	.085
	Total	.203**	.195**	.147*

Average hours of gameplay per week was related to negative outcomes in psychological health, physical health, relationships, finances, and skills and abilities. In

addition, hours of play was related to positive outcomes in psychological health, relationships, and finances. The DSM-5 measure was related to negative outcomes in all categories except for crime, and related to positive outcomes in psychological health, skills and abilities, and crime. In comparison, the ICD-11 measure was related to negative outcomes in all categories except for crime, but only related to positive outcomes in crime. This could suggest that the ICD-11 measure is identifying individuals who are more at risk of a net negative impact from gaming.

Individual Item Analysis

To assess individual items from the taxonomy I next conducted hierarchical cluster analysis using Ward's method and Euclidean square distance (Figure 6.1). Using the dendogram to analyse the results I concluded that the optimum number of clusters was two.

Figure 6.1.

Dendogram Using Ward Linkage to Show Cluster Grouping
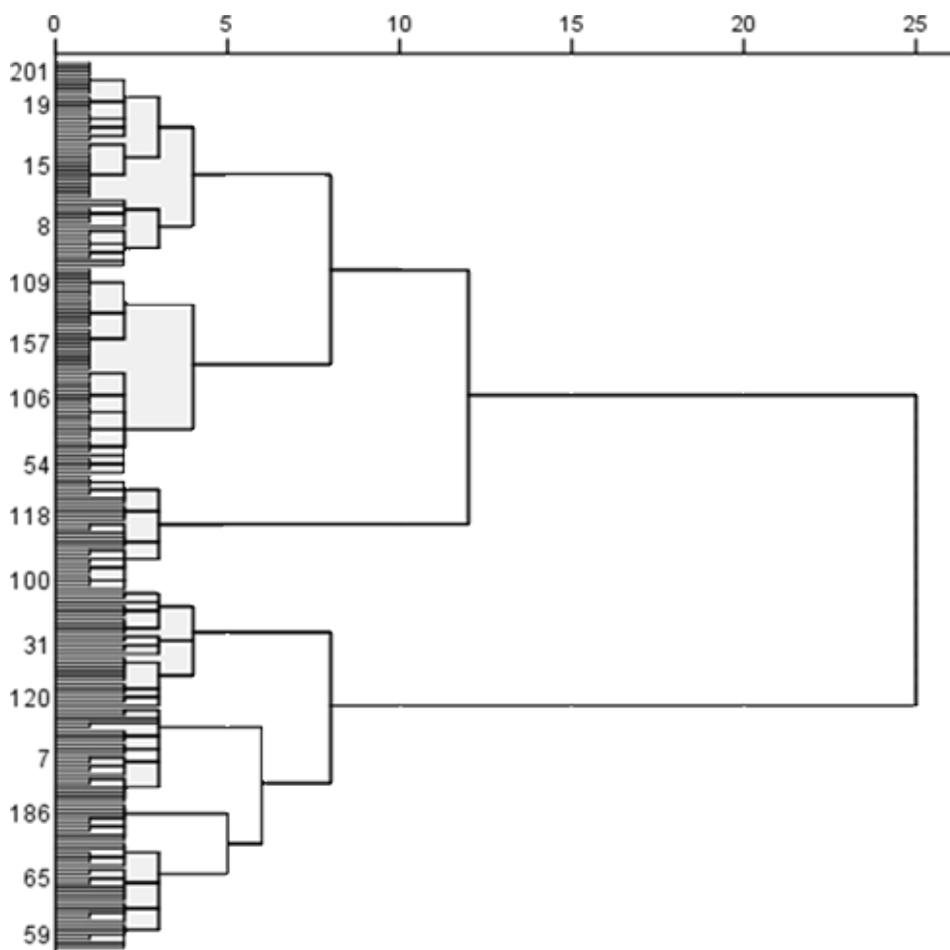
I used this data to conduct a k-means cluster analysis using a two-cluster solution. It took eleven iterations to converge, and I used ANOVA to analyse which outcomes were not significant. In other words, which outcomes did not help us to differentiate between clusters. Almost every non-significant outcome was positive, with the only negative items being attempted suicide, being overweight, struggling to understand sequences, committing crimes of duress, committing fraud, feeling shame due to crimes, and copying criminal acts from games (Appendix 10).

Looking at the final cluster centres we can see that on average, participants in cluster one are more likely to endorse almost every outcome compared to participants in cluster two (Table 6.9). If we explore this further by selecting only items where the difference between cluster one and two is 0.5 or more, we can see that cluster one participants are particularly more likely to struggle with engaging and be easily distracted, experience fatigue, and feel dissatisfied with life.

In comparison, participants within cluster two are more likely to endorse a range of positive outcomes. The difference between cluster one and cluster two participants for these items is below 0.2 in every instance, suggesting only a small increase in likelihood for cluster two individuals. Those items that had a difference of at least 0.1 were a more structured routine, better overall wellbeing, increased cultural connection, good team working, increased life satisfaction, increased cultural belonging, and being employed full-time.

There were 63 individuals represented by cluster one, and 143 represented by cluster two. This suggests that cluster one includes 44.06% of the sample. Using bivariate correlation I found that cluster assignment was related to age (r = .154, p = .027), relationship status (r = .190, p = .006), MacArthur score (r = .241, p = .000), average hours of gameplay per week (r = -.233, p = .000), DSM-5 Score (r = -.446, p = .000) and group (r = -.409, p = .000), and ICD-11 score (r = -.449, p = .000) and group (r = -.422, p = .000). The negative direction of relationship for hours of gameplay, DSM-5 measures, and ICD-11 measures indicates that cluster one individuals are more likely to play for longer, score higher on the DSM-5 and ICD-11 and be categorised as at-risk of diagnosis by the DSM-5 and ICD-11 symptom criteria. In addition, cluster one participants were more likely to be younger in age and rate themselves lower on the subjective social scale.

We can also use the distance to cluster centre to determine which participants are most like the average cluster one or cluster two group member. A value of 0 means the group members are identical, while higher numbers indicate more variation from the average (TIBCO Spotfire, 2015). The participant with the smallest distance to centre value is the most representative of the cluster. For cluster one the most representative participant was 4.66 points away from the centre, suggesting that the cluster may be somewhat varied. The most

representative person from cluster two was 2.95 points away from centre, suggesting more similarity in potentially non-problem gamers within this sample.

Qualitative Review of Other Comments

In analysing the results of the final taxonomy question, I found that almost all additional comments could be covered by items already included in the taxonomy. Participant comments and the associated taxonomy item are detailed in Table 6.9. Those that could potentially lead to new items were, participant 017, who stated that they felt they were saving money during the cost-of-living crisis by gaming instead of going out, and participant 171 who explained that their "opinion of other people in general" had improved through gaming. These could suggest the items, "I have saved money by gaming instead of another activity," and "I have developed more positive opinions about my peers." However, it could be argued that the first item is a perception rather than an objective positive outcome, while the second item could fit into several other relationship items around improved relationships and new friendships. Therefore, these were not included and, the final item total remained at 166 items, with 59 positive benefits and 107 negative harms (Appendix 9).

Table 6.9.

Analysis of Additional Participant Comments

	Comment	Existing Taxonomy Item
002	... others who game... have disabilities... can relate...	I have made new friends; I feel a sense of belonging/part of a community
014	... stopped... violent games... better for my mental health	I have noticed less depression symptoms; I have noticed less anxiety symptoms; I have felt better overall
017	... place I go when... depressed and anxious... avoiding problems... arguments with my partner... agitated... at my own home rather than my partner's... guilt... escaping a social event... suicidal... safe-haven... save money during a cost-of-living crisis... put on a lot of weight... avoid the world outside	I have played games to avoid life; I have felt frustrated or irritable; I have felt guilty; I have avoided face-to-face socialising; I have spent less time with my family/friends; I have thought about committing suicide; I am overweight
023	... sense of satisfaction when I complete difficult levels	I have felt a sense of pride and achievement
066	... more quality time with my partner... lockdowns...	I have spent more quality time with a partner
075	... anger issues resurface... (raging)	I have felt frustrated or irritable; I have felt more angry or aggressive
076	... stress relief... imagination and visualisation	I have played games as a healthy escape from life stressors; Games have improved my abilities/skills; I feel more creative
092	... prioritize what is important in life...	I feel more able to focus; I have a more structured daily routine
121	... quality time with my partner/ friends...	I have spent more quality time with a partner / friend
150	... create and implement audio using middleware...	Games have improved my abilities/skills; Gaming has provided new career options for me; I have found it easier to use a computer; I have learned a new skill or gained new knowledge
162	... derealisation... entertained	I have used games to avoid life; I feel entertained and have fun
167	... never bored... have fun	I feel entertained and have fun
171	... opinion of other people in general has improved…	I believe my viewpoints have expanded
197	... social anxiety... something to do... enjoy... retro gaming online communities... online social thing…	I feel entertained and have fun; I feel a sense of belonging; I have socialised virtually/online
202	Dread, despair, impending doom. Meaninglessness of life... negative feelings come and go… more frequent, stronger, and deeper than positive ones… not always bad	I have experienced symptoms of depression for the first time; I have had increased symptoms of depression; I have felt dissatisfied with life

6.3.4 Discussion

In analysing the Taxonomy of Gaming Outcomes in its current form I found that all but one item was endorsed by at least one participant. This does not suggest that the unendorsed item is inappropriate, as it was selected by individuals in the pilot study.

However, it may indicate that the item is less common and potentially could be rated as a more severe outcome. In continuing to develop this taxonomy it will be important to analyse larger samples to determine whether any single item is not reflective of a gaming outcome.

Continuing our analysis using only outcome number, I found that 39.81% of the sample endorsed more negative items than positive. This could suggest that over ¼ of the sample are suffering significant negative outcomes from gaming, indicating that gaming may have a net-negative affect and therefore be a harmful influence in their lives. However, this does not consider the context of each individual outcome. The positive impact of enjoying a game is most likely not comparable to the negative impact of losing a relationship or considering self-harm. In the next stage of development for the taxonomy it would therefore be beneficial to ask participants to rate outcomes in terms of severity to reach an average severity score for each outcome. This could allow researchers to better understand the positive and negative impacts in comparison, reaching more contextualised and relevant conclusions on whether the overall impact of gaming is harmful.

Despite this we can still draw some useful conclusions from the taxonomy in its current form. I identified that the most commonly experienced negative outcomes were losing time, feeling frustrated or irritable, and going to bed later than normal. These harms could all lead into additional negative outcomes. For example, we might assume that relationship conflicts can occur as a result of being frustrated and irritable, leading to further negative emotions and a potential relationship breakdown. Later bedtimes could lead to oversleeping and being late for work or school, being tired, and underperforming. Neglecting important duties could occur when an individual is losing time. These items may be considered as harms, but they also lead to additional harms. This demonstrates the net of harm that can develop in an individual's life, with one outcome leading to many others. An in-depth interview design using this taxonomy as a baseline could therefore be useful in gathering information on how outcomes interact within individuals.

Additional harms that an individual may not have attributed to their gaming could also be causally linked back to the behaviour. Later bedtimes have been linked to poorer health and functioning generally (McGlinchey & Harvey, 2015), tentatively linked to higher body mass indices (Asarnow et al., 2015), detriments in educational learning and knowledge transfer (Gao et al., 2019), and impaired sperm health (Liu et al., 2017).

Interestingly, when we examine the culture of gaming there is an acceptance of impaired sleep as a social norm. There are several games, gaming companies, and e-Sports events that are regularly sponsored by a long list of energy drink companies (Duran, 2020). Online streamers and content creators have been sponsored by a range of energy drink companies, with Rogue Energy even offering a sponsorship programme for gaming content creators (Rogue Energy, 2022), and several content creators host gaming marathons where

they play for 24 hours or more. Charitable organisations also hold events such as Raise Your Game (Jigsaw, 2022), Game Heroes (Macmillan Cancer Support, 2022), and Game-a-thon (Teenage Cancer Trust, 2022), encouraging continuous gaming marathons to raise money for charity. These gaming marathons can sometimes last for 24 hours or more.

The most common positive outcomes reported by the participants were feeling entertained, using games as a healthy escape from life stressors, being able to perform daily jobs, working well in a team, and socialising online. Like the negative harms, these positive benefits could lead to additional positive outcomes for an individual. Socialising online may lead to developing new relationships and decreased loneliness, while working well in a team could improve academic or workplace achievements.

It is important to note that the harms outlined in this study can occur due to engagement in other behaviours and may be exacerbated by comorbidities. However, this work is aimed at supporting the understanding of gaming related harm in a broad perspective, like the taxonomy created by Langham et al. (2015) for gambling harms. The list in its current form was decided on and critically appraised following the analysis of Delfabbro and King (2019) on Langham et al. (2015)'s taxonomy. They concluded that several items could lead to harms but were not harms themselves. I therefore tried to only include items that are themselves harmful or beneficial to the individual or others.

For future research using this tool it is important to note that although most of the additional comments provided by this cohort were representative of existing items the final question is still important. This provides the opportunity to develop and improve the taxonomy further, but also allows participants to include additional context to their responses and captures items that match existing taxonomy items but were perhaps misunderstood by the participant(s). A key limitation of this study was the fact that several participants gave responses to the 'other' question that matched items listed in the taxonomy. This might suggest that items need to be reworded for clarity. Alternatively, given the length of the taxonomy it may be important for future studies to focus on individual categories, or encourage participants to take breaks between sections to avoid response fatigue that could impact data quality. In continuing to improve and develop this taxonomy I will continue to reflect on these additional comments, and how best to distribute the taxonomy, while also developing a severity score for each item to allow for more objective comparison of the net negative and positive impacts that gaming has on an individual.

CHAPTER SEVEN

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GENERAL DISCUSSION

With the rapid growth of computer technology, psychologists have had a growing interest in the relationship between humans and computers. A prominent Social Psychologist, Kurt Lewin, participated in the 1946 Macy Conference for computing and human behaviour, in 1966 Weizenbaum modelled one of the very first AI chat bots, and in 1983 The Psychology of Human Computer Interaction was published by Card et al. (1986; Stark, 2018). These first steps built the foundation for research into video games, and in chapter one of this thesis, I briefly discussed the history of video games, with particular emphasis on when society began to consider gaming as potentially harmful. Despite one of the first games being shown at the New York World's fair in 1940, research into the potentially harmful psychological effects of games was minimal until the early 80s (Anderson & Ford, 1986; Ross et al., 1982; Soper & Miller, 1983). Interest grew from this point, culminating in the suggested inclusion of gaming in the DSM-5 (Block, 2008). Five years later, IGD was developed using symptom criteria already established for substance use and Gambling Disorder (American Psychiatric Association, 2013).

Comparing gaming to established sources of addiction can be a valuable tool in better understanding the pathways that lead to maladaptive use of video games. This model of research can help us analyse variables that might increase individual risk for diagnosis, and whether those variables suggest a similarity between video games and what we currently understand the umbrella term of addiction to mean. In chapter two of this thesis, I therefore began to explore the concept of impulsivity in addiction. Previous research has suggested that impulsivity is an important factor in addiction (Fauth-Bühler & Mann, 2015; Reilly & Smith, 2013; Volkow et al., 2003) and therefore a potentially important tool in understanding harmful gaming behaviour. I conducted a study exploring the relationship between impulsivity and gaming, gambling, drug use, and alcohol use. The results of this study suggest that there are key similarities between established addiction disorders and gaming. Specifically, I found that the cognitive instability component of the Barrett Impulsivity Scale (BIS-11; Carver & White, 1994) could be a common factor between gaming, gambling, and alcohol use.

I expanded on this research in chapter three of the thesis, by conducting factor analysis on the data. A two-factor model of impulsivity that shared similarities with previous research on substance use and gambling was found to be most appropriate for video

games. This model consisted of an *Urgency* factor representing a tendency to act quickly or prefer immediate reward, and an *Inhibitory Control* factor reflecting an inability to inhibit impulsive action. *Urgency* appeared to be related to the highest levels of potentially disordered behaviour, while *Inhibitory Control* was related to gaming at a potentially healthier level. This indicated a particular similarity between gaming and alcohol use, since Stautz and Cooper (2013) had found that negative and positive urgency from the UPPS-P were most strongly related to problematic drinking.

Research like this on maladaptive behaviours and impulsivity could help to determine whether gaming, or other behaviours, fit under the umbrella of addiction disorder. Despite this, there is not a single agreed understanding of the term addiction and caution is needed when comparing disorders across different brain systems. While some similarities have been found between the disorders, it is important to note that key differences have been identified between these sources of addiction (Badiani et al., 2011). These differences are reflected in the range of specific substances or activities used by individuals, the different patterns of engagement, and the range of comorbidities experienced (Schulenberg et al., 2017; Volberg et al., 2010).

Still, important common characteristics of addiction must exist to justify the use of an umbrella term in diagnostic materials. These include tolerance, withdrawal, loss of control, and preoccupation as reflected by diagnostic symptom criteria (American Psychiatric Association, 2013). Loss of control in particular may be representative of impulsivity. Impulsivity in this case refers to premature actions, undue risk-taking, and poorly considered actions. In other words, a loss of control over behaviour. It is apparent that dysfunctional impulsivity is therefore an important factor in addiction (de Wit, 2009; Evenden, 1999).

As I discussed in chapter two, both the disease model and choice-based model of addiction support the notion of impulsivity as a key factor in addiction. However, while the disease model indicates an underlying dysfunction of the brain preventing voluntary and rational decision making (Racine et al., 2017), the choice-based model indicates that an individual will transition to addiction as a consequence of poor decision making. If we adopted this choice-based model of addiction, we would not expect to observe any pathological loss of control, or dysfunction in the brain leading to an impaired ability to make voluntary choices. In this case we might assume that impulsivity as a measure of addiction would not be sufficient.

In an attempt to summarise the major theoretical approaches to addiction West and Brown (2013) developed their eponymously named Theory of Addiction. They noted that addiction can be driven by many different factors, and if we focus our attention on one factor, we miss the complete holistic picture. The causal pathways and variables of interest in a disorder are important, but this isn't the whole picture. Reflecting on this concept, we can

conclude that regardless of whether we categorise maladaptive video gaming as an addiction, as an impulse control disorder, or as something else entirely, it is important to establish a more nuanced understanding of the behaviour in the context of the real world. What all addictions seem to have in common is that they cause harm to the individual and to those around them. The study of harms provides another method by which we can understand disordered gaming, and in chapter four of the thesis I explore this by conducting a systematic review of the literature on gambling harms.

In this review I identified a range of different harmful outcomes from gambling that were not equally experienced by particular groups in society. In fact, some groups were found to be experiencing more harms even when gambling less. The implied health inequality here would indicate that measuring disorder by its real-world outcomes can offer us deeper insights than simply whether or not a behaviour is harmful. I therefore concluded that the creation of an outcome taxonomy for gaming would be beneficial.

In developing their taxonomy of harmful outcomes from gambling Langham et al. (2015) discussed the importance of a standardised tool for recognising and measuring outcomes from potentially disordered behaviour. They concluded that the research into gambling harm relied heavily on proxy measures, rather than recognising real-world impacts. In order to avoid the same limitation in gaming research the existence of a taxonomy is therefore a worthwhile pursuit. A taxonomy of outcomes that includes both positive and negative items can provide a holistic and practical real-world measure for the negative impact of gaming in an individual's life. Therefore, supporting diagnosis through determining whether gaming is having an overall negative, and therefore disordered, impact on the individual. Further to this, a taxonomy can support researchers to identify characteristics of addiction that contribute to specific outcomes. Particularly in the case of gaming, this may support researchers to better understand key differences between game genres, contexts, and online vs offline play. In chapter five of the thesis, I therefore explore the known outcomes of gaming by conducting a second systematic literature review.

From this review I created an initial list of outcomes that might occur as a result of playing video games. In particular, I included both harmful and beneficial outcomes of the behaviour to allow for a more holistic approach to gaming research. A balanced approach could help to identify maladaptive gaming more objectively than diagnostic symptoms built on preexisting but potentially inappropriate criteria. Snodgrass et al. (2017) argued in favour of this balance, suggesting that patients who report more negative than positive outcomes may require intervention. In addition, they believed that the inclusion of benefits would show gamers that the researcher is respectful of positive gaming experiences and therefore encourage more honest and accurate responses.

Expanding on this groundwork I conducted two studies in chapter six to test and develop the outcome taxonomy further. The initial pilot study involved gamers selecting from a list which positive and negative outcomes they had experienced. They were then asked to add any further comments addressing additional context or outcomes that they felt were missing from the taxonomy. I used this data to improve the taxonomy, concluding that no items were appropriate for removal but that fifteen new items needed to be included. I repeated this process again in study two and there were no new items identified. I then analysed the relationship between this measure of gaming outcomes and the symptom criteria of the DSM-5 and ICD-11. Using cluster analysis, I found two types of participants. Those in cluster one were more likely to endorse a number of negative items and conversely more likely to play longer and endorse more symptom criteria from diagnostic materials. In comparison, participants in cluster two selected more positive outcomes and were less likely to be identified as a potentially addicted gamer.

From this work we can conclude that some individuals are likely experiencing significant negative outcomes related to their gaming, and this experience is at least partially captured by the current diagnostic criteria for IGD. The taxonomy created within this thesis could therefore be a useful tool both clinically and academically in forming a deeper understanding of disordered gaming and how it presents.

Specifically, this taxonomy can be used by researchers to identify patterns between outcomes and multiple factors such as demographic characteristics, game choice, underlying neurobiological factors, levels of maladaptive gaming, and more. In addition, researchers and clinicians will be able to use this tool to support and prompt discussions with patients on the impact of gaming. This could encourage more in-depth qualitative analysis of the holistic impact of video games, as well as drive clinical discussions to improve potential diagnosis and identify key risk factors and areas to be addressed by new interventions and treatment programmes.

As noted by Billieux et al. (2015b), a key limitation of the approaches used in this thesis is the confirmatory nature of the research. The argument they make is that this research process seeks to confirm what the researchers believe to be true, rather than aiming to generate new findings. In reviewing this point, Kardefelt-Winther et al. (2017) suggested that researchers in behavioural addiction could yield useful evidence through a person-centred approach that focuses on qualitative methods. Restrictions during the COVID-19 pandemic impacted the opportunity to achieve this within my thesis. Therefore, in the continued development of my Taxonomy of Gaming Outcomes I will aim to conduct in-depth qualitative research to improve the clarity, depth, and relevance of list items.

Continuing on from this thesis, further research should aim to expand on the Taxonomy of Gaming Outcomes in its current form. Studies that ask a large sample of

participants to rate the severity of each item would be particularly beneficial to improving the taxonomy, allowing for the development of an objective rating scale for taxonomy items. This will help both clinicians and scholars using the tool to calculate the net negative and positive impacts of gaming in a more comparative cost-benefit analysis. In addition, although the second study analysing the taxonomy did not lead to additional list items, there may be specific outcomes that were not captured by the research methods that were utilised. In-depth qualitative analysis of experiences, specifically adopting semi-structured interview techniques, could encourage participants to self-identify outcomes from gaming that were previously not considered. In addition, research that includes affected others and professional clinicians working with gamers could capture items that are difficult to self-identify, or that impact the broader population.

Future research using the taxonomy, such as is represented in chapter three, would then be better able to support the identification of issues such as health inequality, compare different genres and play styles, understand fundamental aspects of addictive games, and support treatment programmes. A simple tool like this taxonomy can not only guide qualitative analysis, but also support more holistic and in-depth quantitative analysis of outcomes in a large sample size. This could then support discussions on symptom criteria relevance in gaming addiction. As was discussed in chapter one, preoccupation (King & Delfabbro, 2014), withdrawal symptoms (Ko et al., 2005; Van Rooij & Prause, 2014), and lying about gaming (Ko et al., 2014) have all been criticised as inappropriate criteria for IGD. Research that aims to provide a deeper understanding of outcomes related to these criteria, such as relationship conflicts as a result of lying, in a large sample could therefore support the continued development and improvement of IGD as a potential DSM-5 diagnosis.

Although more work can be done, it is clear that a holistic approach to understanding gaming in a real-world context would be beneficial and supported by this taxonomy. The practical application of the tool could encourage more in-depth research of the factors associated with, leading to, and resulting from maladaptive gaming. Further to this, the tool could help improve and support the development of interventions, assist in discussions around appropriate symptom criteria for diagnosis, and identify nuances within at-risk groups to improve our understanding of behavioural addictions generally.

7.1.1 Conclusion

The aim of this thesis was to explore different approaches to understanding gaming as a potentially addictive behaviour. I began by discussing the relationship between impulsivity and addiction, comparing gaming to established disorders. I then went on to

explore how harmful real-world outcomes can be used to understand disorders. Expanding on this I developed a taxonomy of gaming outcomes to be used by clinicians and researchers, supporting future research into gaming as an addiction. This holistic approach to understanding gaming in a real-world context allows for a practical application of the taxonomy to encourage in-depth research, the development of interventions, symptom discussions, and more.

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APPENDICES

Appendix 1.

PRISMA Checklist for Study Three

Section/topic	#	Checklist item	On Page
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	40
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	N/A
INTRODUCTION			
Rationale	3	Describe the rationale in the context of what is already known.	39-40
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	40
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	41
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	41
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	41
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix 2
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	41-47
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	41
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	Appendix 4
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including whether this was done at the study or outcome level), and how this information is to be used in synthesis.	41
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	Appendix 4
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	41

Section/topic	#	Checklist item	On Page
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	41
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	41
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	48-49
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	48
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Appendix 3
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	48-61
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	N/A
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	62
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	N/A
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	62
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	62
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	62
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	N/A

Appendix 2.

