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Attached to technology? The roles of attachment, alexithymia & psychological flexibility within Internet Addiction

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LIST OF ABBREVIATIONS

AAQ-II - Acceptance and Action Questionnaire–II

AAQ-SA - Acceptance and Action Questionnaire, Substance Abuse version

ACT – Acceptance and Commitment Therapy

APA – American Psychological Association

BA – Behavioural Addiction

BEAQ – Brief Experiential Avoidance Questionnaire

BVAQ - Bermond–Vorst Alexithymia Questionnaire

CBD – Compulsive Buying Disorder

CIUS - Compulsive Internet Use Scale

DDF - Difficulty Describing Feelings

DIF – Difficulty Identifying Feelings

DPIU – Dimensions of Problematic Internet Use

DSM – Diagnostic and Statistical Manual

EA - Experiential Avoidance

ECR-S - Experiences of Close Relationships Short form

EOT – Externally Orientated Thinking

FOMO – Fear Of Missing Out

GAD-7 – Generalised Anxiety Disorder

GD – Gaming Disorder

IA – Internet Addiction

ICD – International Classification of Diseases

IGD – Internet Gaming Disorder

MBT – Mentalization-based Treatment

MEAQ - Multidimensional Experiential Avoidance Questionnaire

PAQ – Perth Alexithymia Questionnaire

PG – Problem Gambling

PHQ-9 – Patient Health Questionnaire

PTSD – Post-Traumatic Stress Disorder

SMH – Self-Medicating Hypothesis

SNS – Social Networking Sites

TAS-20 - 20 item Toronto Alexithymia Scale

VA – Videogame Addiction

WHO – World Health Organization

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DECLARATION

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Internet Addiction: Attached to Technology?

PREFACE

This portfolio reflects my development and growth on the often arduous, yet hugely rewarding path towards becoming a counselling psychologist. It does so in three parts; the research thesis, combined client study/process report and article. All three are connected through an interest in habits, behaviours and addictions.

During this period and through working at a range of clinical placements as a trainee, I found myself fascinated by compulsive and impulsive problematic habits picked up by many clients. I therefore quite inadvertently stumbled into an area of specialization, which I hope to expand upon and continue to learn about. This is where I first practically learnt about attachment theory in relation to addictive disorders, along with an integrative approach to treatments that further involved Psychodynamic, Cognitive Behavioural Therapy and Acceptance & Commitment Therapy. I found myself reflecting upon how such habits came into being, in my own experience of such habits (in a previous life I helped to develop online applications) and the role of avoidance. Working at a Gambling Disorder clinic (and as part of a pilot programme for other addictive behaviours) gave me a sense of how clients presented with such problems and provided endless motivation to find out more. This interest in damaging habits grew further during a placement in Psychodermatology, which involved meeting clients with compulsive skin-picking issues.

All of the clients I met and formed a therapeutic relationship with over the period of being a trainee left an imprint and I am truly thankful for that. Through our work together, I recognised how relationship dynamics were absolutely essential in order for any kind of change or transformation to occur. Grasping that a certain kind of change must also occur in myself as well as the client was an eye-opening moment and one that nudged me closer to more relational therapies. Training as a counselling psychologist has therefore introduced many challenges which I have found myself working through, with a key emphasis on experiential learning and a focus on my own willingness to engage with difficult or challenging private experiences. It feels like the process of learning and developing will be a continuous state and that the identity of being a counselling psychologist is a mere first step on a life-long path.

Part A: Research Thesis

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The research focuses on the exploration of Internet Addiction through attachment theory, alexithymia and psychological flexibility. The study was quantitative and reflected a post-positivist paradigm, investigating the phenomena through a set of online questionnaires. In most cases, novel and recently developed questionnaires were used to help capture appropriate data, including an Internet Addiction scale that featured an array of specific internet behaviours (e.g. Social Media, Entertainment & Video Streaming, Gambling, Shopping and Pornography). A new model of Alexithymia (*attention-appraisal*) was also investigated, along with a robust scale to measure psychological flexibility (experiential avoidance). Data from a total of 441 participants was statistically analysed and differences were examined between those in the Internet Addiction group versus those in the non-addiction group. This extended to analysis of specific dimensions of Internet Addiction. Mediation regression analysis was used to determine whether experiential avoidance mediated the relationship between attachment and Internet Addiction.

Results showed there were significant differences between the Internet Addiction and non-addiction group in terms of insecure attachment, alexithymia and experiential avoidance. Additionally, experiential avoidance was found to mediate anxious attachment but not avoidant or a combination of both. All dimensions of Internet Addiction had significantly higher levels of anxious and avoidant attachment, aside from Shopping, Entertainment & Video Streaming (which were primarily connected to anxious attachment) and two dimensions which were not connected to either (Messaging and Gaming).

This research was inspired by and built-upon both my clinical experience with addictive disorders and previous experience working within the technology sector. It helps to raise questions about how clinicians may approach working with Internet Addiction and what might be the most effective type of treatment.

Part B: Combined Client Study & Process Report

The combined client study & process report highlights the case of a client who presented with a skin-picking disorder, who suffered terribly from perfectionism, shame, low self-esteem and was fused to the question 'am I good enough?' This involved short-medium term treatment within an NHS setting and using an integrated approach to therapy with CBT at the core. The client battled with his lack of confidence, in part related to core beliefs about appearance and found himself

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hugely dependent upon others, only to anticipate them letting him down in some way further down the line. This extended to rules about self and other including "if I am not perfect, I am not deserving of love". Skin-picking therefore became a compulsive habit, out of awareness, which he used to reduce anxiety in response to the threat of rejection.

This is where my experience of ACT grew substantially and found that an experiential emphasis within therapy was well suited to this particular client who would avoid aversive and painful private experiences. Within this client study, I explore how the theme of being good enough would overlap into my own practice and my own approach. Indeed, this is where I discovered the theory relating to psychological flexibility and experiential avoidance, discovering the immense value of appropriate ways for clients to connect to their bodily sensations, feelings, intolerable emotions and begin a process of connecting to them.

Part C: Publishable Journal Article

The publishable journal article provides a summary of the main research thesis, with a key focus on the underlying mechanisms and the theoretical implications of the results. This is with the intention of publishing within the *Journal of Addictive Disorders* in order to contribute to the growing body of research on Internet Addiction and the shifting theoretical understanding of its conceptualization. It is hoped that the findings in this study might then assist others who find themselves working with clients suffering from addictive disorders, improving understanding of the differences between Internet Addiction as a general concept and as a set of quite unique individual addictive behaviours, each with their own distinct psychological mechanisms.

An overview is given for Internet Addiction and current/past research relating to specific dimensions. Attachment theory is then introduced and discussed in light of addictive disorders and of course, Internet Addiction. This is then followed by an overview of the other two core psychological constructs being explored; alexithymia and the *attention-appraisal* model, and experiential avoidance. An overview of the results section and main findings are then discussed along with future research propositions.

PART A: Doctoral Research

Attached to technology? The roles of psychological flexibility, alexithymia & attachment within Internet Addiction

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ABSTRACT

This research explored the roles of attachment, alexithymia and psychological flexibility within both Internet Addiction and individual dimensions such as Social Media, Entertainment, Gaming and Shopping. It aimed to test the hypothesis that higher levels of insecure attachment, alexithymia and experiential avoidance exist within those classified with Internet Addiction. Additionally, it aimed to explore the role of experiential avoidance as a possible mediating variable between attachment type and Internet Addiction.