Web of Science Database Search for Study Three

Record 1 of 189
Title: Gambling-related harms attributable to lotteries products
Author(s): Booth, L (Booth, Leon); Thomas, S (Thomas, Samantha); Moodie, R (Moodie, Rob); Peeters, A (Peeters, Anna); White, V (White, Victoria); Pierce, H (Pierce, Hannah); Anderson, AS (Anderson, Annie S.); Pettigrew, S (Pettigrew, Simone)
Source: ADDICTIVE BEHAVIORS **Volume:** 109 **Article**
Number: 106472 **DOI:** 10.1016/j.addbeh.2020.106472 **Published:** OCT 2020
Accession Number: WOS:000539099900004
PubMed ID: 32485546
Author Identifiers:
anderson, annie 0000-0002-0047-4500
ISSN: 0306-4603
eISSN: 1873-6327

Record 2 of 189
Title: Association between gambling and self-harm: a scoping review
Author(s): Gray, HM (Gray, Heather M.); Edson, TC (Edson, Timothy C.); Nelson, SE (Nelson, Sarah E.); Grossman, AB (Grossman, Alessandra B.); LaPlante, DA (LaPlante, Debi A.)
Source: ADDICTION RESEARCH &
THEORY **DOI:** 10.1080/16066359.2020.1784881 **Early Access Date:** JUL 2020
Accession Number: WOS:000550933400001
ISSN: 1606-6359
eISSN: 1476-7392

Record 3 of 189
Title: Online Gambling-Related Harm: Findings from the Study on the Prevalence, Behavior and Characteristics of Gamblers in Spain
Author(s): Diaz, A (Diaz, Alejandro); Perez, L (Perez, Levi)
Source: JOURNAL OF GAMBLING STUDIES **DOI:** 10.1007/s10899-020-09966-x **Early**
Access Date: JUL 2020
Accession Number: WOS:000550120800001
PubMed ID: 32686040
Author Identifiers:

Perez, Levi 0000-0001-6632-6626
Diaz, Alejandro 0000-0002-6545-9432
ISSN: 1050-5350
eISSN: 1573-3602

Record 4 of 189
Title: Open letter from UK based academic scientists to the secretaries of state for digital, culture, media and sport and for health and social care regarding the need for independent funding for the prevention and treatment of gambling harms
Author(s): Wardle, H (Wardle, Heather); Banks, J (Banks, James); Bebbington, P (Bebbington, Paul); Blank, L (Blank, Lindsey); Jones, HB (Jones, Henrietta Bowden); Bramley, S (Bramley, Stephanie); Bunn, C (Bunn, Christopher); Casey, E (Casey, Emma); Cassidy, R (Cassidy, Rebecca); Chamberlain, SR (Chamberlain, Samuel R.); Close, J (Close, James); Critchlow, N (Critchlow, Nathan); Dobbie, F (Dobbie, Fiona); Downs, C (Downs, Carolyn); Dymond, S (Dymond, Simon); Fino, E (Fino, Emanuele); Goyder, E (Goyder, Elizabeth); Gray, C (Gray, Cindy); Griffiths, M (Griffiths, Mark); Grindrod, P (Grindrod, Peter); Hogan, L (Hogan, Lee); Hoon, A (Hoon, Alice); Hunt,

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K (Hunt, Kate); James, R (James, Richard); John, B (John, Bev); Manthorpe, J (Manthorpe, Jill); McCambridge, J (McCambridge, Jim); McDaid, D (McDaid, David); McKee, M (McKee, Martin); McManus, S (McManus, Sally); Moss, A (Moss, Antony); Norrie, C (Norrie, Caroline); Nutt, DJ (Nutt, David J.); Orford, J (Orford, Jim); Pryce, R (Pryce, Rob); Purves, R (Purves, Richard); Reith, G (Reith, Gerda); Roberts, A (Roberts, Amanda); Roberts, E (Roberts, Emmett); Roderique-Davies, G (Roderique-Davies, Gareth); Rogers, J (Rogers, Jim); Rogers, RD (Rogers, Robert D.); Sharman, S (Sharman, Stephen); Strang, J (Strang, John); Tunney, R (Tunney, Richard); Turner, J (Turner, John); West, R (West, Robert); Zendle, D (Zendle, David)
Source: BMJ-BRITISH MEDICAL JOURNAL **Volume:** 370 **Article Number:** m2613 **DOI:** 10.1136/bmj.m2613 **Published:** JUL 1 2020
Accession Number: WOS:000548489100006
PubMed ID: 32611591
Author Identifiers:
McManus, Sally, 0000-0003-2711-0819
James, Richard, 0000-0002-6644-7011
McDaid, David, 0000-0003-0744-2664
Roberts, Emmert, 0000-0002-4152-5570
Tunney, Richard, 0000-0003-4673-757X
Wardle, Heather, 0000-0003-1361-3706
Strang, John, 0000-0002-5413-2725
ISSN: 1756-1833

Record 5 of 189
Title: Gambling: Academics call for statutory levy to reduce harm
Author(s): Wise, J (Wise, Jacqui)
Source: BMJ-BRITISH MEDICAL JOURNAL **Volume:** 370 **Article Number:** m2600 **DOI:** 10.1136/bmj.m2600 **Published:** JUL 1 2020
Accession Number: WOS:000548489100016
PubMed ID: 32611554
ISSN: 1756-1833

Record 6 of 189
Title: Harms associated with gambling: abbreviated systematic review protocol
Author(s): Beynon, C (Beynon, Caryl); Pearce-Smith, N (Pearce-Smith, Nicola); Clark, R (Clark, Rachel)
Source: SYSTEMATIC REVIEWS **Volume:** 9 **Issue:** 1 **Article Number:** 148 **DOI:** 10.1186/s13643-020-01397-4 **Published:** JUN 23 2020
Accession Number: WOS:000544974200002
PubMed ID: 32576286
Author Identifiers:
Beynon, Caryl, 0000-0002-2188-1500
eISSN: 2046-4053

Record 7 of 189
Title: Prevalence of gambling behaviours and their associations with socioemotional harm among 11-16 year olds in Wales: findings from the School Health Research Network survey
Author(s): Melendez-Torres, GJ (Melendez-Torres, G. J.); Anthony, RE (Anthony, Rebecca E.); Hewitt, G (Hewitt, Gillian); Murphy, S (Murphy, Simon); Moore, GF (Moore, Graham F.)
Source: EUROPEAN JOURNAL OF PUBLIC HEALTH **Volume:** 30 **Issue:** 3 **Pages:** 432-438 **DOI:** 10.1093/eurpub/ckz176 **Published:** JUN 2020
Accession Number: WOS:000544269000010
PubMed ID: 31580438
Author Identifiers:
Anthony, Rebecca, 0000-0001-9503-9562
ISSN: 1101-1262
eISSN: 1464-360X

Record 8 of 189
Title: Prevalence of gambling behaviours and their associations with socioemotional harm among 11-16 year olds in Wales: findings from the School Health Research Network survey (vol 30, pg 432, 2020)
Author(s): Melendez-Torres, GJ (Melendez-Torres, G. J.); Anthony, RE (Anthony, Rebecca E.); Hewitt, G (Hewitt, Gillian); Murphy, S (Murphy, Simon); Moore, GF (Moore, Graham F.)
Source: EUROPEAN JOURNAL OF PUBLIC HEALTH **Volume:** 30 **Issue:** 3 **Pages:** 611-611 **DOI:** 10.1093/eurpub/ckaa010 **Published:** JUN 2020
Accession Number: WOS:000544269000041
Author Identifiers:
Anthony, Rebecca, 0000-0003-4933-4442
ISSN: 1101-1262
eISSN: 1464-360X

Record 9 of 189
Title: Adolescent Gambling, Gambling Expenditure and Gambling-Related Harms in Finland, 2011-2017
Author(s): Raisamo, S (Raisamo, Susanna); Kinnunen, JM (Kinnunen, Jaana M.); Pere, L (Pere, Lasse); Lindfors, P (Lindfors, Pirjo); Rimpel?, A (Rimpela, Arja)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 36 **Issue:** 2 **Pages:** 597- 610 **DOI:** 10.1007/s10899-019-09892-7 **Published:** JUN 2020
Accession Number: WOS:000531806900012
PubMed ID: 31520272
ISSN: 1050-5350
eISSN: 1573-3602

Record 10 of 189
Title: Use of Self-control Strategies for Managing Gambling Habits Leads to Less Harm in Regular Gamblers
Author(s): Currie, SR (Currie, Shawn R.); Brunelle, N (Brunelle, Natacha); Dufour, M (Dufour, Magali); Flores-Pajot, MC (Flores-Pajot, Marie-Claire); Hodgins, D (Hodgins, David); Nadeau, L (Nadeau, Louise); Young, M (Young, Matthew)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 36 **Issue:** 2 **Pages:** 685- 698 **DOI:** 10.1007/s10899-019-09918-0 **Published:** JUN 2020
Accession Number: WOS:000531806900017
PubMed ID: 31828695
Author Identifiers:
Flores-Pajot, Marie-Claire, 0000-0002-7930-7472
ISSN: 1050-5350
eISSN: 1573-3602

Record 11 of 189
Title: Measuring Gambling Harm: The Influence of Response Scaling on Estimates and the Distribution of Harm Across PGSI Categories
Author(s): Delfabbro, P (Delfabbro, Paul); Georgiou, N (Georgiou, Neophytos); King, DL (King, Daniel L.)
Source: JOURNAL OF GAMBLING STUDIES **DOI:** 10.1007/s10899-020-09954-1 **Early Access Date:** MAY 2020
Accession Number: WOS:000533840200001
PubMed ID: 32424665
Author Identifiers:
King, Daniel, 0000-0002-1762-2581
Georgiou, Neophytos, 0000-0002-7868-8250
ISSN: 1050-5350
eISSN: 1573-3602

Record 12 of 189

Title: Exploring the prevalence of gambling harm among active duty military personnel: a systematic scoping review
Author(s): Paterson, M (Paterson, Marisa); Whitty, M (Whitty, Megan); Leslie, P (Leslie, Patrick)
Source: JOURNAL OF GAMBLING STUDIES **DOI:** 10.1007/s10899-020-09951-4 **Early Access Date:** MAY 2020
Accession Number: WOS:000532879400001
PubMed ID: 32410048
Author Identifiers:
Leslie, Patrick 0000-0002-9218-8981
Whitty, Megan 0000-0003-2628-5203
ISSN: 1050-5350
eISSN: 1573-3602

Record 13 of 189
Title: An overview of digital and online strategies to reduce gambling harm
Author(s): Paterson, M (Paterson, Marisa); Whitty, M (Whitty, Megan); Boyer, C (Boyer, Charlotte)
Source: HEALTH PROMOTION JOURNAL OF AUSTRALIA **DOI:** 10.1002/hpja.341 **Early Access Date:** MAY 2020
Accession Number: WOS:000530743900001
PubMed ID: 32246884
Author Identifiers:
Paterson, Marisa 0000-0001-9989-3467
Whitty, Megan 0000-0003-2628-5203
ISSN: 1036-1073
eISSN: 2201-1617

Record 14 of 189
Title: Don't Say the 'P' Word: Problem Gambling Is More than Harm
Author(s): Delfabbro, P (Delfabbro, Paul); King, DL (King, Daniel L.)
Source: INTERNATIONAL JOURNAL OF MENTAL HEALTH AND ADDICTION **Volume:** 18 **Issue:** 3 **Pages:** 835-843 **DOI:** 10.1007/s11469-020-00274-4 **Early Access Date:** APR 2020 **Published:** JUN 2020
Accession Number: WOS:000529878800001
Author Identifiers:
King, Daniel D-7357-2013 0000-0002-1762-2581
ISSN: 1557-1874
eISSN: 1557-1882

Record 15 of 189
Title: Predictors of Strategy Engagement for the Prevention and Reduction of Gambling Harm: a Prospective Application of the Theory of Planned Behaviour
Author(s): Bagot, KL (Bagot, Kathleen L.); Cheetham, A (Cheetham, Alison); Lubman, DI (Lubman, Dan, I); Rodda, SN (Rodda, Simone N.)
Source: INTERNATIONAL JOURNAL OF MENTAL HEALTH AND ADDICTION **DOI:** 10.1007/s11469-020-00265-5 **Early Access Date:** APR 2020
Accession Number: WOS:000523380500002
ISSN: 1557-1874
eISSN: 1557-1882

Record 16 of 189
Title: Commentary on Nilsson et al. (2019): The development of effective interventions for concerned significant others affected by gambling harms
Author(s): Dowling, NA (Dowling, Nicki A.)
Source: ADDICTION **Volume:** 115 **Issue:** 7 **Pages:** 1343-1344 **DOI:** 10.1111/add.15026 **Early Access Date:** MAR 2020 **Published:** JUL 2020
Accession Number: WOS:000520770300001
PubMed ID: 32196805

Record 17 of 189
Title: A public health advocacy approach for preventing and reducing gambling related harm
Author(s): David, JL (David, Jennifer L.); Thomas, SL (Thomas, Samantha L.); Randle, M (Randle, Melanie); Daube, M (Daube, Mike)
Source: AUSTRALIAN AND NEW ZEALAND JOURNAL OF PUBLIC HEALTH **Volume:** 44 **Issue:** 1 **Pages:** 14-19 **DOI:** 10.1111/1753-6405.12949 **Published:** FEB 2020
Accession Number: WOS:000510265900005
PubMed ID: 31777133
Author Identifiers:
Thomas, Samantha 0000-0003-1427-7775
Randle, Melanie, 0000-0001-9129-1701
ISSN: 1326-0200
eISSN: 1753-6405

Record 18 of 189
Title: Tackling gambling related harms as a public health issue
Author(s): Goyder, E (Goyder, Elizabeth); Blank, L (Blank, Lindsay); Baxter, S (Baxter, Susan); van Schalkwyk, MCI (van Schalkwyk, May C. I.)
Source: LANCET PUBLIC HEALTH **Volume:** 5 **Issue:** 1 **Pages:** E14- E15 **DOI:** 10.1016/S2468-2667(19)30243-9 **Published:** JAN 2020
Accession Number: WOS:000505765200008
PubMed ID: 31831371
ISSN: 2468-2667

Record 19 of 189
Title: Gambling related harms - intensive mentoring from mentors with lived experience
Author(s): Niemczewska, A (Niemczewska, Anna); Graham, F (Graham, Frankie)
Source: PERSPECTIVES IN PUBLIC HEALTH **Volume:** 140 **Issue:** 1 **Pages:** 14- 15 **Published:** JAN 2020
Accession Number: WOS:000506232700003
PubMed ID: 31913104
ISSN: 1757-9139
eISSN: 1757-9147

Record 20 of 189
Title: Gambling as social practice: a complementary approach for reducing harm?
Author(s): Gordon, R (Gordon, Ross); Reith, G (Reith, Gerda)
Source: HARM REDUCTION JOURNAL **Volume:** 16 **Issue:** 1 **Article Number:** 64 **DOI:** 10.1186/s12954-019-0342-2 **Published:** DEC 5 2019
Accession Number: WOS:000515130600001
PubMed ID: 31805952
eISSN: 1477-7517

Record 21 of 189
Title: A Behaviour Sequence Analysis of Young People and Gambling-Related Harm
Author(s): Keatley, D (Keatley, David); Parke, A (Parke, Adrian); Townsend, E (Townsend, Ellen); Markham, C (Markham, Claire); Clarke, D (Clarke, David)
Source: JOURNAL OF GAMBLING ISSUES **Issue:** 43 **Pages:** 10- 28 **DOI:** 10.4309/jgi.2019.43.2 **Published:** DEC 2019
Accession Number: WOS:000529979200002
ISSN: 1910-7595

Record 22 of 189

Title: Measuring Behavioural Dependence in Gambling: A Case for Removing Harmful Consequences from the Assessment of Problem Gambling Pathology
Author(s): Browne, M (Browne, Matthew); Rockloff, MJ (Rockloff, Matthew J.)
Source: JOURNAL OF GAMBLING STUDIES **DOI:** 10.1007/s10899-019-09916-2 **Early Access Date:** NOV 2019
Accession Number: WOS:000498979700001
PubMed ID: 31776754
Author Identifiers:
Browne, Matthew 0000-0002-2668-6229
Rockloff, Matthew 0000-0002-0080-2690
ISSN: 1050-5350
eISSN: 1573-3602

Record 23 of 189
Title: A public health advocacy approach for preventing and reducing gambling related harm
Author(s): David, JL (David, Jennifer L.); Thomas, SL (Thomas, Samantha L.); Randle, M (Randle, Melanie); Daube, M (Daube, Mike)
Source: AUSTRALIAN AND NEW ZEALAND JOURNAL OF PUBLIC HEALTH **Volume:** 44 **Issue:** 1 **Pages:** 14-19 **DOI:** 10.1111/1753-6405.12949 **Early Access Date:** NOV 2019 **Published:** FEB 2020
Accession Number: WOS:000498788600001
PubMed ID: 31777133
Author Identifiers:
Thomas, Samantha, 0000-0003-1427-7775
Randle, Melanie, 0000-0001-9129-1701
ISSN: 1326-0200
eISSN: 1753-6405

Record 24 of 189
Title: Considering the Public Health and Reno Models: Strategic and Tactical Approaches for Dealing with Gambling-Related Harms
Author(s): Shaffer, HJ (Shaffer, Howard J.); Blaszczynski, A (Blaszczynski, Alexander); Ladouceur, R (Ladouceur, Robert)
Source: INTERNATIONAL JOURNAL OF MENTAL HEALTH AND ADDICTION **Volume:** 18 **Issue:** 3 **Pages:** 806-818 **DOI:** 10.1007/s11469-019-00149-3 **Early Access Date:** OCT 2019 **Published:** JUN 2020
Accession Number: WOS:000493362200002
ISSN: 1557-1874
eISSN: 1557-1882

Record 25 of 189
Title: Problem gambling in adolescents: what are the psychological, social and financial consequences?
Author(s): Livazovic, G (Livazovic, Goran); Bojcic, K (Bojcic, Karlo)
Source: BMC PSYCHIATRY **Volume:** 19 **Issue:** 1 **Article Number:** 308 **DOI:** 10.1186/s12888-019-2293-2 **Published:** OCT 22 2019
Accession Number: WOS:000491935800004
PubMed ID: 31640621
Author Identifiers:
Livazovic, Goran, 0000-0002-0277-5534
Bojcic, Karlo, 0000-0001-7901-8833
eISSN: 1471-244X

Record 26 of 189
Title: Avoiding gambling harm: An evidence-based set of safe gambling practices for consumers

Author(s): Hing, N (Hing, Nerilee); Browne, M (Browne, Matthew); Russell, AMT (Russell, Alex M. T.); Rockloff, M (Rockloff, Matthew); Rawat, V (Rawat, Vijay); Nicoll, F (Nicoll, Fiona); Smith, G (Smith, Garry)

Record 27 of 189
Title: Gambling harm: a global problem requiring global solutions
Author(s): Reith, G (Reith, Gerda); Wardle, H (Wardle, Heather); Gilmore, I (Gilmore, Ian)

Record 28 of 189
Title: Gambling related harm: we lack longitudinal data
Author(s): Bramley, S (Bramley, Stephanie); Manthorpe, J (Manthorpe, Jill); Norrie, C (Norrie, Caroline)

Record 29 of 189
Title: Challenges in the Conceptualisation and Measurement of Gambling-Related Harm
Author(s): Delfabbro, P (Delfabbro, Paul); King, DL (King, Daniel L.)

Record 30 of 189
Title: Til Debt Do Us Part: Comparing Gambling Harms Between Gamblers and Their Spouses
Author(s): Jeffrey, L (Jeffrey, Lisa); Browne, M (Browne, Matthew); Rawat, V (Rawat, Vijay); Langham, E (Langham, Erika); Li, E (Li, En); Rockloff, M (Rockloff, Matthew)

Browne, Matthew, 0000-0002-2668-6229
Rockloff, Matthew, 0000-0002-0080-2690

Record 31 of 189
Title: Gambling related harms - community and clinical comparisons
Author(s): Angus, DJ (Angus, Douglas J.); Anjoul, F (Anjoul, Fadi); Shannon, K (Shannon, Kirsten); Blaszczynski, A (Blaszczynski, Alex)
Source: ADDICTION RESEARCH & THEORY **Volume:** 28 **Issue:** 3 **Pages:** 194- 203 **DOI:** 10.1080/16066359.2019.1622001 **Early Access Date:** AUG
2019 **Published:** MAY 3 2020
Accession Number: WOS:000483774200001
Author Identifiers:
Angus, Douglas 0000-0001-9722-2475
Blaszczynski, Alexander 0000-0003-1476-0791

Record 32 of 189
Title: Gambling: health experts investigate scale of harm
Author(s): O'Dowd, A (O'Dowd, Adrian)
Source: BMJ-BRITISH MEDICAL JOURNAL **Volume:** 366 **Article Number:** l4742 **DOI:** 10.1136/bmj.l4742 **Published:** JUL 17 2019
Accession Number: WOS:000476871500017
PubMed ID: 31315838

Record 33 of 189
Title: Social influences normalise gambling, and gambling-related harm, amongst higher-risk gamblers
Author(s): Russell, AMT (Russell, Alex Myles Thomas); Langham, E (Langham, Erika); Hing, N (Hing, Nerilee)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Meeting Abstract:** IO2- 5 **Volume:** 8 **Pages:** 108-109 **Supplement:** 1 **Published:** JUN 2019
Accession Number: WOS:000470323600176

Record 34 of 189
Title: Avoiding harmful gambling: An evidence-based set of safe gambling practices for consumers
Author(s): Hing, N (Hing, Nerilee); Browne, M (Browne, Matthew); Russell, AMT (Russell, Alex Myles Thomas); Rockloff, M (Rockloff, Matthew); Rawat, V (Rawat, Vijay); Nicoll, F (Nicoll, Fiona); Smith, G (Smith, Garry)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Meeting Abstract:** IO4- 1 **Volume:** 8 **Pages:** 112-113 **Supplement:** 1 **Published:** JUN 2019
Accession Number: WOS:000470323600182

Record 35 of 189
Title: Problem gambling and gambling-related harms amongst esports bettors and skin gamblers
Author(s): Greer, N (Greer, Nancy)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Meeting Abstract:** IO6- 4 **Volume:** 8 **Pages:** 122-122 **Supplement:** 1 **Published:** JUN 2019
Accession Number: WOS:000470323600196

Record 36 of 189
Title: What do we know about gambling-related harm affecting migrants and migrant communities? A rapid review
Author(s): Wardle, H (Wardle, Heather); Bramley, S (Bramley, Stephanie); Norrie, C (Norrie, Caroline); Manthorpe, J (Manthorpe, Jill)
Source: ADDICTIVE BEHAVIORS **Volume:** 93 **Pages:** 180- 193 **DOI:** 10.1016/j.addbeh.2019.01.017 **Published:** JUN 2019
Accession Number: WOS:000469156600028
PubMed ID: 30716593
ISSN: 0306-4603
eISSN: 1873-6327

Record 37 of 189
Title: Gambling and public health: we need policy action to prevent harm
Author(s): Wardle, H (Wardle, Heather); Reith, G (Reith, Gerda); Langham, E (Langham, Erika); Rogers, RD (Rogers, Robert D.)
Source: BMJ-BRITISH MEDICAL JOURNAL **Volume:** 365 **Article Number:** l1807 **DOI:** 10.1136/bmj.l1807 **Published:** MAY 8 2019
Accession Number: WOS:000467903100004
PubMed ID: 31068335
Author Identifiers:
Rogers, Robert   AAF-7621-2019 0000-0001-5010-069X
Wardle, Heather 0000-0003-1361-3706
ISSN: 1756-1833

Record 38 of 189
Title: The role of public health advocacy in preventing and reducing gambling related harm: challenges, facilitators, and opportunities for change
Author(s): David, JL (David, Jennifer L.); Thomas, SL (Thomas, Samantha L.); Randle, M (Randle, Melanie); Daube, M (Daube, Mike); Balandin, S (Balandin, Susan)
Source: ADDICTION RESEARCH & THEORY **Volume:** 27 **Issue:** 3 **Pages:** 210- 219 **DOI:** 10.1080/16066359.2018.1490410 **Published:** MAY 4 2019
Accession Number: WOS:000465210700005
Author Identifiers:
Randle, Melanie, 0000-0001-9129-1701
Thomas, Samantha, 0000-0003-1427-7775
Daube, Mike, 0000-0002-3479-2785
ISSN: 1606-6359
eISSN: 1476-7392

Record 39 of 189
Title: Secrets and secretive behaviours: Exploring the hidden through harmful gambling
Author(s): Fulton, C (Fulton, Crystal)
Source: LIBRARY & INFORMATION SCIENCE RESEARCH **Volume:** 41 **Issue:** 2 **Pages:** 151- 157 **DOI:** 10.1016/j.lisr.2019.03.003 **Published:** APR 2019
Accession Number: WOS:000473375000008
ISSN: 0740-8188
eISSN: 1873-1848

Record 40 of 189
Title: A Multivariate Evaluation of 25 Proximal and Distal Risk-Factors for Gambling-Related Harm

Author(s): Browne, M (Browne, Matthew); Hing, N (Hing, Nerilee); Rockloff, M (Rockloff, Matthew); Russell, AMT (Russell, Alex M. T.); Greer, N (Greer, Nancy); Nicoll, F (Nicoll, Fiona); Smith, G (Smith, Garry)
Source: JOURNAL OF CLINICAL MEDICINE **Volume:** 8 **Issue:** 4 **Article Number:** 509 **DOI:** 10.3390/jcm8040509 **Published:** APR 2019
Accession Number: WOS:000467500200094
PubMed ID: 31013926
Author Identifiers:

Russell, Alex, 0000-0002-3685-7220	
Browne, Matthew, 0000-0002-2668-6229	
Hing, Nerilee, 0000-0002-2150-9784	

ISSN: 2077-0383

Record 41 of 189
Title: Women and gambling-related harm: a narrative literature review and implications for research, policy, and practice
Author(s): McCarthy, S (McCarthy, Simone); Thomas, SL (Thomas, Samantha L.); Bellringer, ME (Bellringer, Maria E.); Cassidy, R (Cassidy, Rebecca)
Source: HARM REDUCTION JOURNAL **Volume:** 16 **Article Number:** 18 **DOI:** 10.1186/s12954-019-0284-8 **Published:** MAR 4 2019
Accession Number: WOS:000460585200001
PubMed ID: 30832672
Author Identifiers:

McCarthy, Simone X-5088-2019 0000-0003-2671-3511	
Thomas, Samantha 0000-0003-1427-7775	

ISSN: 1477-7517

Record 42 of 189
Title: Online gambling: Which specificities for harm-minimisation tools?
Author(s): Bonnaire, C (Bonnaire, C.); Barrault, S (Barrault, S.)
Source: PRATIQUES PSYCHOLOGIQUES **Volume:** 25 **Issue:** 1 **Pages:** 17-35 **DOI:** 10.1016/j.prps.2018.04.001 **Published:** MAR 2019
Accession Number: WOS:000459943000002
ISSN: 1269-1763

Record 43 of 189
Title: Effects of prevention and harm reduction interventions on gambling behaviours and gambling related harm: An umbrella review
Author(s): McMahon, N (McMahon, Naoimh); Thomson, K (Thomson, Katie); Kaner, E (Kaner, Eileen); Bambra, C (Bambra, Clare)
Source: ADDICTIVE BEHAVIORS **Volume:** 90 **Pages:** 380- 388 **DOI:** 10.1016/j.addbeh.2018.11.048 **Published:** MAR 2019
Accession Number: WOS:000456900000058
PubMed ID: 30529994
Author Identifiers:

Thomson, Katie 0000-0002-9614-728X	
McMahon, Naoimh 0000-0001-6319-2263	

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Record 44 of 189
Title: A mapping review of research on gambling harm in three regulatory environments
Author(s): Baxter, DG (Baxter, David G.); Hilbrecht, M (Hilbrecht, Margo); Wheaton, CTJ (Wheaton, Cameron T. J.)
Source: HARM REDUCTION JOURNAL **Volume:** 16 **Article Number:** 12 **DOI:** 10.1186/s12954-018-0265-3 **Published:** FEB 8 2019

Author Identifiers:
Baxter, David, 0000-0001-5235-6728
Hilbrecht, Margo, 0000-0002-7615-7595

Title: The nature of gambling-related harm for adults with health and social care needs: an exploratory study of the views of key informants
Author(s): Bramley, S (Bramley, Stephanie); Norrie, C (Norrie, Caroline); Manthorpe, J (Manthorpe, Jill)
Source: PRIMARY HEALTH CARE RESEARCH AND
DEVELOPMENT **Volume:** 20 **Article Number:** UNSP e115 **DOI:** 10.1017/S1463423619000549
Published: 2019
Author Identifiers:
Norrie, Caroline 0000-0001-6715-9305
Manthorpe, Jill 0000-0001-9006-1410
Bramley, Stephanie 0000-0003-2702-1672

Title: Decision-Making Measured by the Iowa Gambling Task in Patients with Alcohol Use Disorders Choosing Harm Reduction versus Relapse Prevention Program
Author(s): Briere, M (Briere, Marie); Tocanier, L (Tocanier, Laure); Allain, P (Allain, Phillippe); Le Gal, D (Le Gal, Dewi); Allet, G (Allet, Guillaume); Gorwood, P (Gorwood, Phillip); Gohier, B (Gohier, Benedicte)
Source: EUROPEAN ADDICTION RESEARCH **Volume:** 25 **Issue:** 4 **Pages:** 182- 190 **DOI:** 10.1159/000499709 **Published:** 2019
Author Identifiers:
ALLAIN, Philiooe, 0000-0003-0668-0986

Title: Gambling disorder in adolescents: what do we know about this social problem and its consequences?
Author(s): Ferrara, P (Ferrara, Pietro); Franceschini, G (Franceschini, Giulia); Corsello, G (Corsello, Giovanni)
Source: ITALIAN JOURNAL OF PEDIATRICS **Volume:** 44 **Article Number:** 146 **DOI:** 10.1186/s13052-018-0592-8 **Published:** DEC 4 2018
Author Identifiers:
FERRARA, Pietro 0000-0001-9449-3464

Title: An empirical review of gambling expansion and gambling-related harm

Author(s): LaPlante, DA (LaPlante, Debi A.); Gray, HM (Gray, Heather M.); Williams, PM (Williams, Pat M.); Nelson, SE (Nelson, Sarah E.)
Source: SUCHT-ZEITSCHRIFT FUR WISSENSCHAFT UND
PRAXIS **Volume:** 64 **Issue:** 5-6 **Special Issue:** SI **Pages:** 295-306 **DOI:** 10.1024/0939-5911/a000563 **Published:** DEC 2018
Accession Number: WOS:000457208500006
Author Identifiers:

Gray, Heather 0000-0001-8886-5989

Williams, Pat, 0000-0003-3732-0510

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Record 49 of 189
Title: Social influences normalize gambling-related harm among higher risk gamblers
Author(s): Russell, AMT (Russell, Alex M. T.); Langham, E (Langham, Erika); Hing, N (Hing, Nerilee)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Volume:** 7 **Issue:** 4 **Pages:** 1100- 1111 **DOI:** 10.1556/2006.7.2018.139 **Published:** DEC 2018
Accession Number: WOS:000454636900031
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Title: BEHAVIORAL ECONOMICS AND GAMBLING: A NEW PARADIGM FOR APPROACHING HARM-MINIMIZATION
Author(s): Gainsbury, SM (Gainsbury, Sally M.); Tobias-Webb, J (Tobias-Webb, Juliette); Slonim, R (Slonim, Robert)
Source: GAMING LAW REVIEW-ECONOMICS REGULATION COMPLIANCE AND
POLICY **Volume:** 22 **Issue:** 10 **Pages:** 608-617 **DOI:** 10.1089/glr2.2018.22106 **Published:** DEC 1 2018
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Title: Where Lies the Harm in Lottery Gambling? A Portrait of Gambling Practices and Associated Problems
Author(s): Costes, JM (Costes, Jean-Michel); Kairouz, S (Kairouz, Sylvia); Monson, E (Monson, Eva); Eroukmanoff, V (Eroukmanoff, Vincent)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 34 **Issue:** 4 **Pages:** 1293- 1311 **DOI:** 10.1007/s10899-018-9761-3 **Published:** DEC 2018
Accession Number: WOS:000447811800012
PubMed ID: 29536292
Author Identifiers:

Kairouz, Sylvia 0000-0002-8788-4456

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Title: A BRIEF OVERVIEW OF THE AUSTRIAN GAMBLING REGULATION AND IMPLICATIONS FOR PLAYER PROTECTION AND HARM MINIMIZATION
Author(s): Malischnig, D (Malischnig, Doris); Griffiths, MD (Griffiths, Mark D.); Auer, M (Auer, Michael)
Source: GAMING LAW REVIEW-ECONOMICS REGULATION COMPLIANCE AND
POLICY **Volume:** 22 **Issue:** 9 **Pages:** 564-567 **DOI:** 10.1089/glr2.2018.2297 **Published:** NOV 1 2018

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Title: The demand for gambling in Italian regions and its distributional consequences
Author(s): Gandullia, L (Gandullia, Luca); Leporatti, L (Leporatti, Lucia)
Source: PAPERS IN REGIONAL SCIENCE **Volume:** 97 **Issue:** 4 **Pages:** 1203-
+ **DOI:** 10.1111/pirs.12302 **Published:** NOV 2018
Accession Number: WOS:000449522700017
Author Identifiers:

LEPORATTI, LUCIA, 0000-0003-4186-908X

GANDULLIA, Luca, 0000-0003-2545-9742

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Record 54 of 189
Title: A Comparison of Online Versus Offline Gambling Harm in Portuguese Pathological Gamblers:
An Empirical Study
Author(s): Hubert, P (Hubert, Pedro); Griffiths, MD (Griffiths, Mark D.)
Source: INTERNATIONAL JOURNAL OF MENTAL HEALTH AND
ADDICTION **Volume:** 16 **Issue:** 5 **Pages:** 1219-1237 **DOI:** 10.1007/s11469-017-9846-
8 **Published:** OCT 2018
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PubMed ID: 30416402
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Title: Harm caused by gambling among non-problem gamblers: Is a whole-of-population approach
undervalued?
Author(s): Raisamo, S (Raisamo, Susanna)
Source: SCANDINAVIAN JOURNAL OF PUBLIC
HEALTH **Volume:** 46 **Issue:** 5 **Pages:** 503-
504 **DOI:** 10.1177/1403494817744073 **Published:** JUL 2018
Accession Number: WOS:000438611100001
PubMed ID: 29173046
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Record 56 of 189
Title: Prevalence of gambling-related harm provides evidence for the prevention paradox
Author(s): Browne, M (Browne, Matthew); Rockloff, MJ (Rockloff, Matthew J.)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Volume:** 7 **Issue:** 2 **Pages:** 410- 422 **DOI:**
10.1556/2006.7.2018.41 **Published:** JUN 2018
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PubMed ID: 29788761
Author Identifiers:

Browne, Matthew 0000-0002-2668-6229

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Title: Gambling participation, gambling habits, gambling-related harm, and opinions on gambling
advertising in Finland in 2016

Author(s): Salonen, AH (Salonen, Anne H.); Hellman, M (Hellman, Matilda); Latvala, T (Latvala, Tiina); Castren, S (Castren, Sari)
Source: NORDIC STUDIES ON ALCOHOL AND
DRUGS **Volume:** 35 **Issue:** 3 **Pages:** 215-
234 **DOI:** 10.1177/1455072518765875 **Published:** JUN 2018
Accession Number: WOS:000435962100006
Author Identifiers:
Hellman, Matilda 0000-0001-8884-8601

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Title: Validation of the Short Gambling Harm Screen (SGHS): A Tool for Assessment of Harms from Gambling
Author(s): Browne, M (Browne, Matthew); Goodwin, BC (Goodwin, Belinda C.); Rockloff, MJ (Rockloff, Matthew J.)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 34 **Issue:** 2 **Pages:** 499- 512 **DOI:** 10.1007/s10899-017-9698-y **Published:** JUN 2018
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Author Identifiers:
Browne, Matthew 0000-0002-2668-6229

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Record 59 of 189
Title: Crossover Effects of Protective Behavioural Strategies for Drinking on Gambling Consequences Among College Gamblers With Alcohol or Drug Abuse
Author(s): Granato, H (Granato, Hollie); Luk, JW (Luk, Jeremy W.); Paves, A (Paves, Andrew); Geisner, IM (Geisner, Irene M.); Cronce, JM (Cronce, Jessica M.); Kilmer, JR (Kilmer, Jason R.); Lostutter, TW (Lostutter, Ty W.); Larimer, ME (Larimer, Mary E.)
Source: JOURNAL OF GAMBLING ISSUES **Issue:** 38 **Special Issue:** SI **Pages:** 190- 202 **DOI:** 10.4309/jgi.2018.38.10 **Published:** MAY 2018
Accession Number: WOS:000438728500010
Author Identifiers:
Luk, Jeremy 0000-0002-9061-1555
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Record 60 of 189
Title: Women's gambling behaviour, product preferences, and perceptions of product harm: differences by age and gambling risk status
Author(s): McCarthy, S (McCarthy, Simone); Thomas, SL (Thomas, Samantha L.); Randle, M (Randle, Melanie); Bestman, A (Bestman, Amy); Pitt, H (Pitt, Hannah); Cowlishaw, S (Cowlishaw, Sean); Daube, M (Daube, Mike)
Source: HARM REDUCTION JOURNAL **Volume:** 15 **Article Number:** 22 **DOI:** 10.1186/s12954-018-0227-9 **Published:** APR 24 2018
Accession Number: WOS:000431052100001
PubMed ID: 29690876
Author Identifiers:
Pitt, Hannah, 0000-0002-4259-6186
McCarthy, Simone, 0000-0003-2671-3511
Thomas, Samantha, 0000-0003-1427-7775
Bestman, Amy, 0000-0003-1269-2123
Daube, Mike, 0000-0002-3479-2785
Randle, Melanie, 0000-0001-9129-1701
ISSN: 1477-7517

Record 61 of 189
Title: The Case for Using Personally Relevant and Emotionally Stimulating Gambling Messages as a Gambling Harm-Minimisation Strategy
Author(s): Harris, A (Harris, Andrew); Parke, A (Parke, Adrian); Griffiths, MD (Griffiths, Mark D.)
Source: INTERNATIONAL JOURNAL OF MENTAL HEALTH AND ADDICTION **Volume:** 16 **Issue:** 2 **Pages:** 266-275 **DOI:** 10.1007/s11469-016-9698-7 **Published:** APR 2018
Accession Number: WOS:000429946600002
PubMed ID: 29670498
Author Identifiers:

Parke, Adrian, 0000-0002-5242-6308
Griffiths, Mark, 0000-0001-8880-6524
Harris, Andrew, 0000-0001-9627-4900

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Title: A process evaluation of the 'Aware' and 'Supportive Communities' gambling harm- minimisa-tion programmes in New Zealand
Author(s): Kolandai-Matchett, K (Kolandai-Matchett, Komathi); Bellringer, M (Bellringer, Maria); Landon, J (Landon, Jason); Abbott, M (Abbott, Max)
Source: EUROPEAN JOURNAL OF PUBLIC HEALTH **Volume:** 28 **Issue:** 2 **Pages:** 369-376 **DOI:** 10.1093/eurpub/ckx120 **Published:** APR 2018
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Author Identifiers:

Landon, Jason AAD-3951-2019 Kolandai-Matchett, Komathi AAK-7059-2020

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Title: Gambling Participation, Expenditure and Risk of Harm in Australia, 1997-1998 and 2010-2011
Author(s): Armstrong, AR (Armstrong, Andrew Richard); Thomas, A (Thomas, Anna); Abbott, M (Abbott, Max)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 34 **Issue:** 1 **Pages:** 255- 274 **DOI:** 10.1007/s10899-017-9708-0 **Published:** MAR 2018
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Title: Gambling-related harms and homelessness: findings from a scoping review
Author(s): Bramley, S (Bramley, Stephanie); Norrie, C (Norrie, Caroline); Manthorpe, J (Manthorpe, Jill)
Source: HOUSING CARE AND SUPPORT **Volume:** 21 **Issue:** 1 **Pages:** 26- 39 **DOI:** 10.1108/HCS-02-2018-0003 **Published:** 2018
Accession Number: WOS:000431686800003
Author Identifiers:

Norrie, Caroline, 0000-0001-6715-9305
Bramley, Stephanie, 0000-0003-2702-1672
Manthorpe, Jill, 0000-0001-9006-1410

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Title: Understanding end-user perspectives to enhance perceived value uptake of harm- minimization tools: considering gambler's views of a pre-commitment system
Author(s): Gainsbury, SM (Gainsbury, Sally M.); Jakob, L (Jakob, Laura); Aro, D (Aro, David)
Source: INTERNATIONAL GAMBLING STUDIES **Volume:** 18 **Issue:** 1 **Pages:** 22- 38 **DOI:** 10.1080/14459795.2017.1370723 **Published:** 2018
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Title: Identifying risk and mitigating gambling-related harm in online poker
Author(s): Parke, A (Parke, Adrian); Griffiths, MD (Griffiths, Mark D.)
Source: JOURNAL OF RISK RESEARCH **Volume:** 21 **Issue:** 3 **Pages:** 269- 289 **DOI:** 10.1080/13669877.2016.1200657 **Published:** 2018
Accession Number: WOS:000427729500001
Author Identifiers:
Parke, Adrian, 0000-0002-5242-6308
Griffiths, Mark, 0000-0001-8880-6524
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Title: Loyalty programmes in the gambling industry: potentials for harm and possibilities for harm-minimization
Author(s): Wohl, MJA (Wohl, Michael J. A.)
Source: INTERNATIONAL GAMBLING STUDIES **Volume:** 18 **Issue:** 3 **Pages:** 495- 511 **DOI:** 10.1080/14459795.2018.1480649 **Published:** 2018
Accession Number: WOS:000446111100009
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Title: Configurations of gambling change and harm: qualitative findings from the Swedish longitudinal gambling study (Swelogs)
Author(s): Samuelsson, E (Samuelsson, Eva); Sundqvist, K (Sundqvist, Kristina); Binde, P (Binde, Per)
Source: ADDICTION RESEARCH & THEORY **Volume:** 26 **Issue:** 6 **Pages:** 514- 524 **DOI:** 10.1080/16066359.2018.1448390 **Published:** 2018
Accession Number: WOS:000445288300011
Author Identifiers:
Samuelsson, Eva M-8975-2019 0000-0002-0856-9854
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eISSN: 1476-7392

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Title: Casino Gambling and the Family: Exploring the Connections and Identifying Consequences
Author(s): Anderson, TL (Anderson, Tammy L.); Rempusheski, VF (Rempusheski, Veronica F.); Leedy, KN (Leedy, Kelly N.)
Source: DEVIANT BEHAVIOR **Volume:** 39 **Issue:** 9 **Pages:** 1109-1119 **DOI:** 10.1080/01639625.2017.1409484 **Published:** 2018
Accession Number: WOS:000433135100001
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Title: On gambling research, social science and the consequences of commercial gambling
Author(s): Livingstone, C (Livingstone, Charles); Adams, P (Adams, Peter); Cassidy, R (Cassidy, Rebecca); Markham, F (Markham, Francis); Reith, G (Reith, Gerda); Rintoul, A (Rintoul, Angela); Schull, ND (Schuell, Natasha Dow); Woolley, R (Woolley, Richard); Young, M (Young, Martin)
Source: INTERNATIONAL GAMBLING STUDIES **Volume:** 18 **Issue:** 1 **Pages:** 56- 68 **DOI:** 10.1080/14459795.2017.1377748 **Published:** 2018
Accession Number: WOS:000423752500004
Author Identifiers:

Markham, Francis, 0000-0002-4266-2569
Rintoul, Angela, 0000-0003-4159-8814
Livingstone, Charles, 0000-0003-3946-2061
Adams, Peter, 0000-0002-3237-0108
Woolley, Richard, 0000-0003-1247-8776

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Title: Association between gambling harms and game types: Finnish population study
Author(s): Castren, S (Castren, Sari); Perhoniemi, R (Perhoniemi, Riku); Kontto, J (Kontto, Jukka); Alho, H (Alho, Hannu); Salonen, AH (Salonen, Anne H.)
Source: INTERNATIONAL GAMBLING STUDIES **Volume:** 18 **Issue:** 1 **Pages:** 124- 142 **DOI:** 10.1080/14459795.2017.1388830 **Published:** 2018
Accession Number: WOS:000423752500008
Author Identifiers:

Kontto, Jukka 0000-0003-3899-9852

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Title: Gambling and Gambling Harm in New Zealand: a 28-Year Case Study
Author(s): Abbott, M (Abbott, Max)
Source: INTERNATIONAL JOURNAL OF MENTAL HEALTH AND ADDICTION **Volume:** 15 **Issue:** 6 **Pages:** 1221-1241 **DOI:** 10.1007/s11469-017-9767-6 **Published:** DEC 2017
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Title: The Unintended Normalization of Gambling: Family Identity Influences on the Adoption of Harmful Consumption Practices
Author(s): Westberg, K (Westberg, Kate); Beverland, MB (Beverland, Michael B.); Thomas, SL (Thomas, Samantha L.)
Source: JOURNAL OF MACROMARKETING **Volume:** 37 **Issue:** 4 **Special Issue:** SI **Pages:** 426-443 **DOI:** 10.1177/0276146717720979 **Published:** DEC 2017
Accession Number: WOS:000414653700008
Author Identifiers:

Westberg, Kate, P-7601-2019
Thomas, Samantha, 0000-0003-1427-7775

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Title: INTENSITY AND GAMBLING HARMS: EXPLORING BREADTH OF GAMBLING INVOLVE-MENT AMONG ESPORTS BETTORS

Author(s): Gainsbury, SM (Gainsbury, Sally M.); Abarbanel, B (Abarbanel, Brett); Blaszczynski, A (Blaszczynski, Alex)
Source: GAMING LAW REVIEW-ECONOMICS REGULATION COMPLIANCE AND POLICY **Volume:** 21 **Issue:** 8 **Special Issue:** SI **Pages:** 610- 615 **DOI:** 10.1089/glr2.2017.21812
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Author Identifiers:
Blaszczynski, Alexander G-2713-2013 0000-0003-1476-0791

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Title: What is the harm? Applying a public health methodology to measure the impact of gambling problems and harm on quality of life
Author(s): Browne, M (Browne, Matthew); Rawat, V (Rawat, Vijay); Greer, N (Greer, Nancy); Langham, E (Langham, Erika); Rockloff, M (Rockloff, Matthew); Hanley, C (Hanley, Christine)
Source: JOURNAL OF GAMBLING ISSUES **Issue:** 36 **Pages:** 28- 50 **DOI:** 10.4309/jgi.2017.36.2
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Accession Number: WOS:000419669100002
Author Identifiers:
Langham, Erika, 0000-0002-1824-5108

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Record 76 of 189
Title: The dangers of conflating gambling-related harm with disordered gambling Commentary on: Prevention paradox logic and problem gambling (Delfabbro & King, 2017)
Author(s): Browne, M (Browne, Matthew); Rockloff, MJ (Rockloff, Matthew J.)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Volume:** 6 **Issue:** 3 **Pages:** 317- 320 **DOI:** 10.1556/2006.6.2017.059 **Published:** SEP 2017
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PubMed ID: 28889755
Author Identifiers:
Browne, Matthew 0000-0002-2668-6229

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Title: Public attitudes towards gambling product harm and harm reduction strategies: an online study of 16-88 year olds in Victoria, Australia
Author(s): Thomas, SL (Thomas, Samantha L.); Randle, M (Randle, Melanie); Bestman, A (Bestman, Amy); Pitt, H (Pitt, Hannah); Bowe, SJ (Bowe, Steven J.); Cowlishaw, S (Cowlishaw, Sean); Daube, M (Daube, Mike)
Source: HARM REDUCTION JOURNAL **Volume:** 14 **Article Number:** 49 **DOI:** 10.1186/s12954-017-0173-y **Published:** JUL 25 2017
Accession Number: WOS:000406319200001
PubMed ID: 28743300
Author Identifiers:
Pitt, Hannah, 0000-0002-4259-6186
Bowe, Steven, 0000-0003-3813-842X
Randle, Melanie, 0000-0001-9129-1701
Bestman, Amy, 0000-0003-1269-2123
Daube, Mike, 0000-0002-3479-2785
Thomas, Samantha, 0000-0003-1427-7775

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Title: Prevention paradox logic and problem gambling: Does low-risk gambling impose a greater burden of harm than high-risk gambling?
Author(s): Delfabbro, P (Delfabbro, Paul); King, D (King, Daniel)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Volume:** 6 **Issue:** 2 **Pages:** 163- 167 **DOI:** 10.1556/2006.6.2017.022 **Published:** JUN 2017
Accession Number: WOS:000404596200010
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Author Identifiers:
Delfabbro, Paul AAB-2144-2019
King, Daniel L D-7357-2013 0000-0002-1762-2581
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Title: Sense of Coherence and Gambling: Exploring the Relationship Between Sense of Coherence, Gambling Behaviour and Gambling-Related Harm
Author(s): Langham, E (Langham, Erika); Russell, AMT (Russell, Alex M. T.); Hing, N (Hing, Nerilee); Gainsbury, SM (Gainsbury, Sally M.)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 33 **Issue:** 2 **Pages:** 661- 684 **DOI:** 10.1007/s10899-016-9640-8 **Published:** JUN 2017
Accession Number: WOS:000402186400021
PubMed ID: 27572488
Author Identifiers:
Russell, Alex, 0000-0002-3685-7220
Gainsbury, Sally, 0000-0002-9641-5838
Hing, Nerilee, 0000-0002-2150-9784
Langham, Erika, 0000-0002-1824-5108
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Title: Keynote for ICBA Conference (Haifa 2017) Behavioural tracking in gambling: Implications for responsible gambling, player protection, and harm minimization
Author(s): Griffiths, M (Griffiths, Mark)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Meeting Abstract:** PL- 04 **Volume:** 6 **Pages:** 2-2 **Supplement:** 1 **Published:** MAR 2017
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Title: Shape and size - An exploration of both intended and unintended consequences and re-sponses of gambling within a diverse society with reference to South African women
Author(s): De Vries, L (De Vries, Linda)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Meeting Abstract:** OP- 17 **Volume:** 6 **Pages:** 10-10 **Supplement:** 1 **Published:** MAR 2017
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Title: Online gamblers opinion about harm-minimisation tools
Author(s): Caillon, J (Caillon, J.); Grall-Bronnec, M (Grall-Bronnec, M.); Romo, L (Romo, L.); Bouju, G (Bouju, G.)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Meeting Abstract:** SH- 04 **Volume:** 6 **Pages:** 63-63 **Supplement:** 1 **Published:** MAR 2017

Title: Breaking Bad: Comparing Gambling Harms Among Gamblers and Affected Others
Author(s): Li, E (Li, En); Browne, M (Browne, Matthew); Rawat, V (Rawat, Vijay); Langham, E (Langham, Erika); Rockloff, M (Rockloff, Matthew)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 33 **Issue:** 1 **Pages:** 223- 248 **DOI:** 10.1007/s10899-016-9632-8 **Published:** MAR 2017
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Author Identifiers:
Langham, Erika 0000-0002-1824-5108
Browne, Matthew 0000-0002-2668-6229
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Title: Gambling Harm and Crime Careers
Author(s): May-Chahal, C (May-Chahal, Corinne); Humphreys, L (Humphreys, Leslie); Clifton, A (Clifton, Alison); Francis, B (Francis, Brian); Reith, G (Reith, Gerda)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 33 **Issue:** 1 **Pages:** 65- 84 **DOI:** 10.1007/s10899-016-9612-z **Published:** MAR 2017
Accession Number: WOS:000395082100005
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Author Identifiers:
Francis, Brian J, 0000-0001-7926-9085
Humphreys, Leslie, 0000-0002-3756-4710
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Title: A Critical Review of the Harm-Minimisation Tools Available for Electronic Gambling
Author(s): Harris, A (Harris, Andrew); Griffiths, MD (Griffiths, Mark D.)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 33 **Issue:** 1 **Pages:** 187- 221 **DOI:** 10.1007/s10899-016-9624-8 **Published:** MAR 2017
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PubMed ID: 27289237
Author Identifiers:
Griffiths, Mark 0000-0001-8880-6524
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Title: Factors that influence children's gambling attitudes and consumption intentions: lessons for gambling harm prevention research, policies and advocacy strategies
Author(s): Pitt, H (Pitt, Hannah); Thomas, SL (Thomas, Samantha L.); Bestman, A (Bestman, Amy); Daube, M (Daube, Mike); Derevensky, J (Derevensky, Jeffrey)
Source: HARM REDUCTION JOURNAL **Volume:** 14 **Article Number:** 11 **DOI:** 10.1186/s12954-017-0136-3 **Published:** FEB 17 2017
Accession Number: WOS:000394814600001
PubMed ID: 28212685
Author Identifiers:

Pitt, Hannah, 0000-0002-4259-6186	
Thomas, Samantha, 0000-0003-1427-7775	
Bestman, Amy, 0000-0003-1269-2123	
Daube, Mike, 0000-0002-3479-2785	

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Record 87 of 189
Title: Attitudes towards gambling, gambling participation, and gambling-related harm: cross- sectional Finnish population studies in 2011 and 2015
Author(s): Salonen, AH (Salonen, Anne H.); Alho, H (Alho, Hannu); Castren, S (Castren, Sari)
Source: BMC PUBLIC HEALTH **Volume:** 17 **Article Number:** 122 **DOI:** 10.1186/s12889- 017- 4056-7 **Published:** JAN 26 2017
Accession Number: WOS:000392915000001
PubMed ID: 28122531
ISSN: 1471-2458