A cross-sectional design was conducted in a general population sample of Internet users (n = 441). Results supported the hypotheses, with insecure attachment (medium effect size), alexithymia (small to medium effect size) and experiential avoidance (medium to large effect size) all scoring significantly higher in the Internet Addiction group over the non-addiction group. Additionally, online Entertainment/ Video Streaming and online Shopping addiction (both with small to medium effect size) were specific to significantly higher levels of anxious attachment. Gaming addiction had no significant differences in terms of attachment scores, however small to medium effect sizes were found in connection to alexithymia (difficulty identifying feelings and difficulty describing feelings). Messaging addiction was uniquely different from the other measured dimensions, in terms of not having significantly higher scores with any of the measurements. It did, however, show non-significant but small effect sizes for alexithymia (externally orientated thinking) and experiential avoidance.

Finally, results partially supported the hypothesis that experiential avoidance would mediate the relationship between attachment and Internet Addiction. It was found to mediate anxious attachment but not avoidant or overall attachment. This indicates that targeting experiential avoidance in therapy may only be effective for those with anxious attachment types. Further research should both focus upon replicating these results and on specific dimensions of Internet Addiction.

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1 CHAPTER 1: INTRODUCTION

1.1 Chapter Overview

Problematic Internet use was highlighted as a potential form of addiction by Dr. Kimberley Young in 1996 (Young, 1996). Young noted that excessive use of the Internet could have similar negative impacts to the more established addictions such as pathological gambling or substance abuse. At this point, no appropriate addiction classification was present in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) 4th ed and the idea was a rather contentious one (Griffiths, 1999). Not much has changed since then, aside from a wealth of new research, a sharp rise in Internet use and the DSM-5 creating a new category called 'Substance-Related and Addictive Disorders' in 2013.

This DSM-5 category is, however, notable in terms of the inclusion of gambling disorder and the recognition of phenomenological and biological similarities between substance addictions and behavioural addictions (Potenza, 2014). They noticed that aspects of substance addiction, such as urges/cravings, preoccupation, withdrawal and increased tolerance also occurred with gambling disorder. Much like substance abuse, emotion dysregulation contributes to the craving states and engaging in gambling behaviour can decrease anxiety and increase positive affect. While gambling disorder is the only current addictive disorder to exist in this DSM-5 category, they included specific diagnostic criteria in order to help future research. Indeed, they also proposed that further research was required for an apparent subtype or dimension of Internet Addiction; 'Internet Gaming Disorder' (Petry & O'Brien, 2013). However, Internet Gaming Disorder (IGD) is only one potential type of problematic Internet use and there are numerous other online behaviours (e.g. social media, pornography, shopping and video-streaming) that may well fit into the same category.

Thus, a clear need exists for us to advance our understanding of possible new Addictive Disorders and this includes Internet Addiction (IA). Investigating emerging dimensions, such as IGD and the processes that help develop and maintain them, may well lead to identifying future targets for treatment intervention. Key questions remain over whether IA is a general phenomenon (across online behaviours), or more useful as an umbrella term for a collection of specific and quite unique online behaviours such as shopping, social media or entertainment. This present study

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aims to help clarify this current situation by exploring key psychological features of both IA and individual online behaviours.

Theory and research into IA has historically taken a generalised approach, with a more recent trend emerging where studies have focused on specific online behaviours that also relate to the technologies that give access to them. This includes smartphone or smart TV use, social media, online shopping, gaming, porn and sex. The comparison with substance misuse, which began with problem gambling, has led to similar diagnostic criteria being used e.g. preoccupation, withdrawal, tolerance, lack of control and negative consequences impacting upon relationships and work (Griffith, 1995; Young, 1996). Of course, comparison between problematic Internet use and substance misuse may be surprising to some. However, the evidence for shared neurobiological features, such as anticipatory reward resulting in diminished ventral striatal activation, has been shown to exist in other behavioural addictions (e.g. problem gambling and binge-eating) and may well extend to specific Internet behaviours (Potenza, 2014).

This chapter will begin by providing a definition of IA, highlighting problems with classification, diagnosis and naming conventions. It will look at prevalence rates and discuss the effect of new digital technologies, examine research into different types of online behaviours and the historical comparison with substance addiction. It will then examine predictors for Internet Addiction and psychological treatment models, reviewing Attachment Theory, Alexithymia and Experiential Avoidance. The latter will be introduced as part of the Acceptance & Commitment (ACT) model, which will be evaluated in terms of providing a foundation for this research and as a potential treatment strategy for specific problem online behaviours. Lastly, the relationship between each of these constructs will be explored, drawing attention to gaps in the research literature and outlining the key aims and hypotheses.

1.2 Internet Addiction

The term 'addiction' originates from a Latin verb in Roman times, which referred to a court act of binding one person to another (Maddux, 2000). It eventually evolved to simply mean 'to attach' in the sense of an attachment or devotion to a thing or activity. This meaning later became a primarily negative term to reflect a loss of control over substance use and a dependence that persists even in the face of clear negative consequences (Rosenthal & Faris, 2018). Indeed, now the meaning has extended beyond substance use and into the domain of a range of problematic behaviours

referred to as behavioural addictions. These include, but are certainly not limited to, gambling, sex, shopping, exercise, eating and of course, the Internet (Grant, Potenza, Weinstein & Gorelick (2010).

According to the office for National Statistics, 90% of adults in the UK were recent Internet users during 2018, a small rise over 2017 (ONS report, 2018). This is even higher (99%) for a younger demographic of adults between the ages of 16-34. IA affects roughly 1.2% of the general UK adult population (Morrison & Gore, 2010) with a global prevalence estimated at 6% (Cheng & Li, 2014). This prevalence might be expected to rise alongside improving Internet access. Indeed, smartphone is the medium of choice for accessing the Internet in 2018, with 62% of users spending time online this way in the UK (Ofcom report, 2018). With users averaging around 3hrs of Internet use per day, the most frequently access sites are Google (Youtube, Search, Maps and Gmail), Facebook and BBC sites. There are also shifts in Internet use when it comes to demographics and socio-economic status e.g. older and lower income individuals are more likely to *not* use the Internet in 2018 (Ofcom report, 2018). Considering that smartphones were not often considered as the obvious choice for accessing the Internet back in 2011, a significant increase in IA prevalence might therefore be anticipated based on the rise of this new technology.

1.2.1   What's In a Name?

The term 'Internet Addiction' is now rather contentious in terms of just how useful it is. It first emerged alongside other competing titles e.g. technological addictions (Griffiths, 1996) and has gone on to take a plethora of names, including digital addiction (Ali, Jiang, Phalp, Muir & McAlaney, 2015), online addiction (Su, Fang, Miller & Wang, 2011), problematic Internet use and pathological Internet use (Shaw & Black, 2008). There remains very little difference between these varied terms, which reflects the lack of any concrete definition or clear diagnostic classification. There has been a historical split between those researchers looking at IA as an addictive disorder, much like substance abuse and those seeing it as an impulse control or obsessive-compulsive disorder (Shaw & Black, 2008). Since the update to the DSM-5 and the new category for gambling disorder, the momentum has notably shifted over into identifying IA in a similar light. While IA is still often used as a high level title and is researched as such, there remains a longstanding question over the differences between a generalised form of IA and specific online problem behaviours.

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It is often argued that addiction to the Internet, as a medium, does not exist (Griffiths, 2018; Starcevic & Aboujaoude, 2016; Yellowlees & Marks, 2007). Rather it has been suggested that the Internet instead plays a role in specific behaviours becoming problematic and causing distress. Therefore, the problem behaviours themselves may be very specific and uniquely different from each other. For example, previous diagnostic categories used for IA have often referred to excessive Internet use and this can be a difficult variable to quantify in terms of what might be problematic or not (Starcevic & Aboujaoude, 2016). A person may spend the entire day online gathering information for their work, or hours on their smartphone when commuting, yet this may not be deemed excessive or indeed problematic. Therefore, the specific type of online behaviour could be vital when it comes to a practical and actionable classification. Indeed, criteria relating to the negative consequences or impairment that a user suffers may be more significant. This may of course change depending upon the type of behaviour e.g. online gambling, gaming or watching Netflix excessively may each have quite different negative consequences.