Record 88 of 189
Title: Me, myself and money: having a financially focused self-concept and its consequences for disordered gambling
Author(s): Tabri, N (Tabri, Nassim); Wohl, MJA (Wohl, Michael J. A.); Eddy, KT (Eddy, Kamryn T.); Thomas, JJ (Thomas, Jennifer J.)
Source: INTERNATIONAL GAMBLING STUDIES **Volume:** 17 **Issue:** 1 **Pages:** 30- 50 **DOI:** 10.1080/14459795.2016.1252414 **Published:** 2017
Accession Number: WOS:000396684100003
Author Identifiers:

Thomas, Jennifer J.,	
Tabri, Nassim, 0000-0002-7085-9350	
Tabri, Nassim, 0000-0002-7085-9350	

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Record 89 of 189
Title: Responsible gambling codes of conduct: lack of harm minimisation intervention in the context of venue self-regulation
Author(s): Rintoul, A (Rintoul, Angela); Deblaquiere, J (Deblaquiere, Julie); Thomas, A (Thomas, Anna)
Source: ADDICTION RESEARCH & THEORY **Volume:** 25 **Issue:** 6 **Pages:** 451- 461 **DOI:** 10.1080/16066359.2017.1314465 **Published:** 2017
Accession Number: WOS:000413961400004
Author Identifiers:

Rintoul, Angela 0000-0003-4159-8814	

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Record 90 of 189
Title: Assigning responsibility for gambling-related harm: scrutinizing processes of direct and indirect consumer responsibilization of gamblers in Sweden
Author(s): Alexius, S (Alexius, Susanna)
Source: ADDICTION RESEARCH & THEORY **Volume:** 25 **Issue:** 6 **Pages:** 462- 475 **DOI:** 10.1080/16066359.2017.1321739 **Published:** 2017
Accession Number: WOS:000413961400005
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eISSN: 1476-7392

Record 91 of 189
Title: Harm reduction in gambling: a systematic review of industry strategies

Author(s): Tanner, J (Tanner, Jessica); Drawson, AS (Drawson, Alexandra S.); Mushquash, CJ (Mushquash, Christopher J.); Mushquash, AR (Mushquash, Aislin R.); Mazmanian, D (Mazmanian, Dwight)

Record 92 of 189
Title: Mapping the proportional distribution of gambling-related harms in a clinical and community sample
Author(s): Shannon, K (Shannon, K.); Anjoul, F (Anjoul, F.); Blaszczynski, A (Blaszczynski, A.)
Author Identifiers:
Blaszczynski, Alexander G-2713-2013 0000-0003-1476-0791

Record 93 of 189
Title: A population-level metric for gambling-related harm
Author(s): Browne, M (Browne, Matthew); Greer, N (Greer, Nancy); Rawat, V (Rawat, Vijay); Rockloff, M (Rockloff, Matthew)
Author Identifiers:
Rockloff, Matthew, 0000-0002-0080-2690
Browne, Matthew, 0000-0002-2668-6229

Record 94 of 189
Title: The family exclusion order as a harm-minimisation measure for casino gambling: the case of Singapore
Author(s): Goh, ECL (Goh, Esther C. L.); Ng, V (Ng, Vincent); Yeoh, BSA (Yeoh, Brenda S. A.)
Author Identifiers:
Goh, Esther C L K-8511-2012 0000-0002-0235-2363
Yeoh, Brenda 0000-0002-0240-3175

Record 95 of 189
Title: The Effects of Pop-up Harm Minimisation Messages on Electronic Gaming Machine Gambling Behaviour in New Zealand
Author(s): du Preez, KP (du Preez, Katie Palmer); Landon, J (Landon, Jason); Bellringer, M (Bellringer, Maria); Garrett, N (Garrett, Nick); Abbott, M (Abbott, Max)

Author Identifiers:
Landon, Jason, 0000-0002-3595-7430
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Title: Thoughts and acts of self-harm, and suicidal ideation, in online gamblers
Author(s): Lloyd, J (Lloyd, Joanne); Hawton, K (Hawton, Keith); Dutton, WH (Dutton, William H.); Geddes, JR (Geddes, John R.); Goodwin, GM (Goodwin, Guy M.); Rogers, RD (Rogers, Robert D.)
Source: INTERNATIONAL GAMBLING STUDIES **Volume:** 16 **Issue:** 3 **Pages:** 408- 423 **DOI:** 10.1080/14459795.2016.1214166 **Published:** DEC 2016
Accession Number: WOS:000389046000005
Author Identifiers:
Rogers, Robert AAF-7621-2019 0000-0001-5010-069X
Lloyd, Joanne 0000-0003-3891-7247
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eISSN: 1479-4276

Record 97 of 189
Title: The extent and type of gambling harms for concerned significant others: A cross-sectional population study in Finland
Author(s): Salonen, AH (Salonen, Anne H.); Alho, H (Alho, Hannu); Castren, S (Castren, Sari)
Source: SCANDINAVIAN JOURNAL OF PUBLIC
HEALTH **Volume:** 44 **Issue:** 8 **Pages:** 799-
804 **DOI:** 10.1177/1403494816673529 **Published:** DEC 2016
Accession Number: WOS:000387502800011
PubMed ID: 28929933
ISSN: 1403-4948
eISSN: 1651-1905

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Title: BUILDING THE EVIDENCE FOR EFFECTIVE HARM REDUCTION: WHERE IS GAMBLING?
Author(s): Thomas, A (Thomas, Anna)
Source: DRUG AND ALCOHOL REVIEW **Meeting Abstract:** 103 **Volume:** 35 **Special Issue:** SI
Pages: 70-70 **Supplement:** 1 **Published:** OCT 2016
Accession Number: WOS:000398381500192
ISSN: 0959-5236
eISSN: 1465-3362

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Title: Types of gambling and levels of harm: A UK study to assess severity of presentation in a treatment-seeking population
Author(s): Ronzitti, S (Ronzitti, Silvia); Soldini, E (Soldini, Emiliano); Lutri, V (Lutri, Vittorio); Smith, N (Smith, Neil); Clerici, M (Clerici, Massimo); Bowden-Jones, H (Bowden- Jones, Henrietta)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Volume:** 5 **Issue:** 3 **Pages:** 439- 447 **DOI:** 10.1556/2006.5.2016.068 **Published:** SEP 2016
Accession Number: WOS:000385362700008
PubMed ID: 27677350
Author Identifiers:
Clerici, Massimo, 0000-0001-8769-6474
Soldini, Emiliano, 0000-0002-9577-5567
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Record 100 of 189
Title: Predictors of adverse gambling related consequences among adolescent boys

Author(s): Ricijas, N (Ricijas, Neven); Hundric, DD (Hundric, Dora Dodig); Huic, A (Huic, Aleksandra)
Source: CHILDREN AND YOUTH SERVICES REVIEW **Volume:** 67 **Pages:** 168-176 **DOI:** 10.1016/j.childyouth.2016.06.008 **Published:** AUG 2016
Accession Number: WOS:000381171100020
Author Identifiers:
Ricijas, Neven I-7477-2019 0000-0001-8107-8448
ISSN: 0190-7409
eISSN: 1873-7765

Record 101 of 189
Title: The Interaction of Gambling Outcome and Gambling Harm-Minimisation Strategies for Electronic Gambling: the Efficacy of Computer Generated Self-Appraisal Messaging
Author(s): Harris, A (Harris, Andrew); Parke, A (Parke, Adrian)
Source: INTERNATIONAL JOURNAL OF MENTAL HEALTH AND
ADDICTION **Volume:** 14 **Issue:** 4 **Pages:** 597-617 **DOI:** 10.1007/s11469-015-9581-y **Published:** AUG 2016
Accession Number: WOS:000380147300019
Author Identifiers:
Parke, Adrian K-4354-2015 0000-0002-5242-6308
ISSN: 1557-1874
eISSN: 1557-1882

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Title: Preventing and responding to gambling-related harm and crime in the workplace
Author(s): Binde, P (Binde, Per)
Source: NORDIC STUDIES ON ALCOHOL AND
DRUGS **Volume:** 33 **Issue:** 3 **Pages:** 247-265 **DOI:** 10.1515/nsad-2016-0020 **Published:** JUL 2016
Accession Number: WOS:000379145900005
Author Identifiers:
Binde, Per 0000-0002-4875-8115
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Record 103 of 189
Title: Harmonizing Screening for Gambling Problems in Epidemiological Surveys - Development of the Rapid Screener for Problem Gambling (RSPG)
Author(s): Challet-Bouju, G (Challet-Bouju, Gaelle); Perrot, B (Perrot, Bastien); Romo, L (Romo, Lucia); Valleur, M (Valleur, Marc); Magalon, D (Magalon, David); Fatseas, M (Fatseas, Melina); Chereau-Boudet, I (Chereau-Boudet, Isabelle); Luquiens, A (Luquiens, Amandine); Grall-Bronnec, M (Grall-Bronnec, Marie); Hardouin, JB (Hardouin, Jean-Benoit)
Group Author(s): Jeu Grp
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Volume:** 5 **Issue:** 2 **Pages:** 239- 250 **DOI:** 10.1556/2006.5.2016.030 **Published:** JUN 2016
Accession Number: WOS:000379339700009
PubMed ID: 27348558
Author Identifiers:
Romo, Lucia O-1584-2019
Luquiens, Amandine AAB-4984-2019 0000-0002-9402-442X
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Title: Video Lottery is the Most Harmful Form of Gambling in Canada
Author(s): MacLaren, VV (MacLaren, Vance Victor)

Record 105 of 189
Title: Consumer Perspectives on Gambling Harm Minimisation Measures in an Australian Jurisdiction
Author(s): Jackson, AC (Jackson, Alun C.); Christensen, DR (Christensen, Darren R.); Francis, KL (Francis, Kate L.); Dowling, NA (Dowling, Nicki A.)
Author Identifiers:
Jackson, Alun, 0000-0001-9565-1399
Dowling, Nicki, 0000-0001-8592-2407
Francis, Kate, 0000-0002-1751-5313

Record 106 of 189
Title: The Extent and Distribution of Gambling-Related Harms and the Prevention Paradox in a British Population Survey
Author(s): Canale, N (Canale, Natale); Vieno, A (Vieno, Alessio); Griffiths, MD (Griffiths, Mark D.)
Author Identifiers:
Griffiths, Mark 0000-0001-8880-6524
CANALE, NATALE 0000-0002-6032-0490

Record 107 of 189
Title: Players without problem gambling of 55 years and more: events, consequences, and structural and environmental characteristics influencing gambling
Author(s): Giroux, I (Giroux, Isabelle); Ferland, F (Ferland, Francine); Savard, C (Savard, Cathy); Jacques, C (Jacques, Christian); Brochu, P (Brochu, Priscilla); Nadeau, D (Nadeau, Dominic); Landreville, P (Landreville, Philippe); Sevigny, S (Sevigny, Serge)

Record 108 of 189
Title: Gambling in the Czech Republic: Prevalence and Social Consequences
Author(s): Mravcik, V (Mravcik, Viktor); Rous, Z (Rous, Zdenek); Lestinova, ZT (Lestinova, Zuzana Tion); Drbohlavova, B (Drbohlavova, Barbora); Chomynova, P (Chomynova, Pavla); Grohmannova, K (Grohmannova, Kateoina); Janikova, B (Janikova, Barbara); Vlach, T (Vlach, Tomas)

Author Identifiers:
Drbohlavova, Barbora, 0000-0001-9723-840X
Chomynova, Pavla, 0000-0002-4263-3194

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Title: Social Responsibility and Harm Minimization in Commercial Gambling in Great Britain
Author(s): Miers, D (Miers, David)
Source: GAMING LAW REVIEW & ECONOMICS-REGULATION COMPLIANCE AND POLICY **Volume:** 20 **Issue:** 2 **Pages:** 164-176 **DOI:** 10.1089/glre.2016.2024 **Published:** MAR 1 2016
Accession Number: WOS:000372932800005

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Title: Problem Gambling Among Urban and Rural Gamblers in Limpopo Province, South Africa: Associations with Hazardous and Harmful Alcohol Use and Psychological Distress
Author(s): Skaal, L (Skaal, Linda); Sinclair, H (Sinclair, Heidi); Stein, DJ (Stein, Dan J.); Myers, B (Myers, Bronwyn)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 32 **Issue:** 1 **Pages:** 217- 230 **DOI:** 10.1007/s10899-015-9522-5 **Published:** MAR 2016
Accession Number: WOS:000375403100015
PubMed ID: 25631703
Author Identifiers:
Stein, Dan J A-1752-2008 0000-0001-7218-7810

Record 111 of 189
Title: The relationship between player losses and gambling-related harm: evidence from nationally representative cross-sectional surveys in four countries
Author(s): Markham, F (Markham, Francis); Young, M (Young, Martin); Doran, B (Doran, Bruce)
Source: ADDICTION **Volume:** 111 **Issue:** 2 **Pages:** 320-330 **DOI:** 10.1111/add.13178 **Published:** FEB 2016
Accession Number: WOS:000368940500017
PubMed ID: 26567515
Author Identifiers:
Markham, Francis, 0000-0002-4266-2569
Doran, Bruce, 0000-0002-4214-2205
Young, Martin, 0000-0001-5168-9416

Record 112 of 189
Title: Understanding gambling related harm: a proposed definition, conceptual framework, and taxonomy of harms
Author(s): Langham, E (Langham, Erika); Thorne, H (Thorne, Hannah); Browne, M (Browne, Matthew); Donaldson, P (Donaldson, Phillip); Rose, J (Rose, Judy); Rockloff, M (Rockloff, Matthew)
Source: BMC PUBLIC HEALTH **Volume:** 16 **Article Number:** 80 **DOI:** 10.1186/s12889- 016-2747-0 **Published:** JAN 27 2016
Accession Number: WOS:000369475600001
PubMed ID: 26818137
Author Identifiers:
Langham, Erika, 0000-0002-1824-5108

Rose, Judy, 0000-0001-6383-7666
Browne, Matthew

Record 113 of 189
Title: Dealing with the negative consequences of gambling addiction
Author(s): Blanco Miguel, P (Blanco Miguel, Pilar)
Source: CUADERNOS DE TRABAJO SOCIAL **Volume:** 29 **Issue:** 2 **Pages:** 335- 344 **DOI:** 10.5209/CUTS.48858 **Published:** 2016
Accession Number: WOS:000386278700016
ISSN: 0214-0314
eISSN: 1988-8295

Record 114 of 189
Title: The Need for Knowledge Extraction: Understanding Harmful Gambling Behavior with Neural Networks
Author(s): Percy, C (Percy, Chris); Garcez, ASD (Garcez, Artur S. d'Avila); Dragicevic, S (Dragicevic, Simo); Franca, MVM (Franca, Manoel V. M.); Slabaugh, G (Slabaugh, Greg); Weyde, T (Weyde, Tillman)
Edited by: Kaminka GA; Fox M; Bouquet P; Hullermeier E; Dignum V; Dignum F; VanHarmelen F
Source: ECAI 2016: 22ND EUROPEAN CONFERENCE ON ARTIFICIAL INTELLIGENCE **Book Series:** Frontiers in Artificial Intelligence and Applications **Volume:** 285
Pages: 974-981 **DOI:** 10.3233/978-1-61499-672-9- 974 **Published:** 2016
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Author Identifiers:
Garcez, Artur, 0000-0001-7375-9518
Weyde, Tillman, 0000-0001-8028-9905
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ISBN: 978-1-61499-672-9; 978-1-61499-671-2

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Title: The nature and framing of gambling consequences in advertising
Author(s): Orazi, DC (Orazi, Davide C.); Lei, J (Lei, Jing); Bove, LL (Bove, Liliana L.)
Source: JOURNAL OF BUSINESS RESEARCH **Volume:** 68 **Issue:** 10 **Special Issue:** SI **Pages:** 2049-2056 **DOI:** 10.1016/j.jbusres.2015.03.002 **Published:** OCT 2015
Accession Number: WOS:000360516300002
Author Identifiers:
Bove, Liliana J-9658-2014 0000-0002-1201-9281
ISSN: 0148-2963
eISSN: 1873-7978

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Title: CPGI-Population Harm: A Supplement to the Canadian Problem Gambling Index
Author(s): Quilty, LC (Quilty, Lena C.); Watson, C (Watson, Chris); Bagby, RM (Bagby, R. Michael)
Source: CANADIAN JOURNAL OF ADDICTION **Volume:** 6 **Issue:** 2 **Pages:** 20- 28 **Published:** SEP 2015
Accession Number: WOS:000219284400004
ISSN: 2368-4720
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Title: The extent and distribution of gambling harm in Finland as assessed by the Problem Gambling Severity Index
Author(s): Raisamo, SU (Raisamo, Susanna U.); Makela, P (Makela, Pia); Salonen, AH (Salonen, Anne H.); Lintonen, TP (Lintonen, Tomi P.)
Source: EUROPEAN JOURNAL OF PUBLIC HEALTH **Volume:** 25 **Issue:** 4 **Pages:** 716-722 **DOI:** 10.1093/eurpub/cku210 **Published:** AUG 2015
Accession Number: WOS:000359159900034
PubMed ID: 25505020
Author Identifiers:
Makela, Pia C-5679-2015 0000-0002-3343-2139
Lintonen, Tomi 0000-0003-3455-2439
ISSN: 1101-1262
eISSN: 1464-360X

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Title: Construct Development for the FocaL Adult Gambling Screen (FLAGS): A Risk Measurement for Gambling Harm and Problem Gambling Associated with Electronic Gambling Machines
Author(s): Schellinck, T (Schellinck, Tony); Schrans, T (Schrans, Tracy); Schellinck, H (Schellinck, Heather); Bliemel, M (Bliemel, Michael)
Source: JOURNAL OF GAMBLING ISSUES **Issue:** 30 **Pages:** 140- 173 **DOI:** 10.4309/jgi.2015.30.7 **Published:** MAY 2015
Accession Number: WOS:000410418500009
Author Identifiers:
Bliemel, Michael 0000-0002-7603-6988
ISSN: 1910-7595

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Title: The Impulsivity and Sensation-Seeking Mediators of the Psychological Consequences of Pathological Gambling in Adolescence
Author(s): Estevez, A (Estevez, Ana); Herrero-Fernandez, D (Herrero-Fernandez, David); Sarabia, I (Sarabia, Izaskun); Jauregui, P (Jauregui, Paula)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 31 **Issue:** 1 **Pages:** 91- 103 **DOI:** 10.1007/s10899-013-9419-0 **Published:** MAR 2015
Accession Number: WOS:000350221300006
PubMed ID: 24297606
Author Identifiers:
Estevez, Ana, 0000-0003-0314-7086
David, 0000-0002-6092-8332
Jauregui, Paula, 0000-0002-9706-0274
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Title: Academic-Industry Partnerships in Alcohol and Gambling: a Continuum of Benefits and Harms
Author(s): Stein, DJ (Stein, Dan J.)
Source: ISRAEL JOURNAL OF PSYCHIATRY AND RELATED SCIENCES **Volume:** 52 **Issue:** 2 **Pages:** 81-84 **Published:** 2015
Accession Number: WOS:000375965400002
PubMed ID: 26431410
Author Identifiers:
Stein, Dan J A-1752-2008 0000-0001-7218-7810
ISSN: 0333-7308

Record 121 of 189

Title: TAKING CHANCES. ONLINE GAMBLING ADDICTION AND STUDENTS; CAUSES, CONSEQUENCES AND TREATMENT
Author(s): Butler, L (Butler, Lynann Annie)
Edited by: Chova LG; Martinez AL; Torres IC
Source: INTED2015: 9TH INTERNATIONAL TECHNOLOGY, EDUCATION AND DEVELOPMENT CONFERENCE **Book Series:** INTED Proceedings **Pages:** 2891- 2894 **Published:** 2015
Accession Number: WOS:000398586302132
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Conference Location: Madrid, SPAIN
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Title: The influence of harmonious passion on gambling addiction: The moderating effects of proactive coping
Author(s): Shin, HJ (Shin, Hyun Ji); Im, SH (Im, Sook Hee); Kim, KH (Kim, Kyo Heon)
Source: JOURNAL OF BEHAVIORAL ADDICTIONS **Meeting Abstract:** PO- 22 **Volume:** 4 **Pages:** 53-54 **Supplement:** 1 **Published:** 2015
Accession Number: WOS:000350801200128
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Title: How the causes, consequences and solutions for problem gambling are reported in Australian newspapers: a qualitative content analysis
Author(s): Miller, HE (Miller, Helen E.); Thomas, SL (Thomas, Samantha L.); Robinson, P (Robinson, Priscilla); Daube, M (Daube, Mike)
Source: AUSTRALIAN AND NEW ZEALAND JOURNAL OF PUBLIC HEALTH **Volume:** 38 **Issue:** 6 **Pages:** 529-535 **DOI:** 10.1111/1753-6405.12251 **Published:** DEC 2014
Accession Number: WOS:000345825200009
PubMed ID: 25169775
Author Identifiers:
Thomas, Samantha, 0000-0003-1427-7775
Daube, Mike, 0000-0002-3479-2785
ISSN: 1326-0200
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Title: FORTUNE OR FOE: THE FATAL HARM CAUSED BY A GAMBLING DISORDER
Author(s): Tse, S (Tse, Samson); Tang, J (Tang, Joe); Wong, P (Wong, Paul)
Source: ADDICTION **Volume:** 109 **Issue:** 12 **Pages:** 2135-2135 **DOI:** 10.1111/add.12744 **Published:** DEC 2014
Accession Number: WOS:000344780300029
PubMed ID: 25384938
Author Identifiers:
A-2507-2010 0000-0003-3388-6285
Tse, Samson Shu-Ki D-4948-2009 0000-0001-9003-1086
ISSN: 0965-2140
eISSN: 1360-0443

Record 125 of 189
Title: Recommendations for International Gambling Harm-Minimisation Guidelines: Comparison with Effective Public Health Policy

Author(s): Gainsbury, SM (Gainsbury, Sally M.); Blankers, M (Blankers, Matthijs); Wilkinson, C (Wilkinson, Claire); Schelleman-Offermans, K (Schelleman-Offermans, Karen); Cousijn, J (Cousijn, Janna)

Record 126 of 189
Title: Examining the Structural Relationships Among Gambling Motivation, Passion, and Consequences of Internet Sports Betting
Author(s): Lee, CK (Lee, Choong-Ki); Chung, N (Chung, Namho); Bernhard, BJ (Bernhard, Bo J.)

Record 127 of 189
Title: WORKING TOWARDS A HARM INDEX IN PROBLEM GAMBLING: STUDY 2. ARE TREATMENT OUTCOMES DETERMINED BY TYPE OF GAMBLING?
Author(s): Bowden-Jones, H (Bowden-Jones, H.); Ronzitti, S (Ronzitti, S.)

Record 128 of 189
Title: WORKING TOWARDS A HARM INDEX IN PROBLEM GAMBLING: DOES TYPE OF PLAY AND LEVEL OF INVOLVEMENT DETERMINE SEVERITY OF PRESENTATION? A UK STUDY (HARM INDEX STUDY 1)
Author(s): Bowden-Jones, HM (Bowden-Jones, H. M.); Ronzitti, S (Ronzitti, S.)