In this present study, the name Internet Addiction will be used as a general, pragmatic term to describe the phenomena across a dimension of online behaviours, with exploration of the differences highlighted above between this high-level term and specific online behaviours. Additionally, it will use the diagnostic criteria offered by the DSM-5 for addictive disorders and as implemented into more recent measurement scales (Van Ameringen, Simpson, Patterson, Turna & Khalesi, 2018). In which case, terms such as problem or problematic behaviours, addiction or addictive behaviours will be used where appropriate and in relation to referenced research, however such terms are for all intents and purposes interchangeable.

The majority of studies connecting such disorders are usually cross-sectional, self-report surveys and therefore it is impossible to provide evidence for causation. It is not inconceivable to speculate that IA may well begin as a coping strategy, perhaps for depression or anxiety (Kardefelt-Winther, 2014). However, that strategy (as with substance addiction) eventually changes into a new problem with its own specific characteristics. Indeed, a study examining IA in South Korean adolescent males provided interesting evidence that this may well be the case, discovering that childhood depression/anxiety and withdrawal were significantly related to future IA (Cho, Sung, Shin, Lim & Shin, 2013).

Conceptually, IA continues to suffer from a crisis of identity. Regarded as a behavioural addiction, it straddles a grey area between impulsive behaviours (pleasure seeking) and compulsive, repetitive behaviours (reducing anxiety). Impulse control behavours usually describe actions that are initially pleasurable, but over time lead to negative consequences and impact upon relationships, causing impairment and a loss of control over ones' actions (Shaw & Black, 2008). In the realm of IA, impulse control behaviours might therefore be connected with activities such as gambling, sexual content/pornography, or dating apps. Where-else compulsive behaviours describe actions that are triggered by anxiety, avoiding harm and are repetitive in nature, thus closer to obsessive-compulsive spectrum disorders. In terms of IA behaviours or activities, this could include use of social media, messaging, entertainment or information seeking. However, many of these activities can, in reality, be used for either pleasure seeking or anxiety reduction and further exploration is therefore needed to help better define the psychological processes involved in such problem behaviours.

1.2.2   A Need for Appropriate Research

According to Web of Science, research into IA has grown substantially since it was first reported in 1996 when there were 3 publications referencing the title. Since then it has grown steadily, with 410 publications alone during 2017 and over 2,000 in total. While the majority of these studies occupy the sphere of psychiatry and psychology, the topic covers a diverse area of research areas including nursing, computer science, educational research and public environmental occupational health. Research has emerged from a variety of regions, including the USA (416 publications), China (400), South Korea (216) Turkey (202) and Germany (182), with the majority of publications being found within the journals Computers in Human Behavior (177) and the Journal of Behavioral Addictions (116).

This present study seeks to bring an appropriate aspect of clarity to research into IA, including the examination of specific IA dimensions and in doing so, exploring what role the Internet plays, as a medium, in such problematic online behaviours. As an example, videogame addicts (VAs) who might not have a history of gaming addiction may well be drawn to Internet gaming due to other mechanisms that relate to communication and social validation. Perhaps the medium of the Internet may promote a certain level of disinhibition that helps to negate interpersonal issues (Joinson, 2007). In which case, this would allow a person to explore behaviours (e.g.

gambling, pornography) they would not have otherwise had access to offline or indeed in-person. Additionally, the medium itself might be significant here as a delivery mechanism for the behaviour. In which case, increased accessibility to behaviour via smartphone may increase the risk of a person engaging in that behaviour, or indeed the negative consequences in doing so e.g. spending money more frequently via gambling or shopping online. In summary, the medium or platform for the behaviour and the specific behaviour itself all arguably play a role in activating the criteria for addiction.

Building upon this uncertainty relating to naming conventions, the DSM-5 fails to clarify things by suggesting that IGD may also apply to non-Internet games (APA, 2013). Again, this begs the question of why gaming does not simply have its own category as an addictive behaviour with IGD as a dimension or subtype. Ideally such distinctions and clarifications will be made in the future versions of the DSM. It is worth noting that the World Health Organization has done this, deciding to classify IGD as a subtype of Gaming Disorder (GD) within the 11th draft revision of the International Classification of Diseases (ICD11).

1.2.3   *Problems with Diagnosis and Prevalence Rates*

There is no agreed, unified measurement for IA and therefore prevalence rates often differ quite radically across regions. The most common test to date is the Internet Addiction Test (IAT) which was developed by Young back in 1998. It is a cross-sectional survey scale, comprised of 20 items and based on criteria used for pathological gambling and substance dependence (Young, 1998), including neglect of relationships and activities, loss of control and negative consequences. However, it has received criticism relating to the cultural context of analysis and whether sociocultural factors may affect IA assessment (Chen & Nath, 2016; Kuss, Griffiths, Karila & Billieux, 2014; Moon et al., 2018).

Numerous alternative scales also exist, with many seeking to preserve the core diagnostic criteria (evolved from that used with substance addiction and problem gambling) whilst aiming to reflect the changing nature of how we access the Internet. This includes the scale being used in this present study (Dimensions of Problematic Internet Use or DPIU; Van Ameringen et al., 2018), along with others not being used such as the Compulsive Internet Use Scale (CIUS; Meerkerk, Eijnden, Vermulst & Garretsen, 2009) and Chen Internet Addiction Scale (CIAS; Chen, Weng, Su, Wu &

Yang, 2003). No agreement has been found on which survey is considered the most robust, with some reports that the IAT provides lower prevalence rates in comparison to others such as the popular CIAS, or indeed the newer DPIU (Van Ameringen et al., 2018; Kuss et al., 2014). This may well be due to the general approach taken by the IAT and the lack of reference to specific online behaviours.

There are, of course, limitations that must be taken into consideration when using DSM diagnostic criteria, particularly from a counselling psychology perspective. The reductionist nature can provide a pragmatic function in terms of psychological intervention, while risking the negative consequences of stigma and a loss of unique individual experience. Questions have also been raised over attempts to transfer such diagnostic criteria over onto problem behaviours. Key constructs such as preoccupation or tolerance may not have the same negative consequences in comparison to addictive substances and there exists the risk of overpathologizing everyday behaviours (Kuss, Griffiths & Pontes, 2017).

> **Commented [RP9]:** Added to bring in-line with added points in the discussion (as per feedback point 29).

IA prevalence is frequently collected in the form of cross-sectional surveys, with adolescents, young adults and students often the most targeted sample population (Lopez-Fernandez, 2015). Data has been collected across North America, Europe and Asia and in most cases, used the IAT or variations of the same scale. Issues have been flagged relating to cultural differences and translations of IA measurement scales (Lei, Li, Chiu & Lu, 2018). In a recent meta-analysis looking at social support and IA among mainland Chinese teenagers and young adults (Lei, Li, Chiu & Lu, 2018), differences were found between data collected with a translated version of the IAT when compared to measurement scales which were natively developed e.g. the CIAS. They cited inadequate cultural adaptability as a possible reason for finding these differences and recommended using scales that accounted for this possible bias when considering future research.

> **Commented [RP10]:** Added reference as per point 7.

1.2.4   Regional, Cultural and Socio-economic differences

IA prevalence rates differ across regions and a meta-analysis in 2014 by Cheng and Li found an overall global prevalence rate of 6%. This study was based on 80 reports (1996-2012) and focused entirely on data collected with Young's IAT. Interestingly, it found that the highest prevalence rate was in the Middle East (10.9%) with North American in second place (8.0%) and the lowest was in Northern and Western Europe (2.6%). They did not find any connection between Internet penetration rates

(e.g. accessibility) and prevalence of IA. Therefore, while it may appear counter-intuitive, easier access to the Internet was not deemed to be a significant factor in explaining such differences.

Cheng and Li (2014) also proposed that socio-economic factors were key in explaining different prevalence rates. IA prevalence was found to be higher for those nations with greater life dissatisfaction, lower GDP per capita and lower perceived quality of life. Specifically, quality of life included a perception of less life satisfaction in general, including environmental and economic factors such as greater traffic commute time and lower national income. It should be noted that this meta-analysis did rely on data collected with Young's IAT and thus, it is susceptible to the cultural bias errors highlighted in the previous section (Lei et al., 2018).

A more recent study in Taiwan (Chern & Huang, 2018) also focused on IA and quality of life factors. Focusing on a sample of college students and much like the study by Cheng and Li (2014), they discovered a higher prevalence of IA with those experiencing a lower quality of life. In this study, the World Health Organisation (WHO) Quality of Life survey was used along with the CIAS and they found that as many as one in three college students had IA. Quality of Life surveys do differ rather radically, with the WHO version examining 4 domains (physical, psychological, social and environmental). Each of these domains was reported as significantly lower with IA. Specific IA problem factors such as compulsivity, interpersonal & health problems and time management problems were associated with lower physical health. Chern and Huang suggested that compulsivity might provide impaired control over Internet use, which could then lead onto the other IA problems via an unhealthy lifestyle based on poor diet and sleep deprivation. Additionally, those students who reported a lower social quality of life also reported interpersonal and health problems owing to Internet use. However, both the Cheng and Li (2014) and Chern and Huang (2018) studies highlight the importance of environmental, socio-economic factors and how they interweave with personality to affect the risk of IA. Indeed, the large difference in prevalence rates, while covering very different population samples, draws attention to such differences as detected by the IAT when compared to the CIAS.

It is not surprising that IA is linked, globally, to interpersonal problems and it is easy to suggest that problematic Internet use may isolate and alienate users or indeed, initially be a solution to interpersonal or social issues that already existed. A link between economic status and IA was also made based on the connection between

increased compulsivity and lower psychological and environmental quality of life (Chern & Huang, 2018). Students with greater expenditure on the Internet may therefore experience that impact in terms of where that money may otherwise be spent on improving their environment. This again lends weight to the argument that some specific criteria for addiction may well have more importance than others.

In contrast to Chern and Huiang's findings (2018), Lei et al. (2018) identified interesting variations in IA and levels of social support across regions within their meta-analysis of IA in mainland China. They found that region moderated the relation between social support and IA, with the highest negative correlation found in Eastern China, while it was smaller in both Central China and Western China. Curiously, they speculated that this might be connected to regional differences in the number of siblings (the sample was teenagers and young adults) and economic differences, with Eastern China being the richest region and with the most developed Internet infrastructure and lower number of siblings. In which case, the argument here is that there is more social support in less developed regions (Central and Western China), less accessibility to the Internet and a greater dependence on developing interpersonal relationships (Lei et al., 2018). It is interesting to note just how this study differs to the findings in the meta-analysis by Cheng and Li (2014), which suggested Internet accessibility, was not connected to IA. There could be many explanations for this, although it was partially explained by the lower prevalence rates detected by the translated IAT and the focus on a Chinese population (Lei et al., 2018). Indeed, it might also be explained by a combination of trends in Internet use, along with cultural factors where social support is still emphasised alongside the introduction of new Internet technologies.

In the case of such studies that have emerged from China (Cheng & Li, 2014; Chern & Huiang, 2018; Lei et al., 2018), it may be pertinent to also point out the challenges relating to Internet use in this region. Due to government censorship, the Internet in China is rather different to the one accessed in the West, with popular sites such as Facebook or Twitter not accessible but with equivalent services often available such as RenRen or Weibo (King, Pan & Roberts, 2013). Therefore while online activities appear rather similar, they may be quite different in application and design from those popular in the West. Additionally, other constraints might also influence how online activities are carried out, including posting censorship and keyword blocking, which stops users from posting certain words or phrases (King et al., 2013).

Commented [RP11]: Added paragraph to comment on caveat of using data from Chinese studies (see point 8 in feedback).

1.2.5   New Technologies

While growing Internet accessibility may or may not lead to heightened risk of IA depending upon a wealth of social-economic and psychological factors, accessing the Internet has become a daily habit for many and specific trends in use may well help explain the phenomena. Growing access to the Internet has gone hand in hand with speed and ease of access via mobile technologies. According to an Ofcom consumer report last year, smartphone take-up in the UK had increased from 27% in 2011 to 78% in 2018. Indeed, the use of tablets for Internet access rose from 2% in 2011 to 58% in 2018. According to the same report, consideration that the smartphone was the most important device for Internet access rose from 15% in 2013 to 48% in 2018. While desktop access to the Internet is still favoured, it is quite conceivable to see smartphone internet access continue to increase, particularly as newer generations become comfortable with the technology in contrast to current older demographics who have not. Indeed, access to the Internet continues to expand and has moved beyond smartphones into wearable devices, such as smart watches and health/fitness bands (Piwek, Ellis, Andrews & Joinson, 2016).

Commented [RP12]: Referencing wearable tech as new way of accessing the Internet as per point 9.

The rise of new technology has provided easier access to the Internet and with it, access to a greater range of activities and potential problem behaviours. Such new online behaviours or specific activities may well help to explain the prior conflicting evidence on Internet accessibility and IA (Cheng & Li, 2014; Lei et al., 2018). When not using the Internet for work or study, people might be using it to watch their favourite television shows, track fitness activities or calories eaten, swipe right for online dates, post updates on social media, message their friends or play videogames. The variety of behaviours connected to using the Internet has grown exponentially over the last few decades and have become increasingly sophisticated (Ofcom, 2018).

It is within this context that problematic Internet use appears to be inevitably on the rise and it is becoming an increasingly popular, if contentious, field of research. Fear of Missing Out (FOMO) has been connected to heightened anxiety for individuals when they are separated from their phones (Schmidt, Muench, Schneider, Breitenbach & Carolus, 2018). The term nomophobia has also been coined to describe the fear of separation that some individuals experience at the prospect of losing close proximity to their smartphone (King et al., 2014). In both of the aforementioned studies, the fear has primarily been based around an inability to

communicate, or be communicated with. Such elevated anxiety may then be alleviated upon the point of picking up the phone and checking it, which then may lead into the use of a variety of other applications or behaviours, which may of course be compulsive or impulsive depending upon the individual's personality, relational style and situation.

Commented [RP13]: Added to give extra clarity as per feedback point 10.

1.2.6 Subtypes and Dimensions: Specific Online Behaviours

Young (1999) proposed that IA should be considered a broad term and suggested five subtypes or dimensions; cybersexual addiction (pornography), cyber-relational addiction (online relationships), net compulsions (including gambling or shopping), information overload (excessive web-surfing for information) and lastly, computer addiction (including gaming). These have, of course, evolved alongside changing Internet technology and now include social media, entertainment and video streaming. Each contains specific characteristics and perhaps, unique etiology, while also employing similar systems in order to encourage increased use (Eyal, 2014; Fogg et al., 2009). Exploring such similarities and differences, may well allow us to find more practical clinical formulations that could lead to increasingly appropriate treatments.

In a review by Starcevic and Billieux (2017), they concluded that the umbrella term of IA is not sufficient when considering the differences between various addictive online activities. Specific online behaviours might instead be better described as dimensions of IA. Online activities involving sex, gaming or shopping have been found to reflect a spectrum of IA related disorders (Starcevic et al., 2017) where as many differences exist as similarities. In which case, what makes an online activity addictive?