Record 129 of 189
Title: Gambling expenditure predicts harm: evidence from a venue-level study
Author(s): Markham, F (Markham, Francis); Young, M (Young, Martin); Doran, B (Doran, Bruce)

Markham, Francis, 0000-0002-4266-2569
Doran, Bruce, 0000-0002-4214-2205
Young, Martin, 0000-0001-5168-9416

Record 130 of 189
Title: Gambling Harms and Gambling Help-Seeking Amongst Indigenous Australians
Author(s): Hing, N (Hing, Nerilee); Breen, H (Breen, Helen); Gordon, A (Gordon, Ashley); Russell, A (Russell, Alex)
Source: JOURNAL OF GAMBLING STUDIES **Volume:** 30 **Issue:** 3 **Pages:** 737- 755 **DOI:** 10.1007/s10899-013-9388-3 **Published:** SEP 2014
Accession Number: WOS:000340885700013
PubMed ID: 23740348
Author Identifiers:
Russell, Alex, 0000-0002-3685-7220
Breen, Helen, 0000-0002-1350-6129
Hing, Nerilee, 0000-0002-2150-9784

Record 131 of 189
Title: Commentary on Markham et al. (2014): Huffing and puffing our way to accurate gambling-related harm prevalence estimates
Author(s): Hodgins, DC (Hodgins, David C.)
Source: ADDICTION **Volume:** 109 **Issue:** 9 **Pages:** 1517-1517 **DOI:** 10.1111/add.12678 **Published:** SEP 2014
Accession Number: WOS:000340566600020
PubMed ID: 25103103
Author Identifiers:
Hodgins, David 0000-0003-2737-5200

Record 132 of 189
Title: Exploring the Relationship Between Treatment Satisfaction, Perceived Improvements in Functioning and Well-Being and Gambling Harm Reduction Among Clients of Pathological Gambling Treatment Programs
Author(s): Monnat, SM (Monnat, Shannon M.); Bernhard, B (Bernhard, Bo); Abarbanel, BLL (Abarbanel, Brett L. L.); St John, S (St John, Sarah); Kalina, A (Kalina, Ashlee)
Source: COMMUNITY MENTAL HEALTH JOURNAL **Volume:** 50 **Issue:** 6 **Pages:** 688- 696 **DOI:** 10.1007/s10597-013-9635-1 **Published:** AUG 2014
Accession Number: WOS:000339382400008
PubMed ID: 23756725
Author Identifiers:
Abarbanel, Brett 0000-0002-4279-8466

Record 133 of 189
Title: CROSS-OVER EFFECTS OF ALCOHOL PROTECTIVE BEHAVIORAL STRATEGIES ON GAMBLING CONSEQUENCES AMONG COLLEGE STUDENTS
Author(s): Granato, HF (Granato, H. F.); Paves, A (Paves, A.); Samuelson, M (Samuelson, M.); Larimer, ME (Larimer, M. E.); Lostutter, TW (Lostutter, T. W.); Cronce, JM (Cronce, J. M.)
Source: ALCOHOLISM-CLINICAL AND EXPERIMENTAL RESEARCH **Meeting**

Record 134 of 189
Title: Identifying Indicators of Harmful and Problem Gambling in a Canadian Sample Through Receiver Operating Characteristic Analysis
Author(s): Quilty, LC (Quilty, Lena C.); Murati, DA (Murati, Daniela Avila); Bagby, RM (Bagby, R. Michael)
Source: PSYCHOLOGY OF ADDICTIVE BEHAVIORS **Volume:** 28 **Issue:** 1 **Pages:** 229- 237 **DOI:** 10.1037/a0032801 **Published:** MAR 2014
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Title: Household experience of gambling-related harm by socio-economic deprivation in New Zealand: increases in inequality between 2008 and 2012
Author(s): Tu, D (Tu, Danny); Gray, RJ (Gray, Rebecca J.); Walton, DK (Walton, Darren K.)
Source: INTERNATIONAL GAMBLING STUDIES **Volume:** 14 **Issue:** 2 **Pages:** 330- 344 **DOI:** 10.1080/14459795.2014.922112 **Published:** 2014
Accession Number: WOS:000343218900010
Author Identifiers:
Gray, Rebecca 0000-0001-8492-5585
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Title: Examining Antecedents and Consequences of Gambling Passion: The Case of Gambling on Horse Races
Author(s): Lee, CK (Lee, Choong-Ki); Back, KJ (Back, Ki-Joon); Hodgins, DC (Hodgins, David C.); Lee, TK (Lee, Tae Kyung)
Source: PSYCHIATRY INVESTIGATION **Volume:** 10 **Issue:** 4 **Pages:** 365- 372 **DOI:** 10.4306/pi.2013.10.4.365 **Published:** DEC 2013
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Author Identifiers:
Lee, Choong-Ki AAH-9113-2020
Hodgins, David 0000-0003-2737-5200
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Title: Is online gambling harm a fact? Comparing online and offline pathological gambling
Author(s): Hubert, P (Hubert, Pedro); Griffiths, M (Griffiths, Mark); Sommer, M (Sommer, Manuel); De Lourdes, M (De Lourdes, Maria); De Vasconcelos, V (De Vasconcelos, Venancio)
Source: PSYCHOLOGY & HEALTH **Volume:** 28 **Special Issue:** SI **Pages:** 230- 230 **Supplement:** 1 **Published:** JUL 1 2013
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Title: From 'morality' policy to 'normal' policy: framing of drug consumption and gambling in Germany and the Netherlands and their regulatory consequences
Author(s): Euchner, EM (Euchner, Eva-Maria); Heichel, S (Heichel, Stephan); Nebel, K (Nebel, Kerstin); Raschzok, A (Raschzok, Andreas)
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Author(s): Raisamo, S (Raisamo, Susanna); Halme, J (Halme, Jukka); Murto, A (Murto, Antti); Lintonen, T (Lintonen, Tomi)
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Author Identifiers:
Lintonen, Tomi 0000-0003-3455-2439
ISSN: 1050-5350

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Title: The Leisure of Women Caring for People Harmfully Involved With Alcohol, Drugs, and Gambling
Author(s): Wood, S (Wood, Stephanie); Tirone, S (Tirone, Susan)
Source: JOURNAL OF LEISURE RESEARCH **Volume:** 45 **Issue:** 5 **Pages:** 583- 601 **Published:**
2013
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Title: Modelling vulnerability to gambling related harm: How disadvantage predicts gambling losses
Author(s): Rintoul, AC (Rintoul, Angela C.); Livingstone, C (Livingstone, Charles); Mellor, AP (Mellor, Andrew P.); Jolley, D (Jolley, Damien)
Source: ADDICTION RESEARCH & THEORY **Volume:** 21 **Issue:** 4 **Pages:** 329- 338 **DOI:**
10.3109/16066359.2012.727507 **Published:** 2013
Accession Number: WOS:000319946700007
Author Identifiers:
Rintoul, Angela,
Livingstone, Charles, 0000-0003-3946-2061
Rintoul, Angela, 0000-0003-4159-8814
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Author(s): Larsen, CVL (Larsen, Christina Viskum Lytken); Curtis, T (Curtis, Tine); Bjerregaard, P (Bjerregaard, Peter)
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Title: Can an Industry Be Socially Responsible If Its Products Harm Consumers? The Case of Online Gambling
Author(s): Yani-de-Soriano, M (Yani-de-Soriano, Mirella); Javed, U (Javed, Uzma); Yousafzai, S (Yousafzai, Shumaila)
Source: JOURNAL OF BUSINESS ETHICS **Volume:** 110 **Issue:** 4 **Special Issue:** SI **Pages:** 481-497 **DOI:** 10.1007/s10551-012-1495-z **Published:** NOV 2012

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Title: Bupropion SR and Harm Reduction vs. Abstinence-Focused Treatment for Problem Gambling
Author(s): Desai, N (Desai, Nitigna); Rofman, BE (Rofman, Barbara Elaine); King, K (King, Kendra); O'Connor, A (O'Connor, Ashley); Krebs, C (Krebs, Christopher); Potenza, M (Potenza, Marc); Drebing, C (Drebing, Charles)
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Title: Risk and Protective Factors Associated with Gambling Consequences for Indigenous Australians in North Queensland
Author(s): Breen, HM (Breen, Helen M.)
Source: INTERNATIONAL JOURNAL OF MENTAL HEALTH AND ADDICTION **Volume:** 10 **Issue:** 2 **Pages:** 258-272 **DOI:** 10.1007/s11469-011-9315-8 **Published:** APR 2012

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Author(s): Livingstone, C (Livingstone, Charles)
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Author(s): Walker, SE (Walker, Sue E.); Abbott, MW (Abbott, Max W.); Gray, RJ (Gray, Rebecca J.)
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Author Identifiers:
Gray, Rebecca 0000-0001-8492-5585
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Title: Placing Bets: gambling venues and the distribution of harm
Author(s): Young, M (Young, Martin); Markham, F (Markham, Francis); Doran, B (Doran, Bruce)
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Accession Number: WOS:000312443800007
Author Identifiers:
Markham, Francis, 0000-0002-4266-2569
Young, Martin, 0000-0001-5168-9416
Doran, Bruce, 0000-0002-4214-2205
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Author(s): Hing, N (Hing, Nerilee); Breen, H (Breen, Helen); Gordon, A (Gordon, Ashley)
Source: LEISURE SCIENCES **Volume:** 34 **Issue:** 3 **Pages:** 217-235 **DOI:** 10.1080/01490400.2012.669682 **Published:** 2012
Accession Number: WOS:000304472700002
Author Identifiers:
Breen, Helen Q-7515-2017 0000-0002-1350-6129
Hing, Nerilee 0000-0002-2150-9784
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eISSN: 1521-0588

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Author(s): Breen, HM (Breen, Helen M.); Hing, N (Hing, Nerilee); Gordon, A (Gordon, Ashley)
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Author Identifiers:
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Hing, Nerilee, 0000-0002-2150-9784
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eISSN: 1557-1882

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Author(s): Livingstone, C (Livingstone, Charles); Adams, PJ (Adams, Peter J.)
Source: ADDICTION **Volume:** 106 **Issue:** 1 **Pages:** 3-8 **DOI:** 10.1111/j.1360- 0443.2010.03137.x
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Author(s): Reith, G (Reith, Gerda)
Source: ADDICTION **Volume:** 106 **Issue:** 1 **Pages:** 9-10 **DOI:** 10.1111/j.1360- 0443.2010.03220.x
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Author(s): Ariyabuddhiphongs, V (Ariyabuddhiphongs, Vanchai)
Source: ADDICTION **Volume:** 106 **Issue:** 1 **Pages:** 12-13 **DOI:** 10.1111/j.1360-0443.2010.03178.x **Published:** JAN 2011
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Author Identifiers:
Hadianfard, Habib W-5644-2018 0000-0002-1728-632X
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Author(s): Splevins, K (Splevins, Katie); Mireskandari, S (Mireskandari, Shab); Clayton, K (Clayton, Kymbra); Blaszczynski, A (Blaszczynski, Alex)
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Author Identifiers:
Blaszczynski, Alexander, 0000-0003-1476-0791
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Author(s): Blaszczynski, A (Blaszczynski, Alex)
Source: ADDICTION **Volume:** 104 **Issue:** 7 **Pages:** 1072-1074 **DOI:** 10.1111/j.1360-0443.2009.02505.x **Published:** JUL 2009
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Author Identifiers:
Blaszczynski, Alexander G-2713-2013 0000-0003-1476-0791
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Title: A question of balance: prioritizing public health responses to harm from gambling

Author(s): Adams, PJ (Adams, Peter J.); Raeburn, J (Raeburn, John); de Silva, K (de Silva, Kawshi)
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Author Identifiers:
Adams, Peter 0000-0002-3237-0108
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Title: MINIMIZING HARM FROM GAMBLING: WHAT IS THE GAMBLING INDUSTRY'S ROLE?
Author(s): Griffiths, MD (Griffiths, Mark D.)
Source: ADDICTION **Volume:** 104 **Issue:** 5 **Pages:** 696-697 **Published:** MAY 2009
Accession Number: WOS:000265008400007
PubMed ID: 19413782
Author Identifiers:
Griffiths, Mark 0000-0001-8880-6524
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Title: Consequences of Winning: The Role of Gambling Outcomes in the Development of Irrational Beliefs
Author(s): Monaghan, S (Monaghan, Sally); Blaszczynski, A (Blaszczynski, Alex); Nower, L (Nower, Lia)
Source: BEHAVIOURAL AND COGNITIVE PSYCHOTHERAPY **Volume:** 37 **Issue:** 1 **Pages:** 49-59 **DOI:** 10.1017/S135246580800502X **Published:** JAN 2009
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Author Identifiers:
Blaszczynski, Alexander, 0000-0003-1476-0791
Nower, Lia, 0000-0002-2497-8957
ISSN: 1352-4658

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Title: Gambling problems in the family - A stratified probability sample study of prevalence and reported consequences
Author(s): Wenzel, HG (Wenzel, Hanne Gro); Oren, A (Oren, Anita); Bakken, IJ (Bakken, Inger Johanne)
Source: BMC PUBLIC HEALTH **Volume:** 8 **Article Number:** 412 **DOI:** 10.1186/1471- 2458-8-412
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PubMed ID: 19087339
Author Identifiers:
Bakken, Inger Johanne 0000-0002-4176-8257
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Title: The liberalization and (re)regulation of Dutch gambling markets: National consequences of the changing European context
Author(s): Kingma, SF (Kingma, Sytze F.)
Source: REGULATION & GOVERNANCE **Volume:** 2 **Issue:** 4 **Pages:** 445- 458 **DOI:** 10.1111/j.1748-5991.2008.00045.x **Published:** DEC 2008

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Author Identifiers:
Kingma, Sytze F-8436-2013,
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Title: Pathological gambling and its consequences for public health
Author(s): de Oliveira, MPMT (Magalhaes Tavares de Oliveira, Maria Paula); da Silveira, DX (da Silveira, Dartiu Xavier); Silva, MTA (Araujo Silva, Maria Teresa)
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Author Identifiers:
Oliveira, Maria Paula AAC-8514-2019
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Title: College students' gambling behavior: When does it become harmful?
Author(s): Weinstock, J (Weinstock, Jeremiah); Whelan, JP (Whelan, James P.); Meyers, A (Meyers, Andrew)
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Author(s): Cantinotti, M (Cantinotti, Michael); Ladouceur, R (Ladouceur, Robert)
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Title: Virtual harm reduction efforts for Internet gambling: effects of deposit limits on actual Internet sports gambling behavior
Author(s): Broda, A (Broda, Anja); LaPlante, DA (LaPlante, Debi A.); Nelson, SE (Nelson, Sarah E.); LaBrie, RA (LaBrie, Richard A.); Bosworth, LB (Bosworth, Leslie B.); Shaffer, HJ (Shaffer, Howard J.)
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Author(s): Dickson-Gillespie, L (Dickson-Gillespie, Laurie); Rugle, L (Rugle, Lori); Rosenthal, R (Rosenthal, Richard); Fong, T (Fong, Timothy)

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Title: Gambling as an addictive behaviour: impaired control, harm minimization, treatment and pre-vention
Author(s): Lim, D (Lim, Dominic)

Record 167 of 189
Title: Association between posttreatment gambling behavior and harm in pathological gamblers
Author(s): Weinstock, J (Weinstock, Jeremiah); Ledgerwood, DM (Ledgerwood, David M.); Petry, NM (Petry, Nancy M.)

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Title: Gambling as an addictive behaviour: Impaired control, harm minimisation, treatment and pre-vention
Author(s): West, R (West, Robert)

Record 169 of 189
Title: Gambling as an addictive behaviour: Impaired control, harm minimisation, treatment and pre-vention
Author(s): George, S (George, Sanju)

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Title: Gambling as an addictive behaviour. Impaired control, harm minimisation, treatment and pre-vention.
Author(s): Paul, EM (Paul, Edward M.)

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Title: Evidence against prospect theories in gambles with positive, negative, and mixed consequences
Author(s): Birnbaum, MH (Birnbaum, Michael H.)
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Author(s): Currie, SR (Currie, SR); Hodgins, DC (Hodgins, DC); Wang, JL (Wang, JL); el- Guebaly, N (el-Guebaly, N); Wynne, H (Wynne, H); Chen, S (Chen, S)
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PubMed ID: 16548936
Author Identifiers:
Hodgins, David, 0000-0003-2737-5200
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Title: Structural changes to electronic gaming machines as effective harm minimization strategies for non-problem and problem gamblers
Author(s): Sharpe, L (Sharpe, Louise); Walker, M (Walker, Michael); Coughlan, MJ (Coughlan, Maree-Jo); Enersen, K (Enersen, Kirsten); Blaszczynski, A (Blaszczynski, Alex)
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PubMed ID: 16311879
Author Identifiers:
Blaszczynski, Alexander, 0000-0003-1476-0791
Sharpe, Louise,
Sharpe, Louise, 0000-0002-8790-6272
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eISSN: 1573-3602

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Title: Passion and gambling: Investigating the divergent affective and cognitive consequences of gambling
Author(s): Mageau, GA (Mageau, GA); Vallerand, RJ (Vallerand, RJ); Rousseau, FL (Rousseau, FL); Ratelle, CF (Ratelle, CF); Provencher, PJ (Provencher, PJ)
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Accession Number: WOS:000226921900006
Author Identifiers:
Vallerand, Robert J,
Mageau, Genevieve A.,
Vallerand, Robert, 0000-0001-5852-8877
Ratelle, Catherine, 0000-0002-4789-9274
ISSN: 0021-9029
eISSN: 1559-1816

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Author(s): Kalidindi, K (Kalidindi, K); Bowman, H (Bowman, H); Wyble, B (Wyble, B)
Edited by: Cangelosi A; Bugmann G; Borisyuk R
Source: MODELING LANGUAGE, COGNITION AND ACTION **Book Series:** Progress in Neural Processing **Volume:** 16 **Pages:** 331-335 **DOI:** 10.1142/9789812701886_0034 **Published:** 2005
Accession Number: WOS:000230933300034
Conference Title: 9th Neural Computational and Psychology Workshop
Conference Date: SEP 08-10, 2004
Conference Location: Univ Plymouth, Plymouth, ENGLAND
Conference Host: Univ Plymouth
Author Identifiers:

Author	Web of Science ResearcherID	ORCID Number
Borisyuk, Roman	A-7476-2014	0000-0003-1384-9057

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Title: Betting your life on it - Gambling harms both health and equality
Author(s): Wilson, N (Wilson, N)
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Author(s): Dickson, L (Dickson, L); Derevensky, JL (Derevensky, JL); Gupta, R (Gupta, R)
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Author(s): Bernhard, BJ (Bernhard, BJ); Preston, FW (Preston, FW)
Source: AMERICAN BEHAVIORAL SCIENTIST **Volume:** 47 **Issue:** 11 **Pages:** 1395- 1405 **DOI:** 10.1177/0002764204265340 **Published:** JUL 2004
Accession Number: WOS:000221901900003
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Author(s): Dickson, LM (Dickson, LM); Derevensky, JL (Derevensky, JL); Gupta, R (Gupta, R)
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Title: Direct versus indirect emotional consequences on the Iowa Gambling Task
Author(s): Turnbull, OH (Turnbull, OH); Berry, H (Berry, H); Bowman, CH (Bowman, CH)

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Title: Gambling and psychotropic substance consumption; prevalence, coexistence and consequences
Author(s): Arseneault, L (Arseneault, L); Ladouceur, R (Ladouceur, R); Vitaro, F (Vitaro, F)

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Title: Too much too young - Focus - Few drugs are tested on children, so doctors are having to gamble on suitable doses - often with dangerous consequences
Author(s): Fricker, J (Fricker, J)

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Title: The luck business: The devastating consequences and broken promises of America's gambling explosion
Author(s): Green, MT (Green, MT)

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Title: GAMBLERS IN THE GARDEN, THE POLITICAL CONSEQUENCES OF THE FIX
Author(s): FABIAN, A (FABIAN, A)

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Title: THE LUCK BUSINESS - THE DEVASTATING CONSEQUENCES AND BROKEN PROMISES OF AMERICAS GAMBLING EXPLOSION - GOODMAN,R
Author(s): ALVAREZ, A (ALVAREZ, A)

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Title: INSIGHTS ABOUT PATHOLOGICAL GAMBLERS - CHASING LOSSES IN SPITE OF THE CONSEQUENCES
Author(s): CUSACK, JR (CUSACK, JR); MALANEY, KR (MALANEY, KR); DEPRY, DL (DEPRY)
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ISSN: 0032-5481

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Title: GAMBLING WITH NATURE - A NEW PARADIGM OF NATURE AND ITS CONSEQUENCES FOR NATURE MANAGEMENT STRATEGY
Author(s): VANZOEST, J (VANZOEST, J)
Edited by: CARTER RWG; CURTIS TG; SHEEHYSKEFFINGTON MJ
Source: COASTAL DUNES : GEOMORPHOLOGY, ECOLOGY AND MANAGEMENT FOR CONSERVATION **Pages:** 503-515 **Published:** 1992
Accession Number: WOS:A1992BW21P00046
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Conference Date: JUN 17-21, 1992
Conference Location: UNIV COLL GALWAY, GALWAY, IRELAND
Conference Sponsors: EUROPEAN UNION COASTAL CONSERVAT
Conference Host: UNIV COLL GALWAY
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Title: LEADERS, RIVERBOAT GAMBLERS, OR PURPOSEFUL UNINTENDED CONSEQUENCES IN THE MANAGEMENT OF COMPLEX, DANGEROUS
TECHNOLOGIES
Author(s): OSBORN, RN (OSBORN, RN); JACKSON, DH (JACKSON, DH)
Source: ACADEMY OF MANAGEMENT JOURNAL **Volume:** 31 **Issue:** 4 **Pages:** 924- 947 **DOI:** 10.2307/256345 **Published:** DEC 1988
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Title: IMPACT OF LEGALIZED GAMBLING - SOCIOECONOMIC CONSEQUENCES OF LOTTER-IES AND OFF-TRACK BETTING - WEINSTEIN,D AND DEITCH,L
Author(s): MARTINEZ, T (MARTINEZ, T); LANDSBERG, M (LANDSBERG, M)
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Appendix 3.

Kmet and Lee Research Quality Assessment for Study Three

Study	1 Question / Objective sufficiently described	2 Study design evident and appropriate	3 Method of subject/comparison group selection or source of information/input variables described and appropriate	4 Subject (and comparison group, if applicable) characteristics sufficiently described	5 If interventional and random allocation was possible, was it described	6 f interventional and blinding of investigators was possible, was it reported	7 If interventional and blinding of subjects was possible, was it reported	8 Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment	9 Sample size appropriate	10 Analytic methods described/justified and appropriate	11 Some estimate of variance is reported for the main results	12 Controlled for confounding	13 Results reported in sufficient detail	14 Conclusions supported by the results	Total Sum	Total Possible Sum	Summary Score
Angus et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	**1.00**
Apinuntavech et.	3	3	3	3	N/A	N/A	N/A	2	3	2	1	1	2	3	15	22	**0.68**
Browne and	3	3	3	3	N/A	N/A	N/A	3	2	3	3	1	3	3	19	22	**0.86**
Browne et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	2	1	3	3	19	22	**0.86**
Browne et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	**1.00**
Browne et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	1	3	3	3	20	22	**0.91**
Browne, Good-	3	3	3	3	N/A	N/A	N/A	3	N/A	3	3	3	3	3	20	20	**1.00**
Canale, Vieno,	3	3	3	3	N/A	N/A	N/A	3	3	3	3	2	3	3	21	22	**0.95**
Castren et al.	3	3	2	3	N/A	N/A	N/A	3	3	3	3	2	3	3	20	22	**0.91**
Currie et al.	3	3	3	2	N/A	N/A	N/A	3	3	3	3	2	3	3	20	22	**0.91**

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Delfabbro, Geor-	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	**1.00**
Estevez et al.	3	3	2	3	N/A	N/A	N/A	3	3	3	3	3	3	3	21	22	**0.95**
Hing et al. (2014)	3	3	3	3	N/A	N/A	N/A	3	3	3	2	1	3	3	19	22	**0.86**
Hubert and Grif-	3	3	2	3	N/A	N/A	N/A	3	3	3	3	N/A	3	3	19	20	**0.95**
Jeffrey et al.	3	3	3	2	N/A	N/A	N/A	3	3	3	3	3	3	3	21	22	**0.95**
Kildahl et. al.	2	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	21	22	**0.95**
Langham et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	**1.00**
Larsen, Curtis,	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	**1.00**
Lee, Chung, and	3	3	2	3	N/A	N/A	N/A	3	3	3	3	3	3	3	21	22	**0.95**
Li et al. (2017)	3	3	3	2	N/A	N/A	N/A	3	3	3	3	1	3	3	19	22	**0.86**
Livazovic and	3	3	3	3	N/A	N/A	N/A	3	3	3	3	1	3	3	20	22	**0.91**
Lloyd et al.	3	3	2	3	N/A	N/A	N/A	3	3	3	3	3	3	3	21	22	**0.95**
Mageau et al.	3	3	3	2	N/A	N/A	N/A	3	3	3	3	3	3	3	21	22	**0.95**
May-Chahal et al.	3	3	3	2	N/A	N/A	N/A	2	3	3	3	3	3	3	20	22	**0.91**
Melendez-Torres	3	3	3	3	N/A	N/A	N/A	3	3	3	3	1	3	3	20	22	**0.91**
Mihaylova,	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	**1.00**
Raisamo et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	2	3	3	21	22	**0.95**
Raisamo et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	**1.00**
Raisamo et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	1	3	3	20	22	**0.91**
Ricijas, Hundric,	3	3	2	3	N/A	N/A	N/A	3	3	3	3	3	3	3	21	22	**0.95**
Salonen, Alho,	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	**1.00**
Salonen et al.	3	3	2	2	N/A	N/A	N/A	2	3	3	3	1	3	3	17	22	**0.77**
Shannon, Anjoul,	3	3	2	3	N/A	N/A	N/A	3	3	3	3	N/A	3	3	19	20	**0.95**
Skaal et al.	3	3	2	3	N/A	N/A	N/A	3	3	3	3	3	3	3	21	22	**0.95**
Splevins et al.	3	3	2	3	N/A	N/A	N/A	3	2	3	3	1	3	3	18	22	**0.82**
Tu, Gray, and	3	3	3	3	N/A	N/A	N/A	2	3	3	3	1	3	3	19	22	**0.86**
Yani-de-Soriano,	3	3	2	2	N/A	N/A	N/A	3	2	3	3	1	3	3	17	22	**0.77**

Study	Criteria										Total Sum	Total Possible Sum	Summary Score
	1	2	3	4	5	6	7	8	9	10			
	Question / objective sufficiently described	Study design evident and appropriate	Context for the study clear	Connection to a theoretical framework / wider body of knowledge	Sampling strategy described, relevant and justified	Data collection methods clearly described and systematic	Data analysis clearly described and systematic	Use of verification procedure(s) to establish credibility	Conclusions supported by the results	Reflexivity of the account			
Anderson, Rem-	3	3	3	3	3	3	3	3	3	2	19	28	0.68
Bergh and	3	3	3	3	1	2	1	1	3	1	11	28	0.39
Binde (2016)	3	3	3	3	1	2	2	1	3	1	12	28	0.43
Bramley, Norrie,	3	3	3	3	2	3	3	1	3	1	15	28	0.54
Bramley, Norrie,	3	3	3	3	3	3	3	1	3	1	16	28	0.57
Breen (2012)	3	3	3	3	3	3	3	3	3	1	18	28	0.64
Breen, Hing, and	3	3	3	3	3	3	3	3	3	1	18	28	0.64
Delfabbro and	2	2	3	3	1	1	2	1	3	2	10	28	0.36
Ferrara, Frances-	1	2	3	3	1	1	2	1	3	1	8	28	0.29
Fulton (2019)	3	3	3	3	3	3	3	3	3	1	18	28	0.64
Goh, Ng, and	3	3	3	3	3	3	3	3	3	3	20	28	0.71
Heiskanen and	3	3	3	3	3	3	3	3	3	1	18	28	0.64
Hing and Breen	3	3	3	3	3	3	2	1	3	3	17	28	0.61
Hing, Breen, and	3	3	3	3	3	3	3	3	3	3	20	28	0.71
Kolandai-Mat-	3	3	3	3	3	3	3	2	3	1	17	28	0.61
Langham et al.	3	3	3	3	3	3	3	3	3	2	19	28	0.68
McCarthy et al.	3	2	3	3	2	2	2	1	3	2	13	28	0.46

Paterson, Whitty,	3	3	3	3	3	3	3	1	3	1	16	28	**0.57**
Pitt et al. (2017)	3	3	3	3	2	3	3	3	3	3	19	28	**0.68**
Rintoul,	3	3	3	3	2	3	3	3	3	2	18	28	**0.64**
Samuelsson,	3	3	3	3	3	3	3	3	3	2	19	28	**0.68**
Wardle et al.	3	3	3	3	3	3	3	3	3	2	19	28	**0.68**

Appendix 4.