There are numerous theories relating to what makes a behaviour addictive, often originating from research into substance abuse and derived from a wide variety of theoretical perspectives. As previously discussed, proposed diagnostic criteria (Young, 1996) for problematic internet use has closely matched that used for drug or gambling disorders, including; tolerance, cravings, preoccupation, withdrawal, negative consequences, loss of control and impact upon relationships (APA, 2013). Tolerance refers to increasingly higher amounts of the substance or specific behaviour over time in order to result in a similar effect e.g. chasing larger 'wins' in gambling, pursuit of more 'likes' in social media, completing a harder level on game,

or perhaps constant swiping for a prospective date on Tinder. Cravings and withdrawal refer to negative effects (restlessness/irritability) when trying to cutback or reduce engagement with the behaviour, preoccupation signals frequent thoughts about the behaviour (either past or future) and negative consequences refer to clear issues relating to the behaviour e.g. health, financial losses, loss of job. Finally, loss of control and impact upon relationships refer to an inability to control the behaviour, even in the face of adverse or negative consequences, including the breakdown in relationships (family or partners). With the DSM-5 gambling disorder classification, an individual must display four or more of the nine criteria (a combination of the above) within a 12 month period (APA, 2013).

A neurobiological perspective may well view problematic behaviour as occurring due to the activation of dopamine related reward-pleasure pathways in the brain via appropriate stimuli (Berke & Hyman, 2000; Hong et al., 2013; Liu & Luo, 2015; Weinstein & Lejoyeux, 2015). Indeed, such cognitive and behavioural models have been used in the development of online applications with so-called persuasive design or captology (Eyal, 2014; Fogg et al., 2009). Such approaches employ a combination of conditioning techniques and cognitive bias (triggers, actions, variable rewards) in an attempt to maximise habit formation with users (Eyal, 2014). The more successful techniques have been replicated across online behaviour subtypes, such as the use of variable reward mechanisms and unpredictable outcomes in videogames (Johansson & Götestam, 2004). This has led to debates on the ethics of using such techniques, such as loot boxes in games, with the young or vulnerable populations (Drummond & Sauer, 2018). Yet while it is clear that robust psychological mechanisms are being used in the design of online activities, it is not always clear what makes a population sample more vulnerable than another in relation to specific behaviours and for this, it is necessary to explore other perspectives.

Another perspective, such as attachment theory (Bowlby, 1970), seeks to identify pre-existing conditions, such as relational patterns, that may develop during early childhood or adolescence and later lead to an increased vulnerability for addiction. Such factors influence how we respond to the world around us, in terms of how we attach to people or things, our appraisal of self/other and the ways in which we both experience and regulate our emotions. It seems clear that there are a complex set of variables at hand here and an intersection between how we relate to others, attachment styles and behaviour. An addiction curve might be imagined that varies based on our attachment style or type, where at one end a specific activity may not

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Commented [RP14]: More specific reference to attachment/relational constructs are referenced in place of personality in order to reduce risk of any confusion between personality theory and attachment theory. As per point 10 in the feedback.

Commented [RP15]: Added also to help clarify that this study is focusing on a persons attachment system rather than classic personality theory – although there is a compelling argument for attachment to be a personality construct (that's for another paper!).

be habit-forming for quite some time, while at the other it might be habitualised extremely quickly. This present study will focus on that exploration of relational style through attachment theory, alexithymia and psychological flexibility, in order to determine how these might alter levels of risk in relation to both IA and specific online behaviours.

In regard to studies that have focused on specific problematic online behaviours, Andreassen et al. (2016) looked at a problematic videogame and social media use along with a range of psychiatric disorders in a large sample (23,533) of adults. They found a small correlation between both problematic online behaviours, along with gender differences in terms of males being significantly associated with addictive use of videogames and females being associated with addictive use of social media. Different motivations were proposed for both types of problem online behaviours, such as social affiliation in relation to social networking/media and escapism, personal achievement and immersion in relation to online videogaming. It is quite possible that overlap occurs here as online activities change, such as the possibility of an increased emphasis on communication within certain types of newer online games. They additionally found significant associations between the problematic online behaviours and ADHD, OCD, depression and anxiety. While the variance was small, they also found evidence that those with problematic use of social networking/media were more likely to suffer from anxiety rather than depression. The reverse was found for problematic online gaming, which was associated with higher levels of depression and lower levels of anxiety (Andreassen et al., 2016). They suggested that those with high levels of anxiety, particularly social anxiety, may therefore have increased difficulties communicating face-to-face and therefore prefer the medium of social networking/media over in-person communication. This is something that will be explored in this present study through looking at associations between attachment type and specific problematic online behaviours. Indeed, it will also explore the association between depression, anxiety and IA.

Andreassen et al. (2017) also found gender differences in a more recent study looking at addictive social media use, which again had a very large sample (23,500 participants). They found that problematic use was associated with being young, single and female. Additionally, they found associations between problematic use and low self-esteem along with higher levels of narcissism. However, the effect size was small in relation to relationship status and age appeared to be a more meaningful indicator of social media addiction. Low self-esteem had a medium effect

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Commented [RP16]: Again removed reference to personality and instead added focus on the wider attachment system as per feedback point 10.

size and therefore had one of the strongest associations with social media addiction, leading the researchers to wonder if such individuals aimed to increase their self-esteem online or escape negative affect. It is entirely plausible that going online and using social media might help a person connect to their digital support network, finding reassurance or help. However, it is also possible that lack of support via social media (such as not enough 'likes' or 'comments' on a Facebook or Twitter post) may trigger low self-esteem. As this particular study was cross-sectional, it is impossible to establish the direction or causation and thus, a longitudinal study design might provide further insight. Demographic data will be gathered and examined as part of this present study in order to explore the role of gender and relationship status on specific online behaviours.

In a comprehensive meta-analysis of problematic Facebook use, researchers also found a strong association between problematic social media use and general IA (Marino, Gini, Vieno & Spada, 2018). This adds weight to the view that general IA might reflect addictive behaviours relating primarily to social media; an activity that has no direct offline equivalent, unlike other problematic online behaviours such as gambling or pornography (Davis, 2001; Montag et al., 2015). They concluded that the core reasons for problematic Facebook use include both affect and emotion regulation. Such online behaviours therefore helped to regulate one's affection in order to reduce negative mood, increase positive affect and can therefore be described as a maladaptive coping strategy (Marino et al., 2018; Moretta & Buodo, 2018).

In a unique study looking across a wide range of contemporary problematic Internet types (including entertainment/video streaming, gambling, gaming, messaging, dating apps, social media, sexual content, shopping and information seeking), Van Ameringen et al. (2018) explored a wide range of psychopathology in connection with IA in a sample of 254 university students based in the USA. They found that prevalence rates using the IAT for general IA were 12.5%, while rates when using the Dimensions of Problematic Internet Use (a scale designed to measure a range of specific subtypes or dimensions, which is used in this present study) were much higher at 42%. The most problematic IA dimension was the use of video streaming services (such as Netflix or Amazon) with 55.8%, followed by social networking/media with 47.9% (such as Facebook or Twitter) and instant messaging tools with 28.5% (such as WhatsApp or Skype). They found that those who screened as positive for both IA and the DPIU were associated with a wide range of

psychopathology, including depression, anxiety, greater executive functioning impairments, attentional issues and increased ADHD symptoms (Van Ameringen et al., 2018).

Interestingly, all of those diagnosed with IA via the IAT were also found to have IA via the DPIU with the exception of the dimension pertaining to the use of instant messaging tools. While this is suggestive of a distinction between the factors being measured, it is unclear why this difference might exist aside from the possible perception that such messaging tools might not traditionally be deemed problematic. The differences in prevalence rates are notable here, particularly when considering the concept that IA as a general construct and as measured by a scale created in the late 1990's (Young, 1998), might not be well suited to capturing the modern ways in which IA is both accessed and used. Indeed, the significance of psychopathology in this study also mirrors what has been found in previous studies, where problematic online behaviours may well arise as a maladaptive or compensatory coping strategy (Andreassen et al., 2016; Kardefelt-Winther, 2014; Jain, Tripathi, Ganesh & Sheth, 2018 ; Marino, Gini, Vieno & Spada, 2018).

While a range of IA dimensions were explored using the DPIU, their study did not appear to report any clusters of types nor any preponderance or greater risk for other types of problematic online behaviours based on those found (Van Ameringen et al., 2018). Indeed, it might prove of practical clinical value to establish profiles for IA based on specific dimensions and in connection to those pre-existing factors that may increase the risk of problematic online behaviours. In which case, one of the key aims of this present study is to explore specific problematic behaviours (along with general IA) and how they differ in relation to attachment type, alexithymia and psychological flexibility. In short, what might make us more likely to form a detrimental attachment to the Internet and what factors might help protect or mitigate such an attachment?

1.3 Attachment Theory

1.3.1 Background

John Bowlby first introduced the term attachment theory in 1969, where it helped to explain how early bonds were formed between an infant and primary caregiver (Bowlby, 1969). Attachment theory has a clear focus on interpersonal and relational

factors, particularly the need for early bonding between mother and child in order to ensure survival. As a theory, attachment has since developed beyond the focus on early infant-parent bonds and has been used as a way of explaining how we later function in adult relationships, emotional distress, depression, anxiety and other forms of psychopathology including addiction (De Rick, Vanheule & Verhaeghe, 2009; Fletcher, Nutton & Brend, 2015; Fonagy, 2018).

At the root of Bowlby's theory, was an infant's need for close proximity to the attachment figure in order to have a secure-base (Ainsworth, 1970). Additionally, this figure would need to be perceived as accessible and responsive when needed, particularly during moments of distress or anxiety (Bowlby, 1973). Should this figure not be responsive or available at a time of need, a secure-base would likely not develop and psychopathology in later life may occur.

At the time, this caused something of a stir within the psychoanalytic community and signaled a bold movement away from popular theories by both Freud and Klein relating to drives and fantasy (Brandell & Ringel, 2007). For Bowlby, the primary and most important human need was an affectionate connection with others.

Numerous researchers have taken Bowlby's ideas and built upon them, embracing varied theoretical orientations while developing past a prior focus on biological needs and maintaining the interpersonal emphasis. Mary Ainsworth was one such researcher who helped update early attachment formulations. She did this by discovering that physical proximity was not the primary factor in her 'strange situation' experiments, rather it was the infant's emotional bond with the mother that was all important (Ainsworth, Blehar, Waters & Wall,1978). More recently, attachment theory has broadened and built upon Bowlby's own theory of mental representations to include concepts relating to affect regulation and development of self (Fonagy et al., 2002). It has retained the pragmatism that underlined Bowlby's early work, however it has grown to encompass the idea of internal development and therefore moved beyond the limitations of any one theoretical stance.

1.3.2   *Ainsworth's Strange Situation*

Mary Ainsworth was central to the development of laboratory-based studies that explored infant attachment to their primary caregiver. The most famous of which, the 'Strange Situation' (1970), helped to build upon Bowlby's earlier concepts by

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exploring how infants reacted to various, novel scenarios within an unfamiliar setting. These included maternal contact, separation and reunion within a specifically designed environment, one that included the occasional presence of a stranger. These strange situations therefore teased out a range of reactions from infants as they experienced increased levels of anxiety/stress, exploring the relationship with their primary caregiver. Her experiments provided a firm, empirical foundation to attachment theory and led to the development of specific attachment styles.

Ainsworth found that the emotional responsiveness of the caregiver (in this case, the mother) was of primary importance and it was this relational quality that would define how an infant would respond within the Strange Situation experiment. She also drew attention to attachment behaviours in infants, behaviours that had specific functions e.g. those aimed to initiate increased proximity or contact such as approaching, following along and smiling/crying (Ainsworth, 1970). The maintenance of a sense of felt security (Bartholomew, 1980) was therefore vital in providing a secure base that helped regulate any sense of anxiety or distress, allowing infants to engage in other behaviours such as exploration or play. Importantly, Ainsworth suggested that attachment should be viewed as an organization of behavioural systems with internal features that exist beyond specific situational conditions. In that sense, this was an acknowledgement that the behavioural theoretical orientation that was popular prior to Bowlby's work, particularly learning theory, was not sufficient in explaining what was occurring in her experiments.

As a result of the data collected in these experiments, three attachment patterns were identified (Ainsworth et al., 1978); secure, insecure (avoidant) and insecure (resistant). These styles have been added to and refined over the years to include a fourth disorganized attachment style (Main & Solomon, 1986) along with more varied terminology including fearful avoidant and dismissive avoidant (Bartholomew, 1990).

1.3.3   Attachment Types

Ainsworth found that the infants that were categorized as being securely attached exhibited the following behaviours within the Strange Situation; they welcomed the return of their caregiver after they had left the room and if at any point they had shown distress when left alone with a stranger, they would seek a closer proximity to their caregiver and are easily comforted by them. The infant would therefore be quickly reassured and would return to exploring or playing. In that sense, the infant

would therefore use their mother as, in Ainsworth's terms, a 'secure base', giving them an increased autonomy. With secure attachment, Ainsworth found that the emotional responsiveness on the part of the caregiver was attuned and in harmony with the infant, fostering a sense of collaboration and co-operation.

Infants that were classified as insecurely attached fell into a two further subtypes: insecure-resistant (anxious/ambivalent) and insecure-avoidant. Insecure-resistant infants demonstrated ambivalent behaviours towards their caregiver and an inability to be comforted by them. Ainsworth found that in the Strange Situation, the infants would often be preoccupied with the caregiver, showing distress upon being separated and that distress continuing upon their return. In this context, the infant behaviour appeared to be one of anger and resistance, perhaps as a form of protest and anxiety due to the period of separation. Ambivalence therefore related to the observed behaviours of infants who would wish to be picked up by the caregiver, but would then show resistance upon being picked up. Ainsworth suggested that such behaviours might be a result of an ambivalent or inconsistent form of parenting on the part of the caregiver, a lack of responsiveness or emotional inconsistency that did not reliably attend to the needs of the infant.

Insecure-avoidant infants were shown to demonstrate less overt distress during separation with the caregiver than those in the other groups. However, they would notably avoid any reunion with the returning caregiver, including looking away, ignoring close proximity and any interaction or communication with them. Ainsworth found that avoidant children would be indifferent to their caregiver, instead focusing on toys and seemingly content to play with the stranger in the room. Ainsworth speculated that such behaviours by the infant could be a primitive form of defense, a part of a phase of detachment (as termed originally by Bowlby). This would normally follow a prior stage of protest and despair on the part of the infant after a prolonged separation. She interpreted this behaviour as being associated with a disrupted emotional responsiveness on the part of the caregiver, specifically relating to rejection and anger at the infant's demands along with a lack of soothing behaviour e.g. physical contact such as holding or cuddling. Additionally, such caregivers would also often demonstrate behaviours deemed to be intrusive or controlling. Ainsworth's findings would later help Bowlby to create a model of internal representation of self that would build upon his interpersonal approach, bringing in ideas from his previous training in object relations.

1.3.4   Internal Representation of Self

Bowlby developed a theory based on attachment styles that aimed to explain the enduring nature of attachment relationships; he termed it the 'internal working model' (Bowlby, 1973).

This theory examined how infants internalized their experiences with their primary caregivers. Such internalized experiences help form a working attachment model that the infant then uses to predict how their caregiver will respond in the future and in turn, their own responses. This internal schema therefore creates an overall attachment system that Bowlby believed led to the formation of defenses and, as Ainsworth highlighted, endures beyond situational triggers. These defenses, for the most part, remain constant within future close relationships (Bowlby, 1973). In that sense, securely attached children would have a more flexible attachment system, based on their internal representation of self, that would permit a greater range of responses within new situations.