Complete data extraction for Study Three

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
Anderson, Rempusheski, and Leedy (2018)	Qualitative – Interview	In-Depth Interview	USA	34 Seniors (62-88)	University of Delaware	Age	Seniors gambling let to mild-severe arguments, broken relationships (divorce), anxiety, debts, exhausting pensions/ inheritance/ savings, shame
Angus et al. (2019)	Case-Control Study	Harm Questionnaire PGSI	Australia	99 Clinical 330 Non-Clinical	The New South Wales Government from the Responsible Gambling Fund	Clinical	100% Psych harms in clinical compared to 14.85% in non-clinical, and 97.98% financial harm vs. 23.33% in non-clinical. Greater severity of harm in all domains for clinical
						Risk Severity	PGs associated with more severe harms, more PGs in clinical sample, 100% psych harms in clinical PGs vs. 54.69% in non-clinical PGs
Apinuntavech et. al. (2012)	Cross-Sectional	DSM-IV-TR	Thailand	173 Students	Psychiatric Association of Thailand	SES	Average GPA lower in gamblers, high chance of smoking, alcohol use and energy drink use, over 50% report 10/20 harms, psych effects were most common, guilt, concealing behaviour, perceived poor health, depression, insomnia, debts, selling possessions, anxiety, substance use, school absence, considering suicide
Bergh and Kuhlhorn (1994)	Qualitative – Interview	Interview DSM-III-R	Sweden	105 Gen. Pop.	The Commission for Social Research	Age	Younger (20-34) gambled longer than older (35+)
						Gender	Similar results for all harms

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
						Gambling Behaviour	Amount spent correlates with debt
Binde (2016)	Qualitative – Narrative Review	Interview	Sweden	1 Security Professional 2 Addiction Professionals 5 Therapists 5 Problem Gamblers	Small writing grant from The Responsible Gambling Trust UK Government or Public Health funding	General Gamblers Harm - Workplace Harms	Gambling in breaks, gambling during work, borrowing from colleagues, poor work performance, lateness, depression, anxiety, tiredness, irritability, absences, less talk about other hobbies (preoccupation), selling belongings, appearing troubled, tax authorities investigating wages, poor self-care, poor standards of belongings (car), crime – transaction irregularities/ embezzlement
Bramley, Norrie, and Manthorpe (2019)	Qualitative – Interview	Semi-Structured Interview	UK	23 Medical and Care Professionals	Ridgeway Information Ltd.	Clinical	Once gambling became habit in a patient they showed high anxiety, financial difficulties, depression,
Bramley, Norrie, & Manthorpe (2020)	Qualitative – Focus Group	Focus Group	UK	32 Migrants	London School of Hygiene and Tropical Medicine and King's College London Interdisciplinary Research Fund and the NIHR Policy Research Programme	Culture	Migrants experienced similar gambling harms to the general population including selling possessions, relationship breakdown, mental health problems, drug use or drug selling, homelessness, domestic violence, sex work and suicide. Participants felt harms were exacerbated by factors including lack of a 'safety net', difficulty accessing informal support. Sub-Saharan African migrants (particularly men) felt that if they lost money they would feel a loss of community status, other migrants felt that they could not easily undo financial hardship as additional

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							employment would have family consequences.
Breen (2012)	Qualitative – Interview	Interview	Australia	60 Indigenous 14 Non-Indigenous 14 Counsellors 20 Venue Managers	Not Stated	Age	Card harms increased by starting young and skipping school. Young gamblers had reduced lifelong aspirations
						Culture	Indigenous Australians experienced debt, child neglect (missed school), lack of resources (food, clothes), social isolation, shame, reluctant to seek help, community shame (gossip)
Breen, Hing, and Gordon (2011)	Qualitative - Interview	Interview Observations	Australia	169 Indigenous Australians	Gambling Research Australia	Game Choice	Card and commercial gambling associated with poverty. Card games led to financial loss and loss of welfare. Commercial led to financial hardship, family and relationship issues, mental health issues, crime, eviction, homelessness, domestic violence, neglect, relationship breakdown, depression, suicidality, theft, sold belongings
Browne and Rockloff (2018)	Secondary Data Analysis	CSPG PGSI SOGS-4 DSM-IV-16 BBGS-2 72-Item Checklist CQLS	Multiple	156 Adult Gamblers	Victorian Responsible Gambling Foundation	Risk Severity	Only 10% of report financial harms were in PG but over 50% social deviance harms in PG, domestic violence, neglect, lowered religious connection most common in RG, other domains mostly even distribution, common moderate harms such as increased debt and less spending on essentials more likely in LR, over 50% selling belongings were RG. Severe harms like loss of utilities or

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							significant assets more likely MR or PG. Most severe harms (unhygienic living) mostly PG.
Browne, Goodwin, and Rockloff (2018)	Cross-Sectional	CSPG PGSI SOGS-4 DSM-IV-16 BBGS-2 72-Item Checklist CQLS	World-wide	156 Adult Gamblers	Victorian Responsible Gambling Fund	Age/ Gender	Non-significant difference
						SES	Wellbeing difference between $15-30k AUD and $101-150k AUD less than 5 points
						Risk Severity	Prevalence of harm in Non-PG twice that of PG (41.5 vs 20.6)
Browne et al. (2019)	Cross-Sectional	GOES PGSI GFM SGP SGHS	Canada	121 Gen. Pop.	Alberta Gambling Research Institute	Age	Younger ages had a large correlation but was insignificant
						Gender	No significant bivariate relationship to harm
						SES	Part time work and unemployment, marriage status, lower education, and lower income had large correlations but were insignificant
						Gambling Behaviour	Motivation didn't predict harm
Browne et al. (2017)	Cross-Sectional	PGSI 72-Item Checklist	Australia	786 Gamblers	Not Stated	Risk Severity	Highest severity of risk showed the same disability weights as moderate to severe alcohol use disorder and similar weights to bipolar disorder. Moderate risk group had similar weights to mild alcohol use disorder and stroke. Low risk was estimated as slightly less disability weights than anxiety.

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							Less severe harms experienced by a large proportion of the population might be of more magnitude than the intense harms by the small high risk proportion. Low risk individuals were 5-10x more prevalent than high risk.
Browne et al. (2020)	Secondary Data Analysis	PPGM 72-Item Checklist	Finland	3795 Gen. Pop.	The Ministry of Social Affairs and Health, Finland	Risk Severity	Total weighted harms reported in the highest PPGM category was 282 compared to 395 across the three lower categories. All individuals in highest risk category reported at least 1 harm, however any individual reporting 1+ harm is more likely to be in a lower risk group. Highest risk group make up the fewest participants reporting few (1-4) harms, and overwhelming majority reporting many (20+) harms. Mild financial, psychological and work/study harms were broadly distributed across all PPGM groups. Mild financial and psych harms were common. Health, relationship and social deviance harms were mostly restricted to highest risk category (over 50% of reports). Mild harms were the most prevalent and were more common in gamblers not experiencing impaired control. Severe financial harms were more likely in those displaying control issues. In psych harms more than

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							50% of all harms were reported in the lower risk categories, and more than 50% of severe harms were in the high risk group. Work/study and social deviance harms had low prevalence overall, health harms and relationship harms both had around 50% of all harm from the high risk group.
Canale, Vieno, and Griffiths (2016)	Secondary Data Analysis	DSM-IV Frequency Survey PGSI 4-Point Scale	UK	781 Gen. Pop.	None	Age	Dependence and social harm higher in 16-34 than 35-54 and 55+
						Gender	Males gambled more frequently for longer and spent more. Dependence and social harm higher in men
						Gambling Behaviour	Most harms reported by non-high time and spend regular gamblers. Harm odds increased with greater gambling volume individually. So higher individual risk in high volume play but larger proportion of at least one harm reported in low volume play.
Castren et al. (2018)	Secondary Data Analysis	PGSI SOGS	Finland	360 Gen. Pop.	The Ministry of Social Affairs and Health, Helsinki	Age	Participants over 24 experienced fewer harms
						Gender	Gender did not have an effect on gambling harms
						Gambling Behaviour	Daily play doubled harms, multiple gambling sessions per week also increased harms. Spending at least 1% of monthly income increased harms.
						Game Choice /	Online gambling statistically associated with harm but not strongly.

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
						Online vs. Offline	Scratchers, betting, slots, non-poker games online, poke online and non-monopoly increased harms. Weekly lottery, fast-paced lottery, low-paced lottery, casino games, horses and private gambling were not included. Weekly lottery had lowest harms and non-monopoly the highest.
Currie et al. (2006)	Secondary Data Analysis	CPGI DSM-IV NODS	Canada	202 Gen. Pop.	Alberta Gaming Research Institute	Age	Under 40s more likely two or more harms than over 40s
						Gender	Two or more harms in the last year more likely reported by men
						SES	Two or more harms in the last year more likely reported by low income, high school or lower education
						Culture	Two or more harms in the last year more likely reported by non-caucasians
						Gambling Behaviour/ Game Choice	Harm risk increased with frequency of play on EGMs, instant-win tickets, bingo and casino games but not lottery plays
Delfabbro and King (2019)	Qualitative – Narrative Review	DSM-5 PGSI SOGS NODS VGS PPGM GES	Multiple	N/A	None	Risk Severity	Not much harm appearing in LR when scaling severity. LR-MR show only low-medium severity harms but a large proportion of these lower severity harms present. Even when scaling severity financial harms found in LR groups (i.e. selling belongings) Low SES in the non-PG/LR group may mean financial harms aren't

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							gambling related (many non-PG scored 0 so little-no gambling)
Delfabbro, Georgiou, and King (2020)	Cross-Sectional	Gambling Activity Scale Risk-Behaviour Scale PGSI 72-Item Checklist	Multiple	554 Adult Gamblers	Not Stated	Risk Severity	Participants scored as "problem gamblers" experienced more harm in general, harm reported by low risk groups was very small when participants were asked to indicate if harm resulted from gambling. Harm close to 0 for all but financial and psych harms in the lowest risk group.
Estevez et al. (2015)	Case-Control Study	Multicage-CAD-4 Symptom List-90 AISS	Spain	131 Clinical 2 Non-Clinical	International Contest ONCE of Research on Responsible Gambling	Clinical	Young adults in the clinical sample had more dysfunctional symptomatology: anxiety, depression, hostility, OC behaviour, and somatisation, high scores for alcohol addiction, drug addiction, game "addiction", sex "addiction" and "compulsive" shopping. No significant difference for eating or internet use. Impulsivity partially mediated anxiety, depression and psychoticism and perfectly mediated somatization, OCD, interpersonal sensitivity, paranoid ideation and hostility.
Ferrara, Franceschini, and Corsello (2018)	Qualitative – Narrative Review	Multiple – Study dependent	World-wide	Adolescents	None	Age	Young age was associated with high rates of addiction comorbidity
						Gender	Males were associated with high rates of addiction comorbidity
						Culture	Non-white was associated with high rates of addiction comorbidity

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Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
						Risk Severity	Participants rated as high risk were more likely to have increased alcoholism or substance use, depression, dysthymia, anxiety, panic and phobia, anger, resentment, headaches, and gastrointestinal symptoms, eating disorders, and criminality. Poor relationship communication, conflicts and arguments, consideration of separation or divorce. Anger and conflict in families, less independence, less engagement in intellectual or cultural activities, little expression of emotions.
						Game Choice	Sports betting was associated with high rates of addiction comorbidity
Fulton (2019)	Qualitative – Interview	In-Depth Interview	Ireland	22 Recovering Gamblers and their Social Circle	Irish Research Council of Ireland's Research Project Grants and The Social Protection Research Innovation Awards	Online vs. Offline	Hiding debt, stealing, hidden bills leading to further debt. Use of online gambling reduced shame but the double life led to stress and emotional deterioration, mood swings, irritability, relationship issues, arguments, self-perception changes (low-esteem increased shame). One individual showed changing perception of reality as he stole from work but did not process that this was theft.

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
Goh, Ng, and Yeoh (2016)	Qualitative – Interview	In-Depth Interview	Singapore	105 FEO Applicants	National Council on Problem Gambling Singapore and The Humanities and Social Sciences Research Grant	Age	Verbal abuse was most common from young male gamblers towards their parents. Older males were found to coerce money from their wives.
						Gender	Physical abuse was equally common between genders
						Culture	Where traditional gender roles were present a mother gambling was seen to lead to child neglect, followed by father leaving work to care for the children and therefore causing financial hardships. The gambler was seen as self-centred and family relationships became strained.
Heiskanen and Matilainen (2020)	Qualitative – Focus Group	Focus Group	Finland	25 "Baby Boomers"	The Finnish Foundation for Alcohol Studies	Age	Difficulty passing a machine without gambling, excessive time and money spent both online and offline, loss of money, negative consequences to social relationships. Some participants discussed feeling unable to "meddle", and shame if seen gambling publicly (particular in small country communities) suggesting a person with a gambling problem would be less likely to have peer support
Hing et al. (2014)	Cross-Sectional	PGSI 11-Listed Harms	Australia	1259 Indigenous Australians	Australian Research Council	Culture	The three most prevalent harms were betting more than they could afford to lose (49%), guilt or regret (44%), and chasing loss (44%).

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							These were followed by financial problems (38%), feeling they had a problem (36%), criticism (34%), needing to spend more (34%), borrowing or selling (25%) and health problems (25%).
						Risk Severity	Among problem gamblers 93.8% indicated at least sometimes betting more than they could afford to lose, 92.9% reported betting larger amounts to get the same thrill and 96.2% reported loss chasing. A significantly higher proportion of moderate risk gamblers (18%) experienced family arguments than low risk gamblers (0.9%). 96.2% of problem gamblers were aware of having an issue, 94.9% had a gambling related health issue
Hing and Breen (2015)	Qualitative – Interview	Semi-Structured Interview	Australia	169 Indigenous Australians	Gambling Research Australia	Culture	Counsellors noted that cultural acceptance was high for gambling and so those with a problem had a strong support network. However when discussing harms isolation from community was a key factor, with family and relationship difficulties. Harms included financial and personal distress, debt, cut off utilities, crime, loss of employment, homelessness, lack of food and no support. Non-Indigenous counsellors highlighted credit card debt as a key harm in the community, using

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							one card to pay off another and getting into a cycle of loss chasing. Gamblers hid their losses due to shame, low self-esteem and guilt and these were highlighted as reasons help wasn't sought out. In contrast a win would lead to high popularity and community power. Family issues were described as missing key events, neglecting children, lying and arguments, violence and breakups. These relationship issues sometimes led to social isolation. Within Indigenous communities' solitary gamblers were viewed as poor role models and were believed to have lost their cultural values. Community gamblers were seen as those with positive consequences and strong family groups.
Hubert and Griffiths (2018)	Cohort Study	Portuguese SOGS Self-Devised Likert Scale of Harms	Portugal	1599 Gen. Pop.	None	Online vs. Offline	Offline gamblers were more likely to have jobs, children and a stable relationship/ Online gamblers appear to become problem gamblers faster (30y/o compared to 40y/o). They had fewer suicidal thoughts but less control over impulsivity and less able to cope with frustrations. Same level of online and offline suicide attempts. Online gambling associated with heavy alcohol use, poor academic functioning, unemployment, and less money later in life.

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
Hing, Breen, and Gordon (2012)	Qualitative – Interview	Semi-Structured Interview	Australia	169 Indigenous Australians	Gambling Research Australia	Gender/ Culture	Heavy commercial gamblers who were women in small villages and men in towns both experienced similar harms. Heavy card players of both genders experienced similar harms. Binge commercial gamblers were mostly men and experienced financial loss.
						Game Choice	Heavy card players spent their pension and borrowed money, as well as playing all day/night. Heavy commercial gamblers played alone, spending their whole pay, and played all day/night. They experienced debt, relationship issues, lost homes, overcrowded refuge housing, missed bills, lack of food and poor nutrition, child neglect and abuse, stress, lying, domestic violence, self-esteem issues, depression suicidality, theft, selling items, and ripping off their work. Binge commercial gamblers had financial loss.
Jeffrey et al. (2019)	Cohort Study	PGSI 72-Item Checklist 83-Item Checklist	Australia and New Zealand	5036 Gamblers	Victorian Responsible Gambling Foundation and New Zealand Ministry of Health	General Gamblers Harm - Gamblers Perceptions vs. Others	Gamblers were more likely to report individual problems such as not having access to money, being late, gambling during work or study time, alcohol use, attempted suicide, hygiene issues, lack of sleep, reduced physical activity, shame, and worthlessness. Spouses reported joint harms such as missed bills, tension

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							and conflict in the relationship. Gamblers may be less aware of relationship dysfunction.
Kildahl et. al. (2020)	Cross-Sectional	GamTest IOWA Task	Denmark	140 Gamblers	The Luxembourg National Research Fund	Gambling Behaviour	Overconsumption of time, overconsumption of money, negative consequences of overconsumption of money, negative social consequences, negative emotional consequences and general consequences all increase linearly with gambling frequency. Individuals influenced by reward frequency, who were more likely to swap decks rather than persevere with the same cards were more likely to overconsume time, experience negative social consequences, emotional consequences and overconsume money.
Kolandai-Matchett et al. (2017)	Mixed Methods	Focus Group	New Zealand	8 Gamblers 26 Professionals	New Zealand Ministry of Health	Culture	Pacific people experienced harms that are similar to other populations. However contexts were complex when culture-related. Collectivist values and least distinction between family, friends and strangers. Collectivism meant harm is far-reaching and included loss of belongings, isolation, shame, loss of respect, disruption of trusting relationships, transference of communal responsibility and an overall loss of social co-

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							occurred for even recreational gamblers but were not well documented or measured. Criminality was only associated with high risk / problem gamblers and was usually a second-order harm used as a tool to address primary harms such as financial.
Larsen, Curtis, and Bjerregaard (2013)	Cross-Sectional	Lie/Bet Questionnaire Interview	Greenland	2189	None	Age	Alcohol use increased with age in PG but decreased with age in non-PG.
						Risk Severity	Harmful alcohol use and frequent marijuana use was associated with lifetime gambling problems and prevalence was high amount PG compared to non-PG.
Lee, Chung, and Bernhard (2014)	Cross-Sectional	Gambling Passion Scale Consequences Checklist	South Korea	288 Online Gamblers	Not Stated	Gambling Behaviour	Motivations of excitement, escape and challenge were linked to positive consequences, whereas money motivation led to harms and obsession.
						Online vs. Offline	Obsessive online gambling was associated with anxiety and guilt.
Li et al. (2017)	Cohort Study	72-Item Checklist PGSI	Australia	5205	Victorian Responsible Gambling Foundation	General Gamblers Harm	Harms in all domains tended to accumulate more quickly to gamblers than to 'affected others' as gambling problems increased.
						Risk Severity	Reduced spending was the most prevalent financial harm, reduced performance, reduced sleep, worry, shame, reduced time, and paying

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							money were highest in other categories. Sold items, absence, reduced performance, reduced sleep, extreme distress, and tension had the highest correlation with PGSI categories.
Livazovic and Bojcic (2019)	Cross-Sectional	CAGI GPSS	Croatia	366 Students	None	Age	Older participants scored higher on problem gambling and risk behaviour but there was no increase in harms.
						Gender	Males scored significantly higher on psychological, social and financial harms but also higher for problem gambling and risk behaviour.
						SES	Family life and parents' education level had no significant effect on harms. Lower achievers in school reported higher psychological harms. There was no significant differences in harms across school types
						Risk Severity	There was a weak significant correlation between success in school and risk score.
Lloyd et al. (2016)	Cross-Sectional	DSM-IV Frequency Questions Mood Disorder Q General Health Q	Europe and North America	4125	Responsibility in Gambling Trust and the Economic and Social Research Council	Age	Age was not a significant predictor for thoughts or acts of self-harm
						Gender	Gambling related thoughts of self-harm were more frequent in males. This contrasts with non-gambling

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
		Self-Harm Yes/No CAGE PRIME-MD 10-Item Drug Screen					thoughts of self-harm. Actual acts of self-harm were not related to gender.
						SES	Gambling related thoughts of self-harm were more frequent in the unemployed but not linked to marital status. Gambling related acts of self-harm were also associated with unemployment, but not marriage status. Thoughts of harm also related to parents gambling.
						Gambling Behaviour	Thoughts of harm were associated with years gambling. Gambling for mood modification and money was associated with thoughts of self-harm. Gambling for enjoyment was negatively associated. Non-gambling related self-harm was also significantly related to gambling for mood modification and inversely with gambling for enjoyment.
Mageau et al. (2005)	Cross-Sectional	Gambling Passion Scale Questionnaire	Canada	554	Not Stated	Gambling Behaviour	Harmonious passion (someone choosing to gamble) was related to positive emotions and thoughts, and negatively related to feeling judged or guilty. However after engaging in gambling it no longer related to guilt. Harmonious passion was not related to anxiety. Obsessive passion (feeling compelled to gamble) was strongly associated with guilt, anxi-

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							ety, and negative emotions. Obsession was negatively related to feeling in control and having fun.
						Game Choice	Casino users reported more positive and negative outcomes overall than lottery players.
May-Chahal et al. (2017)	Cross-Sectional	PGSI Substance Use Q UK National Offenders Data	UK	1057 Prisoners	Economic and Social Research Council	Criminality	The prevalence of gambling within prison was higher than a general population but prevalence of gambling before incarceration was significantly lower. High rate mid-20s peak offenders were 5.3x more likely to chase losses and experience harms. Rate chronic persisters were 3.7x more likely. There was no significant link between gambling and drug use, but occasional gamblers were more likely to abstain from alcohol and drugs.
						Risk Severity	Nearly 2/3 who scored highly on the PGSI abstained from drugs and alcohol.
McCarthy et al. (2019)	Qualitative – Narrative Review	Multiple	Worldwide	Women	None	Age/ Game Choice	Older women personally believed EGMs were less harmful as they could socialise
						Gender	Women were more likely to report comorbid anxiety and depression than men. Also personality disorders, alcoholism and psychological distress.

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
						Culture	Women from ethnic minorities and indigenous communities (Māori, Aboriginal and Pacific New Zealanders) were more at risk of harms compared to European women. Some women in Southeast Asia only saw positive consequences despite negative ones being recorded as present.
Melendez-Torres et al. (2019)	Secondary Data Analysis	Student Health Wellbeing Survey	Wales	363 Students	British Heart Foundation Cancer Research, Economic & Social Research and Medical Research, Welsh Government & Welcome Trust	Age	Increasing school year was associated with increasing socioemotional harms and increased gambling. Harms increased with age more acutely in males.
						Gender	Women were less likely to feel bad about gambling. Harms increased with age was more acute in males.
						SES	Higher family affluence was associated with more harms but also more gambling. Feeling less school connectedness/ belonging led to more harms and also more gambling.
						Culture	Non-white British students experienced more harms. White female students were less likely to feel bad about gambling.
Mihaylova, Kairouz, and Nadeau (2013)	Cohort Study	CPGI – PGSI AUDIT Drug Frequency Q	Canada	2139 Undergraduate Students	Centre Dollard-Cormier,	Game Choice	Online poker gamblers were more likely to gamble at least weekly, spend more and have higher annual debt as a result of poker specifically.

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
					University Institute on Addictions	Online vs. Offline	Online poker players had a greater risk of alcohol dependency. Cannabis use did not differ between online and offline gamblers but online poker users were more likely to have used other illicit drugs over the past year. Academic performance did not differ between online and offline gamblers bur online poker players were more likely to report family issues, studying issues and financial issues.
Paterson, Whitty, and Leslie (2020)	Qualitative – Systematic Review	Multiple	UK Australia New Zealand Canada USA	Military Personnel	None	Military Personnel	Those in the military were found to be quickly reprimanded for gambling but meaningful assistance was slow to be offered. In contrast one study found 21/25 active-duty gamblers who received treatment were retained in the military. Several studies highlighted comorbid substance abuse, mental health problems and suicide in military personnel. One study found 9/35 gamblers receiving treatment had major depressive disorder. One study found 20% of gamblers receiving treatment endorsed suicide ideation and 3 had made attempts. The study noted that targeting the gambling issue led to no further ideation.
Pitt et al. (2017)	Qualitative - Interview	Semi-Structured Interview	Australia	48 Children (8-16)	Australian Research Council Discovery	Age	Children understood the slim chance of winning and that continuing to play meant you would lose "until

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
					Grant on Sports Wagering		you're poor." Children gambled with pocket money or verbal agreements and so financial harms were not experienced. Children didn't seem to perceive harms other than peer pressure and financial loss, though other studies cited show exposure as a child led to increased alcoholism and cigarette use. Children were found to be more likely to experience harm later in life due to believing sport bets were skill based and gambling as a child with minimal harms due to family protection.
Raisamo et al. (2013)	Secondary Data Analysis	Adolescent Health and Lifestyle Survey Harms Questions	Finland	4566	Finnish Foundation for Alcohol Studies and the Ministry of Social Affairs and Health	Age	Gambling involvement increased with age, though harms differed very little. Despite this financial issues appeared much less common in adolescents.
						Gender	Reported harms differed very little between genders. However when not examining frequent gamblers males reported more financial issues than females.
						Gambling Behaviour	Considerably more frequent gamblers reported harms than occasional gamblers. The most common harm for frequent gamblers was guilt or shame, followed by relationship issues and daily routine disruptions. Daily gamblers were significantly more likely to report all harms.

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
Raisamo et al. (2015)	Secondary Data Analysis	PGSI Frequency of Play Spends	Finland	4484	Ministry of Social Affairs and Health Helsinki	Age	Guilt was not related to age. Younger ages were more likely to report harms.
						Gender	Men had a higher prevalence of harm but gambled more and spent more. Increased spends, betting above means and guilt were most prevalent harms. When controlling for frequency and spends gender was no longer related to harms.
						Risk Severity	The most harm reported were found in low-medium risk scorers.
						Gambling Behaviour	Higher frequency of play and higher spends caused more harms. Harm risk increased when weekly spends exceeded E21.
Raisamo et al. (2019)	Secondary Data Analysis	6-Month Gambling Spends 8-Item Harm List	Finland	18857 Adolescents	Ministry of Social Affairs and Health Helsinki	Gender	Most prevalent harm was guilt or shame for both genders. Disrupted daily rhythm and disrupted school-work were second most common in girls but conflict with friends was second for boys.
Ricijas, Hundric, and Huic (2016)	Cross-Sectional	Gambling Activities, Motives and Beliefs CAGI Delinquency Scale Experiences Measure	Croatia	Male Students	Not Stated	Risk Severity	Half of the participants were social gamblers without consequences. Occasional gamblers had low-moderate consequences and problem/high risk gamblers had serious consequences. Higher risk score associated with delinquency, and cognitive distortions.

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
						Game Choice	Sports bettors, VLT users and virtual bettors showed severe psychosocial consequences related to gambling.
Rintoul, Deblaquiere, and Thomas (2017)	Qualitative – Multiple Methods	Observation Semi-Structured Interview Focus Groups	Australia	60	Commonwealth Government of Australia	General Gamblers Harm	Venues highlighted inappropriate social behaviour and emotional responses such as aggression, shouting at the machine or people, appearing sad or depressed, being withdrawn or sweating excessively. In 34 hours harms were present at all observed venues.
						Gambling Behaviour	Gambling fast and intensely, betting over $3 per spin, using multiple machines at once, skipping meals and withdrawing cash multiple times led to more observed harms.
Salonen, Alho, and Castren (2017)	Secondary Data Analysis	PGSI SOGS Attitudes towards Gambling	Finland	4515	Ministry of Social Affairs and Health Helsinki	Age	Females aged 18-24 experienced more harms but also reported an increase in occasional gambling. Gambling more than intended was most common for all age groups.
						Gender	Gambling prevalence was higher in males however females 18-24 reported experiencing more harms. Loss of control (gambling more than intended) and guilt were the most common harms for both genders. The portion of women who lost control, felt guilty, and hid betting slips increased while harms such as lying about wins and loss chasing decreased in males.