Vitally, the internal working model does not exist in a vacuum; it is co-developed between the infant and the caregiver. The interpersonal style of the infant is created over time as a process, it is dependent upon how the caregiver responds and internalized accordingly. Therefore it is possible to argue that there is an inter-subjective interplay (Benjamin, 1988; Stern, 1985) between the caregiver and the infant, where the former's responses (whether attuned, intrusive, accepting or rejecting) help to form the latter's internal representation of self. While this internal working model is seen as one that becomes stable over time and an inherent part of the developing self, it can be prone to change later on due to negative life events that may befall the caregiver and therefore impact upon their parental style.

Bowlby was not the only theorist with an interest in attachment that developed a theory relating to internal representations. Fonagy and Target (1997) published a paper on attachment and reflection that traced the relationship between attachment processes and the ability to mentalize e.g. the process within which we understand how our mind mediates our experience of the world, such as reflective function (Fonagy, 2018). They argued that the ability to mentalize is inherent in the development of self-organisation, particularly through the caregiver's ability to effectively communicate understanding and reflect the child's inner experiences. The caregiver therefore helps shape the formation of an internalized representation of self

within the infant, both mirroring and modeling reflective states that enable reflective states such as empathy. Fonagy and Target further developed this connection between attachment and the development of self to include affect regulation. This is particularly salient in terms of the concept of addiction and in particular, the type of addictive behaviours that manifest with Internet use during times of distress.

1.3.5   Adult Attachment and Avoidance

A multitude of studies have pointed towards attachment styles, for the most part, enduring from early childhood into adulthood (Waters, Merrick, Treboux, Crowell & Albersheim, 2000). In a well-designed longitudinal study by Waters et al., they found that 72% of adults were classified with the same attachment style 20 years after receiving their first style as children. However, they also found, as Bowlby previously stated, that attachment styles can be subject to change and these changes were found to be a result of negative life events experienced by the mother of those children (such as the loss of a parent, parental divorce, life threatening illness of a parent or child and sexual abuse by a family member). Equally, it is important to note that insecure attachment styles can become secure throughout adulthood (Iwaniec & Sneddon, 2001). It is not entirely clear what the change mechanisms might be, however one might speculate that an evolving or adapting internal working model may occur due to new experiences and the development of secure interpersonal relationships.

Kim Bartholomew took the work of Bowlby, Ainsworth and Hazan and Shaver and expanded it to include a 4-group model (see Figure 1 below) for adult attachment (Bartholomew, 1990). This included a focus on attachment avoidance based upon a fear of intimacy, splitting it into two subtypes as a way of explaining what was felt to be too simplistic in Bowlby's initial model. According to Bartholomew, Bowlby's attachment theory may have been apt to describe a child's attachment system, however adults are arguably more complex and involve key differences e.g. a subjective awareness of one's own attachment needs and fear of intimacy (Bartholomew, 1990). Using modified terminology, she looked at adult attachment as a dimension in relation to positive and negative models of self and other; with no one person anticipated to cleanly occupy a single attachment style. In which case, it becomes possible to bring out finer details about an individual e.g. they may have a positive view of self but a negative view of others, thus resulting in a closer match to the dismissing avoidant attachment type then the other styles. Or indeed, they might

have a neutral view of others and a negative view of self, in which case they might be positioned in between the preoccupied and fearful attachment type.

MODEL OF SELF
(Dependence)

	Positive (Low)	**Negative** (High)
Positive (Low)	**SECURE** Comfortable with intimacy and autonomy	**PREOCCUPIED** Preoccupied (Main) Ambivalent (Hazan) Overly dependent
Negative (High)	**DISMISSING** Denial of Attachment Dismissing (Main) Counter-dependent	**FEARFUL** Fear of Attachment Avoidant (Hazan) Socially avoidant

MODEL OF OTHER
(Avoidance)

Figure 1: Bartholomew's styles of adult attachment model (1990).

Bartholomew introduced two attachment avoidance subtypes; 'fearful' and 'dismissing'. Unlike Bowlby's definition of attachment avoidance, only one of the subtypes (dismissing) includes a focus on deactivation of the attachment system. Fearful avoidant is a type fundamentally built upon an individual's negative model of self and other. This negative model, much like Bowlby's findings, is primarily developed via the early interplay between the maternal caregiver and the child, with the child developing the view that others are unavailable and uncaring, while developing a negative view of self as unlovable. It is not dissimilar to ambivalent (or preoccupied) attachment in terms of a strong emphasis on dependence. However, it differs quite radically in terms of behaviour approaches to relationships (Bartholomew, 1990). For instance, fearful avoidant attachment is characterised by a desire for social contact and intimacy but it is accompanied by a fear of rejection and interpersonal distrust that prevents any kind of reaching out behaviour. This can therefore lead to avoidant strategies, such as addictive behaviours, which mitigates this fear of rejection and suppress the suffering triggered by a hypersensitivity to social approval. This pattern of frustrated attachment therefore plays out in a way where individuals are likely to avoid close relationships and social situations. Indeed, Bartholomew argued that the possibility of modifying early attachment representations might therefore be missed as a result of this kind of avoidance.

She also introduced the dismissing avoidant attachment type, which shares the same difficulty with intimacy as the fearful variety, but seeks to deactivate the attachment system and has a kind of autonomy and sense of self-worth not present in the other type. This negative mode would arguably develop based mainly on the early unavailability of the maternal caregiver. In terms of the model of self and other that develops in the child, this unavailability might then result in a view of the other as uncaring and unavailable, while model of self is maintained as positive via creating distance from the attachment figure. In this sense, the attachment system is brought offline and the individual employs a model of self where they see themselves as entirely self-reliant, without a need for others or close relationships. Bartholomew likened this to the avoidant stance observed within the Strange Situation and to Main's dismissing attachment group. In which case, common displacement behaviours might then occur, such as a focus on impersonal activities (such as work or hobbies), preoccupation with achievement (Bartholomew, 1990) or indeed the prospect of particular types of online activities.

Bartholomew's model (see Figure 1) shows how the two dimensions can be defined in terms of a relational response style (Bartholomew, 1990). The horizontal axis shows the dependent response levels in terms of high (low self-esteem requires external validation by others) or low (levels of self-esteem mean that external validation is not required as much). Additionally, the vertical axis shows levels of avoidance and degree of contact with others. She argued that while both fearful and dismissing avoidant attachment groups are similar in terms of dependency and avoidance of close contact with others, they differed in terms of how they valued the acceptance of others. She therefore introduced am emphasis on adult avoidance of intimacy and a key distinction between avoidant attachment types that had not existed in prior research, one based on an individual's differing perception of both self and other.

This allows us to formulate addiction and addictive behaviours in terms of defensive strategies for insecure attachment, particularly the avoidant fearful and dismissing types or styles. Indeed, Bartholomew also conceptualised attachment styles in terms of methods of emotional regulation. However, there can be a cost here in terms of negative affect, where depression and anxiety either increase or are maintained due to the emotional regulation strategies employed during attachment related distress. In that sense, the lack of intimacy and absence of close relationships can also result in additional psychopathology (Bartholomew, 1990).

1.3.6   Attachment and Substance Addiction

A wealth of evidence exists which connect addiction with attachment styles and in particular, insecure attachment (Fonagy, 1996; Piehler, Véronneau & Dishion, 2012). Addictive behaviours and substance abuse have often been formulated as having their origins in early development and interpersonal relationships. This section will first review some of the key theories linking attachment theory and addiction, before applying them to addictive behaviours and Internet Addiction.