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
Salonen et al. (2018)	Secondary Data Analysis	Frequency and Habit Questions 14-Item PPGM 72-Item Checklist	Finland	7305	Ministry of Social Affairs and Health - Appropriation of the Lotteries Act	Age	Financial harm, work and study harm, health problems and emotional harms all tended to decline in older age groups. Relationship issues did not differ. Financial harm was the most commonly reported among younger ages.
						Gender	Men reported more harms than women. Most typical harms reported were financial or emotional/psychological. Men reported more work and study harms than women.
						Clinical	11% Gen. Pop experienced at least one harm during 2016. The clinical sample experienced a notably larger amount of harm 88% emotional, 87% financial, 87% health and 81% relationship. Financial harms, health harms, and work/study harms were similar in both samples, clinical showed more anger in emotional harms than Gen. Pop. Overall other harms were rare in Gen. Pop but in clinical promising to pay back money without intending to, stealing and outcast feelings were common.
Samuelsson, Sundqvist, and Binde (2018)	Qualitative – Interview	Semi-Structured Interview PGSI	Sweden	40	Public Health Agency of Sweden	Gambling Behaviour	Low frequency stable gamblers (mild-no harm) had only shame and guilt. High frequency gamblers with decreasing use (moderate harm) had substantial financial loss, frustration, alcohol use and isolation. Periodic gamblers (moderate harm)

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
							showed financial, psychological, insomnia, isolation, relationship issues and low self-esteem. High frequency increased users (substantial harm) had irrational thoughts (felt immortal), and increased spends. Harms such as financial issues and psychological distress caused a period of reduced play depending upon individual life changes and support networks.
Shannon, Anjoul, and Blaszczynski (2017)	Case-Control Study	PGSI 48-Harm Indicators	Australia	542	South Australian Independent Gambling Authority	Clinical	In the clinical sample the highest rated harms were reduced savings, doing without, worry, frustration and debt. The lower rated harms were drug use, suicide, bankruptcy, self-injury, and education problems. In the general community debt, partner issues, feeling constrained, going out less, decreased self-control and lower pride were rated worst. The distribution of averaged harm was consistent across both samples, excluding reduced savings and decreased happiness.
Skaal et al. (2016)	Cross-Sectional	PGSI 10-KPDS AUDIT	South Africa	900	South African National Responsible Gambling Foundation	SES	Participants from urban areas were more likely to report psychological distress and be high risk gamblers. Alcohol use was most strongly associated with high risk gambling in individuals from urban areas

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
						Risk Severity	High risk gambling was associated with alcohol use and psychological distress.
Splevins et al. (2010)	Cross-Sectional	DSM-IV-MR-J SOGS Harm Scale Attitudes	Australia	252 Students	Star City Casino	Age	Students spent pocket money or wages from part-time jobs on gambling. There was no significant difference between self-report and peer-reported signs of a gambling problem suggesting adolescents may be less aware of what to look for.
						Gender	Males were more likely to be preoccupied with thoughts of gambling, feel the need to increase spending, and experience arguments.
						Risk Severity	Highest scoring individuals on the SOGS were more likely to miss school, sell personal property, commit illegal acts, and try other risks like smoking and drugs. Legal drugs and ecstasy use was the same for all risk categories.
Tu, Gray, and Walton (2014)	Secondary Data Analysis	Health Lifestyle Survey New Zealand Index of Deprivation	New Zealand	6020	Ministry of Health	SES	More affluent individuals were more likely to gamble than less affluent, however where rates of gambling and also harm dropped in affluent groups they did not in less affluent.
Wardle et al. (2019)	Qualitative – Systematic Rapid Review	Multiple	Worldwide	Migrants	King's College London and London School	Culture	Migrants were less likely to gamble than non-migrants but were found to be more likely to experience harms.

Author(s)	Study Design	Measures Used	Country	Sample	Funding	Discussion Categories	Relevant Results Identified
					of Tropical Hygiene and Medicine Interdisciplinary Research Fund		There was minimal evidence of specific harms migrants experience and whether these differed from non-migrants. However they found that Spanish migrants tended to spend over 300 euros daily, claim losses as wins, and chase losses. Australian migrants experienced financial harm, shame, relationship issues, suicide, mental health issues, isolation and prostitution.
Yani-de-Soriano, Javed, and Yousafzai (2012)	Mixed Methods	SOGS K-10 Scale Dichotomous Health Survey 8-Internet Addiction Scale	UK	209 Students	Cardiff Business School	Risk Severity	Probable pathological gamblers reported the highest degree of harms in all categories, including longest time spent online generally and for gambling specifically. As risk scores increased so did physical, mental health, social relationship and academic harms.
						Online vs. Offline	Online gambling was associated with binge drinking but not smoking. Around 60% of participants who were online gamblers rated as high risk (problem gambler) and as scores increased so did physical, mental health, social relationship and academic harms.

Appendix 5.

PRISMA Checklist for Study Four

Section/topic	#	Checklist item	On Page
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	64
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	N/A
INTRODUCTION			
Rationale	3	Describe the rationale in the context of what is already known.	64
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	64
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	65
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	65
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	65
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	65
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	65-66
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	65
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	67 & Appendix 7
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including whether this was done at the study or outcome level), and how this information is to be used in synthesis.	65
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	Appendix 7
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	65
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	65

Section/topic	#	Checklist item	On Page
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or sub-group analyses, meta-regression), if done, indicating which were pre-specified.	65
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	66
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	68
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Appendix 6
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	68-76
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	N/A
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	76-77
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	N/A
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	76-77
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	76-77
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	76-77
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	N/A

Appendix 6.

Kmet and Lee Research Quality Assessment for Study Four

Study	Criteria														Total Sum	Total Possible Sum	Summary Score
	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
	Question / Objective sufficiently described	Study design evident and appropriate	Method of subject/comparison group selection or source of information/input variables described and appropriate	Subject (and comparison group, if applicable) characteristics sufficiently described	If interventional and random allocation was possible, was it described	f interventional and blinding of investigators was possible, was it reported	If interventional and blinding of subjects was possible, was it reported	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment	Sample size appropriate	Analytic methods described/justified and appropriate	Some estimate of variance is reported for the main results	Controlled for confounding	Results reported in sufficient detail	Conclusions supported by the results			
Altintas et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Ariatama et al.	3	3	3	3	N/A	N/A	N/A	3	2	2	1	1	2	3	15	22	0.68
Borgonovi (2016)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Charmaraman et al.	3	3	3	3	N/A	N/A	N/A	3	3	2	2	3	1	3	18	22	0.82
Coyne et al. (2020)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
De Pasquale et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Dredge and Chen	3	3	3	3	N/A	N/A	N/A	3	2	3	3	3	3	3	21	22	0.95
Erevik et al. (2019)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Farchakh et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Fazeli et al. (2020)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Giardina et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00

Guo et al. (2020)	3	3	2	3	N/A	N/A	N/A	3	3	2	3	3	3	3	20	22	0.91
Ivory et al. (2017)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Jeong et al. (2020)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Kaptsis et al. (2016)	3	3	3	3	N/A	N/A	N/A	3	2	3	3	3	3	3	21	22	0.95
Kök Eren and Örsal	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	2	3	21	22	0.95
Krossbakken et al.	3	3	3	2	N/A	N/A	N/A	3	3	3	3	2	3	3	20	22	0.91
Latinsky and Ueno	3	3	3	3	N/A	N/A	N/A	2	3	3	3	3	3	3	21	22	0.95
Mandryk et al.	3	3	3	2	N/A	N/A	N/A	3	3	3	3	3	3	3	21	22	0.95
Männikkö et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Matali et al. (2020)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	2	3	21	22	0.95
Milani et al. (2018)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Özçetin et al.	3	3	3	3	N/A	N/A	N/A	2	3	3	3	3	3	3	21	22	0.95
Satghare et al.	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Sioni et al. (2017)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Stockdale and	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Stockdale and	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Tham et al. (2020)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
van den Eijnden et	3	3	3	3	N/A	N/A	N/A	3	3	3	1	3	3	3	20	22	0.91
Wang et al. (2019)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Yeh et al. (2017)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00
Zahra et al. (2020)	3	3	3	3	N/A	N/A	N/A	3	3	2	3	3	2	3	20	22	0.91
Zhai et al. (2020)	3	3	3	3	N/A	N/A	N/A	3	3	3	3	3	3	3	22	22	1.00

| Study | Criteria | | | | | | | | | | | Total Sum | Total Possible Sum | Summary Score |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
	Question / objective sufficiently described	Study design evident and appropriate	Context for the study clear	Connection to a theoretical framework / wider body of knowledge	Sampling strategy described, relevant and justified	Data collection methods clearly described and systematic	Data analysis clearly described and systematic	Use of verification procedure(s) to establish credibility	Conclusions supported by the results	Reflexivity of the account			
Beranuy et al.	3	3	3	3	3	3	3	3	3	2	19	28	0.68
Griffiths (2010)	3	3	3	2	2	2	2	1	3	1	12	28	0.43
Kleinman and Das	2	2	2	1	2	2	2	1	3	1	8	28	0.29
Lianekhammy and	3	3	3	2	3	3	3	2	3	3	18	28	0.64
Snodgrass et al.	3	3	3	3	3	3	3	3	3	3	20	28	0.71
Snodgrass et al.	3	3	3	3	3	3	3	3	3	3	20	28	0.71
Wong and Lam	3	2	3	1	2	2	3	2	3	1	12	28	0.43

Appendix 7.

Complete Data Extraction for Study Four

Study	Study Design	Sample Character-istics	Negative Out-comes	Positive Outcomes	Measurement Tools	Funding
Altintas et al. (2019)	Cross Sectional Self-Report	217 Online Gamers French Adults Mixed Genders	Poor sleep quality Lower mental health	None Reported	PSQI MOS SF-36 Game Play Frequency AIE-Q	Not Stated
Ariatama et al. (2019)	Cross Sectional Self-Report	48 Internet Café Us-ers Indonesian Adults Mixed Genders	Withdrawal (irritable, anxious, and/or sad) Depression	None Reported	Game Play Frequency IGDS9-SF PHQ-9 ELISA	No Funding
Beranuy et al. (2012)	Qualitative Self-Report Interview	9 Gaming Patients Spanish Adults & Teens Males	Not eating Missed sleep Withdrawal (anx-ious) Lost time Avoid Face-to-Face Friends Lying to Family Skipping School (poor academics) Work disputes (poor attendance) Unemployed Guilty Feelings	Virtual friendships Escapism/Dissocia-tion Entertainment	Demographics Social Relations Hos-pital Visit Reason Game Play Frequency Symptoms/ Outcomes	Not Stated
Borgonovi (2016)	Cross Sectional Self-Report	145,953 PISA Sur-vey Participants Multiple Countries Teenagers Mixed Genders	Reduced reading ability	Improved reading ability Improved computer skills Improved spatial skills	PISA Demographics Game Play Frequency	Not Stated

Study	Study Design	Sample Characteristics	Negative Outcomes	Positive Outcomes	Measurement Tools	Funding
Charmaraman et al. (2020)	Cross Sectional Self-Report	609 Students 772 Students USA Teenagers Mixed Genders	Depressive Symptoms Less Sleep Later Bedtimes Spending More Less Time on Homework Less Time with Family Skipped Meals	Play Online with Others - Social More time interacting in game	List of Games Played (coded by ESRB-risk) Data from Parents Player Interactions CES-DC Sleep Duration PC Use Frequency PRIUSS Gaming Frequency on a school day Gaming Alone or Not Frequency of Social Media Use Sleep Health Money Spent Social Withdrawal	Children and Screens: Institute of Digital Media and Child Development Grant by the National Institutes of Child Health and Human Development
Coyne et al. (2020)	Longitudinal Self-Report	385 Flourishing Families Project Participants Adults & Teens Mixed Genders	Aggression Depression Shyness Anxiety	None reported	VGA-R CES-DC GAD Subscale 5-Aggression 9-Delinquency 7-Empathy 9-Prosocial Behaviour 5-Shyness 4-Parental Knowledge 3-Financial Stress 7-PUMP	Not stated

Study	Study Design	Sample Characteristics	Negative Outcomes	Positive Outcomes	Measurement Tools	Funding
De Pasquale et al. (2020)	Cross Sectional	566 Unemployed Italian Adults Mixed Genders	Depression Anxiety Decreasing Relationships Poor Social Adaptation Sleep Disturbances Increased Somatization Paranoia Psychoticism	None reported	Game Preference IGD9-SF SCL-90 R SASS	Italian Ministry of Health (Ricerca Corrente, 2020)
Dredge and Chen (2020)	Cross Sectional	320 Students Chinese Teenagers Mixed Genders	Depression Poorer Relationships	Social Media Use to Develop New Friendships	PHQ-9 5-Life Satisfaction PSAFU Internet Frequency 18-Relationships	No funding
Erevik et al. (2019)	Cross Sectional Self-Report	5217 Students Norwegian Adults Mixed Genders	Depression Anxiety	Lower Depression Lower Anxiety Less Likely to Abuse Alcohol	GASA AUDIT Mini-IPIP HSCL-25	PhD Grant from the University of Bergen, Norway

Study	Study Design	Sample Characteristics	Negative Outcomes	Positive Outcomes	Measurement Tools	Funding
Farchakh et al. (2020)	Cross Sectional Parental Reports	566 Private Students Lebanese Children Mixed Genders	Worse Memory (episodic, Factual, working) Slower Processing Speed Poor Visual Spatial Organization Poor Sequential Processing Worse Problem Solving Poorer Basic Reading Skills Poorer Written Expression Poorer Clinical Attention	None reported	GASC CMQ Clinical Attention Problems Scale LEAF	No funding
Fazeli et al. (2020)	Cross Sectional Self-Report	1512 Students Iranian Teenagers Mixed Genders	Insomnia Depression Anxiety and Stress	None reported	IGDS9-SF DASS-21 ISI Peds-QL 4.0 SF15	Qazvin University of medical Science (QUMS) Iran
Giardina et al. (2021)	Cross Sectional Between Groups Self-Report	644 Pre & Post COVID Italian Adults Mixed Genders	None reported	Lower Emotional Distress Lower Loneliness	DASS-21 Internet Gaming Disorder Test-10 Videogames Involvement Scale Gaming-Compensation Items	University of Luxembourg

Study	Study Design	Sample Character-istics	Negative Out-comes	Positive Outcomes	Measurement Tools	Funding
Griffiths (2010)	Qualitative Case Studies	2 Adults 1 Unemployed + Single 1 Employed + Married USA Males	Lost Immediate So-cial Circle Relationship Break-down/ Divorce Neglect of Children Withdrawal (moody, anxious, depressed, and irritable) Lost Job due to Un-reliability	Met New Friends Online Daily Routine Increased Self-Es-teem Escape from Life Worries	Case Study	Not Stated
Guo et al. (2020)	Cross Sectional Self-Report	31,659 Students Chinese Adults Mixed Genders	Depression Psychoticism Paranoid Ideation Serious Mental Ill-ness Suicidal Ideation Suicidal Plan Suicide Attempts.	None Reported	Young's 20-Item IAT PHQ-15 PHQ-9 SC-90 6-KPDS SBQ-R	Not Stated
Ivory et al. (2017)	Cross Sectional Self-Report	553 Students USA Adults Mixed Genders	Risky Sexual Be-haviour Being Sexually Vic-timised Victimising Others Increased Weapon Carrying Fighting Hospitalisation from Fights Being Bullied Online Suicidal Thoughts Suicide Attempts Tendency to be Overweight	Less Frequent Sui-cidal Thoughts Less Frequent Sui-cide Attempts Fewer Purges (vomit/laxa-tive) Fewer Diet Pills Used Less Likely to be Underweight	Game Play Frequency Game Genres Played Tobacco Use, Alcohol Use, Substance Use Sexual Risk Fight Frequency Weapon Carrying Bullying Suicide Weight & Dieting Exercise Demographics Parental Education Studying Time	Not Stated

Study	Study Design	Sample Characteristics	Negative Outcomes	Positive Outcomes	Measurement Tools	Funding
Jeong et al. (2020)	Cross Sectional Self-Report	2319 Students Korean Teenagers Mixed Genders	Aggression Anxiety Poor Parental Relationship Musculoskeletal Discomfort Dry Eye Symptoms Poor Interpersonal Relationships	None Reported	IGUESS SAS-SV Physical Symptoms Risk and Protective Factors TAIC RSES Self-Control Scale Sensation Seeking Aggression SSAS PACI IPPA-R	Korean Mental Health Technology R&D Project Grant, Ministry of Health and Welfare
Kaptsis et al. (2016)	Repeated Measures Self-Report	24 Gamers Australian Adults Mixed Genders	Frustration Difficulty relaxing More easily bored Poor sleep No time for other hobbies	Mental challenge/ engaging Relaxation	IGD-9 Checklist Craving Negative Aspects Positive Aspects Changes to Play	2014 Trevor Prescott Memorial Scholarship SA Masonic Foundation Social and Behavioural Sciences, Flinders University
Kleinman and Das (2020)	Qualitative Case Study	1 Male Adult	Spent up to 40% of Monthly Income on Microtransactions	None Reported	N/A	Not Stated
Kök Eren and Örsal (2018)	Cross Sectional Self-Report	104 Students Turkish Children Mixed Genders	Loneliness	None Reported	Computer Game Addiction Scale UCLA Loneliness	Not Stated

Study	Study Design	Sample Characteristics	Negative Outcomes	Positive Outcomes	Measurement Tools	Funding
Krossbakken et al. (2018)	Longitudinal Self-Report	1277 Gen. Pop. Norwegian Adults & Teens Mixed Genders	Depression Loneliness Anxiety	None Reported	Game Addiction Scale for Adolescents (GASA) Hospital Anxiety and Depression Scale (HADS) UCLA Loneliness Scale (RULS) AUDIT Physical and Verbal Aggression Subscale from SF Buss-Perry Aggression (BPAQ-SF)	Norwegian Research Council
Latinsky and Ueno (2020)	Longitudinal Self-Report Qualitative Interview	10,048 Students USA Children/Teens/Adults Mixed Genders	Males less full-time employed Males less achieve a bachelor's	More likely Higher Educated Females full-time employed Males live independently Females had life-partner/ married	Game Play Frequency Education Relationship Status Race Parental Education TV Watching Habits Parental Income	National Science Foundation and Social Science Research Council
Lianekhammy and van de Venne (2015)	Qualitative Forum Scraping	Three forums 18.06.09 - 05.05.10 50 'WoW Widows' 125 Comments Multiple Countries Adults Females	Financial Strain Neglected Housekeeping Neglected Child-Rearing Spending shared funds without spousal approval Missed work after long sessions	None stated	Content analysis of forum messages	Not stated

Study	Study Design	Sample Character-istics	Negative Out-comes	Positive Outcomes	Measurement Tools	Funding
			Poor Communica-tion Lack of quality time together Feelings of hope-lessness Partner angry/ fed-up Partner doesn't trust gamer online			
Mandryk et al. (2020)	Cross Sectional Self-Report	300 WoW Players Multiple Countries Adults Mixed Genders	Loneliness	Decreased loneli-ness Increased wellbeing	Gaming Expertise VPS ISCS UCLA Loneliness Scale WHO 5-Wellbeing In-dex Motives for Gaming	No funding
Männikkö et al. (2015)	Cross Sectional Self-Report	293 Gen. Pop. Finnish Adults & Teens Mixed Genders	Fatigue Sleep interference Depression Anxiety	None stated	GAS Self-reported psycho-logical, social, and physical health	No funding
Matali et al. (2020)	Cross Sectional Qualitative Clinical Interview	135 Outpatients Spanish Teenagers Mixed Genders	Self-Seclusion School absences Functional incapa-bility	None stated	DSM-5 IGD Criteria Ad hoc inventory on Seclusion CGAS	Not stated
Milani et al. (2018)	Cross Sectional Self-Report Parental Reports	612 Students Italian Children & Teens Mixed Genders	Higher distraction/ poor attention Lower support seek-ing Poorer interpersonal relations	None stated	VGA IAT CCSC-R1 TIRs CBCL	Not stated

Study	Study Design	Sample Character-istics	Negative Out-comes	Positive Outcomes	Measurement Tools	Funding
			Worse coping strat-egies Socially Withdrawn Depression Anxiety Aggression Internalization and externalization			
Özçetin et al. (2019)	Cross Sectional Self-Report	46 Gamers, 31 Control Turkish Children & Teens Mixed Genders	Poor object memory & total recall	Improved visual memory	WISC-R FAS TMT-A-B CVLT-C BVRT Stroop Test	Not stated
Satghare et al. (2016)	Cross Sectional Self-Report	1085 Gamers Singaporeans Adults & Teens Mixed Genders	Sleep issues	None stated	IGD Questionnaire Life Satisfaction Scale General Health Questionnaire-12 Insomnia Severity Index	Not stated
Sioni et al. (2017)	Cross Sectional Self-Report	394 Forum Users USA Adults Mixed Genders	Increased social phobia	None stated	IGD-9 Dichotomous Social Phobia Scale SF PAI	
Snodgrass et al. (2018)	Qualitative Clinical Interview	20 Gamers USA Adults Mixed Genders	Loneliness	More able to man-age loneliness Highly social – formed bonds Improved coping Community support	UCLA Loneliness Scale Yee's TMF 15 ISEL 9-IGD Scale	Colorado State University Anthro-pology Depart-ment and the NSF Award

Study	Study Design	Sample Characteristics	Negative Outcomes	Positive Outcomes	Measurement Tools	Funding
Snodgrass et al. (2017)	Mixed-Methods Interview Observation Self-Report	20 Gamers Interviewed 672 Gamers Surveyed Multiple Countries Adults Mixed Genders	Mood deterioration Draining/tiring Boring routine Toxic community Negative anonymity Loss of confidence	Mood improvement Life purpose and focus Adrenaline rush Increased calmness and control Positive routines Testing abilities Positive distraction/ escapism Self-Growth and Evolution Social connection and belonging Expanded point of view Strengthened relationships Positive social obligation Increased confidence Career and life advancement	MINI 15 Involvement Items 21 Positive and Negative Consequences	Colorado State University Anthropology Department and the NSF Award
Snodgrass et al. (2019)	Cross Sectional Self-Report	58 Gamers Multiple Countries Adults Mixed Genders	None stated	Increased mental wellbeing Reduced CTRA indicator genes (better regulated immune function)	Blood collection Mental Health Continuum-SF Yee's TMF 15	US National Science Framework Award
Stockdale and Coyne (2018)	Matched Pairs Self-Report	174 Gamers/Controls USA	Poorer mental health	None stated	IGD-9 Dichotomous ASRS	Loyola University Office of the Provost

Study	Study Design	Sample Character-istics	Negative Out-comes	Positive Outcomes	Measurement Tools	Funding
		Adults Mixed Genders	Poorer cognitive functioning Sleep disturbance Poorer emotional health Isolation feelings (lonely)		Cognitive Functioning Short PROMIS Global Health BMI BPAQ-SF HMI-R ATS DAST-10 AUDIT CPUI DSM-IV Gambling	
Stockdale and Coyne (2020)	Cross Sectional Self-Report	481 Parents USA Adults Mixed Genders	Decreased feelings of parental efficacy Feeling distracted from responsibilities Depression	None stated	Game play frequency IGD-9 Dichotomous PSCS PMP-SE PLC PSI-SF CES-10	School of Family Life at Brigham Young University
Tham et al. (2020)	Cross Sectional Self-Report	361 Students USA Adults Mixed Genders	Depression Anxiety	High in-game social support	6-item PSWS Multidimensional Scale of Perceived Social Support PROMIS Depression PROMIS Anxiety	No funding
van den Eijnden et al. (2018)	Longitudinal Self-Report School Reports	293 Students Netherlanders Teenagers Mixed Genders	Poorer life satisfaction Lower perceived social competence	Increased perceived social competence	Game play frequency IGD-9 Dichotomous 6-Social media use Social Media-9 Dichotomous S-PPA Satisfaction with Life GPA	No funding

Study	Study Design	Sample Character-istics	Negative Out-comes	Positive Outcomes	Measurement Tools	Funding
					Education Level	
Wang et al. (2019)	Cross Sectional Self-Report	578 Students Chinese Children & Teens Mixed Genders	Depression Social anxiety Loneliness	None stated	11-Item MGAM Brief Symptom Inven-tory Child Loneliness Child Social Anxiety	The Major Culti-vating Project Southwest Uni-versity
Wong and Lam (2016)	Qualitative Interview	13 Students Chinese Teenagers Males	Less time for other hobbies/duties Poor academic per-formance Fatigue Dry eyes Blurred vision Dizziness Muscular stiffness/ back pain Headaches Sleep disturbances Anxiety Depression Irritability Risked/lost friends. Risked/lost family relationships Financial strain	Fun/ Satisfaction Social support Teamworking skills Meeting new friends Improved memory Improved reasoning skills Increased In-telligence Increased Creativity Improved intellec-tual agility Responsiveness/ Quick thinking	Reasons for playing Young's IAC modified Perceptions of bene-fits and harms from gaming Academic perfor-mance Coping skills Parental support Rela-tionships	Not stated

Study	Study Design	Sample Characteristics	Negative Outcomes	Positive Outcomes	Measurement Tools	Funding
Yeh et al. (2017)	Matched Pairs Clinical Interview Self-Report	174 Gamers/Controls Chinese Adults Mixed Genders	Procrastination / Distracted	None stated	DSM-5 Diagnostic Chinese MINI Procrastination Scale CGI CES-D Depression Scale BIS-11	The National Science Council, the Kaohsiung Municipal Hsiao-Kang Hospital, and the University Hospital
Zahra et al. (2020)	Cross Sectional Self-Report	315 Students Pakistani Adults Mixed Genders	Emotional distress Poorer emotional intelligence Poor academic performance	None stated	IGD-9 Dichotomous DASS Grades	Not stated
Zhai et al. (2020)	Cross Sectional Self-Report	389 Gamers USA Teenagers Mixed Genders	Greater risk of weapon-carrying Feeling unsafe Experiencing weapon-related threats/injuries Serious physical fights Fight injuries	None stated	Health and functioning Weapon carrying Feelings of safety, threats, injury, fights, medical treatment Game play frequency Minnesota IDI adapted Impulsivity and Sensation Seeking Scale	National Institute of Health, the Connecticut Mental Health Center, State Department on Addiction and Council on Problem Gambling, and a Center of Excellence in Gambling Research Award

Appendix 8.

Creating A Taxonomy of Gaming Harms – Pilot Questionnaire

Please select from the list below all of the possible gaming outcomes that you have experienced at least once. At this stage we want to know about any item associated with gaming, regardless of how small or rare the impact.
Please select items that you believe are related to your involvement in gaming as an activity, or in the gaming community:

Mental Health		
I have felt frustrated or irritable	○	-
I have played games to "escape" from life stress and to relax	○	+
I have developed symptoms of depression or felt my symptoms worsen	○	-
I have developed symptoms of anxiety or felt my symptoms worsen	○	-
I felt entertained and had fun while gaming	○	+
I felt guilty about gaming	○	-
I noticed I have less depression symptoms	○	+
I noticed I have less anxiety symptoms	○	+
I have felt more angry /aggressive	○	-
I have felt less angry /aggressive	○	+
I have felt more able to handle big life changes	○	+
I have felt more confident /had higher self-esteem	○	+
I have felt paranoid or had paranoid thoughts	○	-
I have had fewer suicidal thoughts	○	+
I have thought about committing suicide more	○	-
I have planned how I would commit suicide	○	-
I have attempted suicide	○	-
I have felt less need to purge my food (vomit /use laxatives)	○	+
I have felt less need to use Diet Pills	○	+
I have found it hard to relax or felt stressed	○	-
I felt better overall (general sense of wellbeing)	○	+
I have found it hard to engage in tasks and am easily distracted	○	-
I have felt more able to manage feelings of loneliness	○	+
I have felt less confident/ had lower self-esteem	○	-
I have felt more satisfied with life	○	+
I have felt less satisfied with life	○	-

Physical Health		
I have had poor quality or disturbed sleep	○	-
I believe I drink less alcohol than most others	○	+
I have gone to bed later than I normally would	○	-
I have had insomnia where I couldn't sleep despite trying	○	-
I have experienced somatization (feeling emotions physically such as a racing pulse or sweating when stressed)	○	-
I believe I have a good immune system (I don't get ill often /fight off illnesses fast)	○	+
I am overweight	○	-
I have had pain/ discomfort in my joints, muscles, nerves, or bones	○	-
I have had dry eyes	○	-
I have had blurred vision	○	-

I have had headaches	○	-
I have had fatigue (tired after a full night of sleep)	○	-
I am not underweight	○	+
I have experienced dizziness	○	-
I have had severe back pains	○	-

Personal Safety / Wellbeing		
I have skipped meals	○	-
I have engaged in risky sexual behaviour	○	-
I have been sexually victimised	○	-
I have been hospitalised after a fight	○	-
I have been bullied	○	-
I have been involved in a toxic community	○	-
I have felt unsafe	○	-
I have been threatened with a weapon	○	-
I have been hurt with a weapon	○	-
I have been in a fight	○	-
I have carried a weapon	○	-
I have bullied others	○	-
I have sexually victimised others	○	-

Responsibilities		
I have lost time (realised that time passed without me noticing)	○	-
I have skipped school /work	○	-
I have done poorly at school	○	-
I have used social media to keep up with social contacts (including friends/ family) –	○	+
I have developed a more structured daily routine	○	+
I have rushed my housework /chores	○	-
I have neglected /not done my housework /chores	○	-
I have neglected my children /dependants	○	-
I have neglected my pets	○	-
I have felt less successful as a parent /carer	○	-
I have felt like my life has purpose	○	+
I have been distracted from my responsibilities and procrastinated (avoided them)--	○	-
I have been more able to focus	○	+

Relationships		
I have socialised virtually /online	○	+
I have experienced conflict with family or friends	○	-
My partner/family/friends have been angry with me	○	-
My partner/family/friends have said or shown that they don't trust me	○	-
I have used social media to socialise and make friends	○	+
I have avoided face-to-face socialising	○	-
I have felt less able /likely to seek out support when I needed it	○	-
I have made new friends	○	+
I have lied to someone about gaming	○	-
I am more social and have formed strong bonds	○	+
I have spent less time with my family	○	-

I have spent less time with my friends	○	-
I have felt more shy	○	-
I have developed Social Phobia or felt my symptoms worsen	○	-
I live away from my childhood home through choice	○	+
I feel less able to adapt to different social situations	○	-
I have felt less lonely	○	+
I have found a life partner	○	+
I have lost friends	○	-
I have felt a sense of belonging / part of a community	○	+
I have had a divorce or relationship breakdown	○	-
I believe my viewpoints have expanded	○	+
I have felt lonely or isolated	○	-
I have felt less able to communicate with others	○	-
I have taken part in positive social obligations such as meetups / parties	○	+
I have worse relationships with my teachers or colleagues	○	-
I have worse relationships with my family	○	-
I have worse relationships with my friends	○	-
I feel withdrawn from other people	○	-

Finances		
I have avoided searching for a job	○	-
I have lost a job	○	-
I am employed full-time	○	+
I have spent a large amount of money (more than I could really afford)	○	-
My income is above the minimum wage	○	+
I am unable to find work despite looking	○	-
My finances are strained, I struggle to buy necessities	○	-
I have spent shared money without consent	○	-
I have been absent from work and therefore had less pay	○	-
I have been unable to buy something that I needed	○	-
I have been unable to buy something I wanted	○	-

Skills / Abilities		
I find reading complex text difficult	○	-
I find reading complex text easy	○	+
My memory isn't very good	○	-
Gaming has improved my memory	○	+
I have found it easier to use a computer	○	+
I believe I need more time to think about information than most people	○	-
I have good spatial skills (e.g. finding your way around)	○	+
I am clumsy	○	-
I like to feel mentally challenged and games provide this	○	+
I find it hard to understand sequences like times tables	○	-
I have completed and graduated from school	○	+
I find it hard to solve puzzles	○	-
I am not very good at writing	○	-
Games have improved my abilities / skills generally	○	+
I attended higher education (College / University)	○	+

I have a degree or higher qualification---	◯	+
I can perform daily jobs such as cooking a meal and operating a washing machine----	◯	+
I work well in a team---	◯	+
I don't have good coping mechanisms for stress---	◯	-
I can think about problems and come up with solutions--------------------------------------	◯	+
I feel more creative--	◯	+
I feel more intelligent---	◯	+
I find it hard to empathise with others--	◯	-
I have better motor skills (agility / fast response times / hand-eye coordination) ------	◯	+

Culture		
I have been less involved in cultural rituals	◯	-
I have been more involved in cultural rituals	◯	+
I have felt shame related to expectations and cultural roles	◯	-
I have made less contribution to the community and cultural practices	◯	-
I have made more contribution to the community and cultural practices	◯	+
I have felt less connected to my culture and community	◯	-
I have felt more connected to my culture and community	◯	+
I have felt socially isolated from my culture and community	◯	-
I have felt a sense of cultural belonging	◯	+

Crime		
I have considered or took part in illegal activities---	◯	-
I have been less likely to take part in illegal activities-------------------------------------	◯	+
I have committed petty crimes (piracy, stealing from family etc) --------------------------	◯	-
I have felt less likely to commit petty crimes---	◯	+
I have been involved in a crime of duress to pay debts (prostitution, drug trafficking)	◯	-
I have been able to pay off debts without crimes I otherwise would have resorted to	◯	+
I have committed fraud--	◯	-
I have been arrested and/or convicted---	◯	-
I have a criminal record--	◯	-
I have felt shame due to my criminal activity--	◯	-

Other	
Other - Have you experienced any negative or positive consequences from your involvement in gaming that were not listed above?	

Appendix 9.

Taxonomy of Gaming Harms – Complete Questionnaire

Please select from the list below all of the possible gaming outcomes that you have experienced at least once. At this stage we want to know about any item associated with gaming, regardless of how small or rare the impact.
Please select items that you believe are related to your involvement in gaming as an activity, or in the gaming community:

Mental Health		
I have felt frustrated or irritable	◯	-
I have played games as a healthy "escape" from life stress and to relax	◯	+
I have played games to avoid life, rather than as a healthy "escape"	◯	-
I have developed symptoms of depression for the first time	◯	-
I have had increased symptoms of depression	◯	-
I have been very distressed or effected by the content of a game	◯	-
I have developed symptoms of anxiety for the first time	◯	-
I have had increased symptoms of anxiety	◯	-
I felt entertained and had fun while gaming	◯	+
I felt guilty about gaming	◯	-
I noticed I have less depression symptoms	◯	+
I noticed I have less anxiety symptoms	◯	+
I have felt more angry /aggressive	◯	-
I have felt less angry /aggressive	◯	+
I have felt more able to handle big life changes	◯	+
I have felt more confident /had higher self-esteem	◯	+
I have felt paranoid or had paranoid thoughts	◯	-
I have had fewer suicidal thoughts	◯	+
I have thought about committing suicide more	◯	-
I have planned how I would commit suicide	◯	-
I have attempted suicide	◯	-
I have felt a sense of pride or achievement	◯	+
I have felt less need to purge my food (vomit /use laxatives)	◯	+
I have felt less need to use Diet Pills	◯	+
I have found it hard to relax or felt stressed	◯	-
I felt better overall (general sense of wellbeing)	◯	+
I have found it hard to engage in tasks and am easily distracted	◯	-
I have felt more able to manage feelings of loneliness	◯	+
I have felt less confident/ had lower self-esteem	◯	-
I have felt more satisfied with life	◯	+
I have felt less satisfied with life	◯	-
Physical Health		
I have had poor quality or disturbed sleep	◯	-
I believe I drink less alcohol than most others	◯	+
I have gone to bed later than I normally would	◯	-
I have had insomnia where I couldn't sleep despite trying	◯	-
I have experienced somatization (feeling emotions physically such as a racing pulse or sweating when stressed)	◯	-

I believe I have a good immune system (I don't get ill often /fight off illnesses fast) –	◯	+
I am overweight	◯	-
I have had pain/ discomfort in my joints, muscles, nerves, or bones	◯	-
I have had dry eyes	◯	-
My eyesight has deteriorated (got worse)	◯	-
My heartrate has increased to a point where my breathing was affected	◯	-
I have had blurred vision	◯	-
I have had headaches	◯	-
I have had fatigue (tired after a full night of sleep)	◯	-
I am not underweight	◯	+
I have experienced dizziness	◯	-
I have had severe back pains	◯	-

Personal Safety / Wellbeing

I have skipped meals	◯	-
I have engaged in risky sexual behaviour	◯	-
I have been sexually victimised	◯	-
I have been hospitalised after a fight	◯	-
I have been bullied	◯	-
I have been involved in a toxic community	◯	-
I have felt unsafe	◯	-
I have been threatened with a weapon	◯	-
I have copied dangerous acts from a game in real life (E.g., dangerous driving)	◯	-
I have been hurt with a weapon	◯	-
I have been in a fight	◯	-
I have carried a weapon	◯	-
I have bullied others	◯	-
I have sexually victimised others	◯	-

Responsibilities

I have lost time (realised that time passed without me noticing)	◯	-
I have skipped school /work	◯	-
I have done poorly at school	◯	-
I have used social media to keep up with social contacts (including friends/ family) –	◯	+
I have developed a more structured daily routine	◯	+
I have rushed my housework /chores	◯	-
I have neglected /not done my housework /chores	◯	-
I have failed an exam or education course	◯	-
I have neglected my children /dependants	◯	-
I have neglected my pets	◯	-
I have felt less successful as a parent /carer	◯	-
I have felt like my life has purpose	◯	+
I have been distracted from my responsibilities and procrastinated (avoided them)	◯	-
I have been more able to focus	◯	+

Relationships

I have socialised virtually /online	◯	+
I have experienced conflict with family or friends	◯	-

My partner/family/friends have been angry with me	◯	-
My partner/family/friends have said or shown that they don't trust me	◯	-
I have experienced discrimination such as sexism or racism	◯	-
I have avoided face-to-face socialising	◯	-
I have felt less able /likely to seek out support when I needed it	◯	-
I have made new friends	◯	+
I have lied to someone about gaming	◯	-
I have upset/disrupted others due to my reactions when gaming (E.g., yelling)	◯	-
I am more social and have formed strong bonds	◯	+
I have spent more quality time with my partner/friend/family by gaming	◯	+
I have spent less time with my family	◯	-
I have spent less time with my friends	◯	-
I have felt more shy	◯	-
I have developed Social Phobia or felt my symptoms worsen	◯	-
I live away from my childhood home through choice	◯	+
I feel less able to adapt to different social situations	◯	-
I have felt less lonely	◯	+
I have found a life partner	◯	+
I have lost friends	◯	-
I have felt a sense of belonging / part of a community	◯	+
I have had a divorce or relationship breakdown	◯	-
I believe my viewpoints have expanded	◯	+
I have felt lonely or isolated	◯	-
I have felt less able to communicate with others	◯	-
I have taken part in positive social obligations such as meetups / parties	◯	+
I have worse relationships with my teachers or colleagues	◯	-
I have worse relationships with my family	◯	-
I have worse relationships with my friends	◯	-
I feel withdrawn from other people	◯	-

Finances		
I have avoided searching for a job	◯	-
I have lost a job	◯	-
I am employed full-time	◯	+
I have spent a large amount of money (more than I could really afford)	◯	-
My income is above the minimum wage	◯	+
I have made money from gaming	◯	+
Gaming has provided new career options for me (E.g., e-sports and streaming)	◯	+
I am unable to find work despite looking	◯	-
My finances are strained, I struggle to buy necessities	◯	-
I have spent shared money without consent	◯	-
I have been absent from work and therefore had less pay	◯	-
I have been unable to buy something that I needed	◯	-
I have been unable to buy something I wanted	◯	-

Skills / Abilities		
I find reading complex text difficult	◯	-
I find reading complex text easy	◯	+
My memory isn't very good	◯	-

Statement		
Gaming has improved my memory	◯	+
I have found it easier to use a computer	◯	+
I believe I need more time to think about information than most people	◯	-
My peripheral vision has improved	◯	+
I have good spatial skills (E.g., finding your way around)	◯	+
I am clumsy	◯	-
I like to feel mentally challenged and games provide this	◯	+
I find it hard to understand sequences like times tables	◯	-
I have completed and graduated from school	◯	+
I find it hard to solve puzzles	◯	-
I am not very good at writing	◯	-
Games have improved my abilities / skills generally	◯	+
I attended higher education (College / University)	◯	+
I have a degree or higher qualification	◯	+
I can perform daily jobs such as cooking a meal and operating a washing machine	◯	+
I work well in a team	◯	+
I don't have good coping mechanisms for stress	◯	-
I can think about problems and come up with solutions	◯	+
I feel more creative	◯	+
I feel more intelligent	◯	+
I find it hard to empathise with others	◯	-
I have better motor skills (agility / fast response times / hand-eye coordination)	◯	+
I have gained knowledge or learned a skill (E.g., new language or learning history)	◯	+

Culture		
I have been less involved in cultural rituals	◯	-
I have been more involved in cultural rituals	◯	+
I have felt shame related to expectations and cultural roles	◯	-
I have made less contribution to the community and cultural practices	◯	-
I have made more contribution to the community and cultural practices	◯	+
I have felt less connected to my culture and community	◯	-
I have felt more connected to my culture and community	◯	+
I have felt socially isolated from my culture and community	◯	-
I have felt a sense of cultural belonging	◯	+

Crime		
I have considered or took part in illegal activities	◯	-
I have been less likely to take part in illegal activities	◯	+
I have committed petty crimes (piracy, stealing from family etc)	◯	-
I have felt less likely to commit petty crimes	◯	+
I have been involved in crime of duress to pay debts (prostitution, drug trafficking)	◯	-
I have been able to pay off debts without crimes I would have resorted to	◯	+
I have committed fraud	◯	-
I have been arrested and/or convicted	◯	-
I have a criminal record	◯	-
I have felt shame due to my criminal activity	◯	-
I have copied criminal acts I saw in a game (E.g., driving over speed limits)	◯	-

Other	
Other - Have you experienced any negative or positive consequences from your involvement in gaming that were not listed above?	

Appendix 10.

Individual Item Analysis for Study Six

Listed Item	Average Hours Play Weekly	DSM-5	ICD-11
I have felt frustrated or irritable	.047	.243**	.245**
I have played games as a healthy "escape" from life stress and to relax	.339**	.225**	.112
I have played games to avoid life, rather than as a healthy "escape"	.185**	.357**	.470**
I have developed symptoms of depression for the first time	.070	.110	.179**
I have had increased symptoms of depression	.082	.382**	.351**
I have been very distressed or effected by the content of a game	.174*	.153*	.163*
I have developed symptoms of anxiety for the first time	-.013	.100	.119
I have had increased symptoms of anxiety	.114	.378**	.365**
I felt entertained and had fun while gaming	.147*	.120	.060
I felt guilty about gaming	.047	.316**	.355**
I noticed I have less depression symptoms	.085	.014	-.039
I noticed I have less anxiety symptoms	.169*	.100	.013
I have felt more angry /aggressive	.153*	.234**	.265**
I have felt less angry /aggressive	.135	.005	.055
I have felt more able to handle big life changes	.089	.102	.055
I have felt more confident /had higher self-esteem	.094	.078	.057
I have felt paranoid or had paranoid thoughts	-.028	.137*	.122
I have had fewer suicidal thoughts	.090	.134	.130
I have thought about committing suicide more	.081	.115	.191**
I have planned how I would commit suicide	.040	.078	.095
I have attempted suicide	.056	.054	-.004
I have felt a sense of pride or achievement	.122	.084	.048
I have felt less need to purge my food (vomit /use laxatives)	-.022	.047	.114

Listed Item	Average Hours Play Weekly	DSM-5	ICD-11
I have felt less need to use Diet Pills	-.106	.016	-.005
I have found it hard to relax or felt stressed	.109	.318**	.272**
I felt better overall (general sense of wellbeing)	.079	-.093	-.108
I have found it hard to engage in tasks and am easily distracted	.214**	.385**	.408**
I have felt more able to manage feelings of loneliness	.236**	.308**	.162*
I have felt less confident/ had lower self-esteem	.131	.287**	.295**
I have felt more satisfied with life	.137*	.394**	.377**
I have felt less satisfied with life	.128	-.025	-.006
I have had poor quality or disturbed sleep	.048	.226**	.152*
I believe I drink less alcohol than most others	-.016	.079	.029
I have gone to bed later than I normally would	.017	.306**	.202**
I have had insomnia where I couldn't sleep despite trying	.050	.228**	.232**
I have experienced somatization (feeling emotions physically such as a racing pulse or sweating)	.184**	.249**	.269**
I believe I have a good immune system (I don't get ill often /fight off illnesses fast)	.068	-.044	-.028
I am overweight	.104	.113	.073
I have had pain/ discomfort in my joints, muscles, nerves, or bones	.186**	.218**	.159*
I have had dry eyes	.127	.291**	.281**
My eyesight has deteriorated (got worse)	.070	.151*	.145*
My heart rate has increased to a point where my breathing was affected	-.024	.183**	.069
I have had blurred vision	.089	.183**	.179*
I have had headaches	.017	.263**	.238**
I have had fatigue (tired after a full night of sleep)	.151*	.259**	.282**
I am not underweight-	-.040	.089	.045
I have experienced dizziness	-.030	.155*	.128
I have had severe back pains	.047	.084	.023
I have skipped meals	.075	.299**	.256**

Listed Item	Average Hours Play Weekly	DSM-5	ICD-11
I have engaged in risky sexual behaviour	.093	.213**	.226**
I have been sexually victimised	.027	.094	.101
I have been hospitalised after a fight	.095	.029	.034
I have been bullied	-.038	-.061	-.018
I have been involved in a toxic community	.223**	.226**	.280**
I have felt unsafe	-.008	.089	.092
I have been threatened with a weapon	.040	.011	.008
I have copied dangerous acts from a game in real life (E.g., dangerous driving)	.067	-.048	-.003
I have been hurt with a weapon	.095	.005	-.004
I have been in a fight	.084	.089	.062
I have carried a weapon	.012	.055	-.003
I have bullied others	.053	.122	.192**
I have sexually victimised others	.c	.c	.c
I have lost time (realised that time passed without me noticing)	.125	.338**	.248**
I have skipped school /work	.019	.208**	.285**
I have done poorly at school	-.039	.120	.175*
I have used social media to keep up with social contacts (including friends/ family)	-.046	.094	.034
I have developed a more structured daily routine	-.001	-.068	-.067
I have rushed my housework /chores	.004	.321**	.303**
I have neglected /not done my housework /chores	-.006	.308**	.305**
I have failed an exam or education course	.008	.166*	.189**
I have neglected my children /dependants	.134	.171*	.261**
I have neglected my pets	.035	.147*	.218**
I have felt less successful as a parent /carer	.030	.086	.167*
I have felt like my life has purpose	.021	-.020	-.049
I have been distracted from my responsibilities and procrastinated (avoided them)	.145*	.316**	.315**

Listed Item	Average Hours Play Weekly	DSM-5	ICD-11
I have been more able to focus	.014	-.030	-.103
I have socialised virtually /online	.072	.182**	.147*
I have experienced conflict with family or friends	.089	.176*	.202**
My partner/family/friends have been angry with me	-.071	.152*	.163*
My partner/family/friends have said or shown that they don't trust me	-.028	.156*	.137*
I have experienced discrimination such as sexism or racism	.027	-.011	-.013
I have avoided face-to-face socialising	.168*	.287**	.238**
I have felt less able /likely to seek out support when I needed it	.099	.274**	.312**
I have made new friends	.106	.072	.075
I have lied to someone about gaming	.173*	.290**	.355**
I have upset/disrupted others due to my reactions when gaming (E.g., yelling)	.181**	.248**	.313**
I am more social and have formed strong bonds	-.008	-.037	-.103
I have spent more quality time with my partner/friend/family by gaming	.100	.081	.094
I have spent less time with my family	.170*	.227**	.362**
I have spent less time with my friends	.143*	.154*	.248**
I have felt more shy	.094	.244**	.205**
I have developed Social Phobia or felt my symptoms worsen	.054	.220**	.247**
I live away from my childhood home through choice	.087	.018	.031
I feel less able to adapt to different social situations	-.017	.234**	.208**
I have felt less lonely	.141*	.149*	.093
I have found a life partner	.015	.022	.034
I have lost friends	.066	.286**	.347**
I have felt a sense of belonging / part of a community	.128	.122	.080
I have had a divorce or relationship breakdown	.037	.113	.113
I believe my viewpoints have expanded	.021	.008	.014
I have felt lonely or isolated	.094	.227**	.240**

Listed Item	Average Hours Play Weekly	DSM-5	ICD-11
I have felt less able to communicate with others	.091	.235**	.282**
I have taken part in positive social obligations such as meetups / parties	.023	-.089	-.122
I have worse relationships with my teachers or colleagues	.094	.227**	.283**
I have worse relationships with my family	.136	.151*	.198**
I have worse relationships with my friends	.140*	.195**	.158*
I feel withdrawn from other people	.143*	.289**	.266**
I have avoided searching for a job	.073	.259**	.251**
I have lost a job	.134	.171*	.223**
I am employed full-time	-.158*	-.038	-.135
I have spent a large amount of money (more than I could really afford)	.202**	.294**	.246**
My income is above the minimum wage	-.269**	-.039	-.018
I have made money from gaming	.160*	.203**	.155*
Gaming has provided new career options for me (E.g., e-sports and streaming)	.093	.081	.007
I am unable to find work despite looking	.172*	.135	.127
My finances are strained, I struggle to buy necessities	.115	.154*	.176*
I have spent shared money without consent	.240**	.166*	.244**
I have been absent from work and therefore had less pay	.048	.118	.078
I have been unable to buy something that I needed	.192**	.265**	.321**
I have been unable to buy something I wanted	-.016	.126	.084
I find reading complex text difficult	-.012	.217**	.180**
I find reading complex text easy	.052	-.054	-.058
My memory isn't very good	.100	.145*	.098
Gaming has improved my memory	.168*	.229**	.157*
I have found it easier to use a computer	.029	.252**	.217**
I believe I need more time to think about information than most people	.213**	.127	.147*

Listed Item	Average Hours Play Weekly	DSM-5	ICD-11
My peripheral vision has improved	.128	.279**	.233**
I have good spatial skills (E.g., finding your way around)	.026	.016	.009
I am clumsy	.022	.094	.092
I like to feel mentally challenged and games provide this	.050	.053	.046
I find it hard to understand sequences like times tables	.008	.070	.139*
I have completed and graduated from school	.014	.099	.032
I find it hard to solve puzzles	-.049	.126	.051
I am not very good at writing	.126	.131	.136
Games have improved my abilities / skills generally	.189**	.193**	.225**
I attended higher education (College / University)	-.015	.105	.040
I have a degree or higher qualification	-.085	.033	.010
I can perform daily jobs such as cooking a meal and operating a washing machine	.113	.130	.084
I work well in a team	-.134	-.110	-.167*
I don't have good coping mechanisms for stress	.137	.245**	.266**
I can think about problems and come up with solutions	.063	-.021	-.075
I feel more creative	.010	.113	.128
I feel more intelligent	.148*	.116	.070
I find it hard to empathise with others	.152*	.110	.074
I have better motor skills (agility / fast response times / hand-eye coordination)	.059	.129	.078
I have gained knowledge or learned a skill (E.g., new language or learning history)	.062	.171*	.135
I have been less involved in cultural rituals	.054	.236**	.197**
I have been more involved in cultural rituals	.163*	.168*	.198**
I have felt shame related to expectations and cultural roles	.002	.194**	.107
I have made less contribution to the community and cultural practices	.052	.244**	.243**
I have made more contribution to the community and cultural practices	-.049	-.034	.008
I have felt less connected to my culture and community	.147*	.311**	.300**

Listed Item	Average Hours Play Weekly	DSM-5	ICD-11
I have felt more connected to my culture and community	.054	-.002	.053
I have felt socially isolated from my culture and community	.042	.244**	.340**
I have felt a sense of cultural belonging	-.061	-.081	-.091
I have considered or took part in illegal activities	.109	.168*	.172*
I have been less likely to take part in illegal activities	.086	.133	.095
I have committed petty crimes (piracy, stealing from family etc)	.012	.015	.006
I have felt less likely to commit petty crimes	.104	.113	.123
I have been involved in crime of duress to pay debts (prostitution, drug trafficking)	.017	.078	.110
I have been able to pay off debts without crimes I would have resorted to	.117	.188**	.116
I have committed fraud	.017	.005	.072
I have been arrested and/or convicted	.149*	.136	.119
I have a criminal record	.095	.078	.034
I have felt shame due to my criminal activity	.028	.093	.114
I have copied criminal acts I saw in a game (E.g., driving over speed limits)	-.011	-.024	.057

Notes: p < .05*; p< .005**; p<.001***