The Self-Medicating Hypothesis (SMH) put forward by Khantzian and Duncan in the 1970's, was one of the first to examine addiction alongside ideas relating to self-regulation and attachment. It took a two-tiered approach in terms of vulnerability to addiction, looking at an inability to tolerate painful emotions alongside exposure to the drugs themselves. This inability to tolerate painful emotions is developed as part of an individual's internal working model, resulting in a behavioural strategy that attempts to alleviate or resolve the pain. In contrast to earlier Psychoanalytical thought (Rado, 1933) relating to addiction as a pursuit of pleasure, Khantzian highlighted a pursuit of comfort and contact (Khantzian, 1978). This pursuit of comfort and contact was an attempt at managing negative affect e.g. depression, anxiety, shame and aggression (Khantzian, 1978). Khantzian further defined this approach as a form of self-regulation where addicts self-medicate in order to relieve their specific type of psychological suffering. In terms of attachment, they are therefore less likely to seek close interpersonal relationships due to an inability to tolerate painful emotions that might accompany them, instead opting to form an attachment with their addiction of choice as a delayed maladaptive attachment transition (Hofler & Kooyman, 1997). This means that a person who has an insecure attachment style may opt to choose an addiction as a substitute or indeed alternative to a close relationship, one that might provide a required level of proximity, accessibility and availability.

The idea that addiction can be an alternative or substitute form of attachment to close relationships, was further developed by Flores who termed it to be an 'Attachment Disorder' (2004). Not dissimilar to Khantzian's self-medicating hypothesis, Flores argued that those who had issues with intimacy might pursue addictive behaviours as a means of alleviating distress and seeking comfort. Thus, the emphasis here is on the relationship with the object of addiction, one that can

manifest a kind of secure attachment as a surrogate for an authentic interpersonal relationship. However, this can act as an obstruction, both to the development of an effective means of regulating emotions and to an individual attaining a close relationship with others. Within this theoretical framework, addiction can therefore be seen as an initial solution to the problem of an impaired attachment system that occurs within an early developmental phase and later manifests in adolescence.

De Rick, Vanheule and Verhaeghe (2009) expanded upon attachment theory as a way of exploring addiction through what they termed as an attachment system. This system was organised by both an individual's style of relating to others and their internal representational capacities (Fonagy et al., 2002). They did this by measuring adult attachment style and degree of alexithymia within an adult clinical sample of alcoholic inpatients. For the most part, alexithymia equates to the ability (or not) to identify and describe feelings or emotions. In which case it is arguably an important extension of the internal working model, providing a framework for exploring an individuals ability to recognise or tolerate difficult feelings. They used latent class analysis to determine three subgroups, with the majority (52%) finding themselves in a group featuring an impaired attachment system consisting of problems with affect regulation and incapacity to develop secure interpersonal relationships. The remaining inpatients were split between two other groups, with only a small amount (13.2%) within the group that was considered to have a well-established attachment system featuring the capacity for affect regulation and an ability to form secure interpersonal relationships. This present study will utilise this definition of attachment system and apply it in order to explore how it operates with Internet Addiction.

This study provided evidence for both attachment styles and alexithymia (the proposed attachment system) as playing a key role in addiction, particularly in terms of issues with affect regulation and self-development. De Rick et al. (2009) surmised that the inpatients in their study lacked a capacity to form mental representation of self and others. They also found no correspondence between the attachment system and the severity or indeed duration of the problematic drinking behaviour. For them, this provided evidence that a disruption to the attachment system existed prior to the addiction or problem behaviour. In that sense, such impaired attachment systems can arguably be seen as a development issue. Interestingly, they also found that the degree of impairment in their attachment and representational systems corresponded with their psychiatric symptoms. This points towards the attachment system as a possible set of transdiagnostic processes which could help steer us towards more

appropriate treatments, including the enhancement of mentalization (Bateman & Fonagy, 2004). In which case, the enhancement of mentalization (such as developing reflective function) might assist in drawing attention and awareness to the degree of alexithymia. This in turn offers the hope of increasing a capacity for emotional recognition and ability to describe such feelings, particularly those that have previously been intolerable thus contributed to vulnerability for addictive behaviours. Mentalization-based therapy (MBT) is one such type of treatment created to address these processes and offers a potential pathway relating to those who may have impaired attachment systems (Bateman & Fonagy, 2004). Mentalizing can be seen as a way of establishing epistemic trust between the therapist and client in a way that helps to reduce a client's rigidity, allowing a relearning of flexibility (Fonagy & Allison, 2014). However, very little research currently exists with regard to MBT and addictions, with one study showing improvements within a sample of mothers in addiction treatment (Suchman et al., 2017). Although indirectly linked to addiction, this randomised clinical trial demonstrated improvements in caregiving by those with a history of drug taking. This included a higher capacity for reflective functioning and representational coherence at post-treatment and at 3-months, along with mothers showing greater sensitivity (Suchman et al., 2017).

1.3.7   Attachment and Addictive Behaviours

Attachment styles have also been researched in relation to non-substance related problematic or addictive behaviours such as gambling, shopping (Di Trani, Renzi, Vari, Zavattini & Solano, 2017; Norris, Lambert, DeWall & Fincham, 2012) and entertainment in terms of film and television shows (Silver & Slater, 2019). Initially termed an impulse control disorder under the behavioural addiction umbrella, Gambling Disorder (GD) was the first behaviour recognized by the DSM-V (APA, 2013) to be classified as an Addictive Disorder and it therefore research into this area has helped shape the direction for studies looking at IA.

As with substance abuse, gambling disorder appears to be characterised by problems with emotion regulation (Di Trani et al., 2017). This is suggestive that IA may well occupy a similar sphere, where the behaviour acts as an external regulator for internal emotional states that are otherwise difficult to tolerate. This is likely when considering similarities have been found between IA and PG in previous studies, particularly in relation to shared psychopathological symptoms such as anxiety and depression (Dowling & Brown, 2010; Yen et al., 2008). However, while evidence

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suggests that both also share impulsive coping strategies and socio-emotional impairments, differences do exist in terms of more pronounced use of dissociative mechanisms and emotional/behavioural disengagement in IA (Canan et al., 2012; Tonioni et al., 2014).

Another study examined attachment and emotion regulation across both SUDs and a range of behavioural addictions within a sample of Spanish adolescents (Estevez, Jauregui, Sanchez-Marcos, Lopez-Gonzalez & Griffiths, 2017). Much like the findings by Di Trani et al. (2017), they found that emotion regulation was predictive of all addictive behaviours assessed in their study. In contrast, attachment predicted the non-SUD based addictive behaviours, including problem gambling, videogame addiction and IA. They also found gender differences with males scoring significantly higher in videogame addiction and gambling disorder. The Estevez et al. (2017) and Tonioni et al. (2014) studies therefore both indicate that, as might be expected, similarities and differences do exist between the various types of addictive behaviours in terms of attachment, emotion regulation and the ensuing behavioural strategy.

1.3.8   Attachment and Internet Addiction

A number of studies have looked at the connection between attachment and IA, with insecure attachment particularly linked with problematic Internet use (Blackwell, Leaman, Tramposch, Osborne & Liss, 2017; Bolat, Yavuz, Eliaçık & Zorlu, 2017; Eichenberg, Schott, Decker & Sindelar, 2017; Nitzberg & Farber, 2013; Lin, Ko & Wu, 2011; Schimmenti, Passanisi, Gervasi, Manzella & Famà, 2014; Şenormancı, Ö., Şenormancı, G., Güçlü & Konkan, 2014).

Ambivalent insecure attachment was highlighted as particularly problematic within the Eichenberg et al. (2017) study, with IA connected to relationship motives such as social compensation, escapism, emotional support and anonymity. Interestingly, no evidence was found for attachment styles in relation to the specific type of Internet activity or web services used. However, they did discover that those categorized with IA were more prone towards the use of web-based communication (particularly chat and forums) over normal Internet users. They suggested that this was as a result of impaired interpersonal relationships, where individuals more inclined to suffer with IA have a developmental deficit relating to their attachment style and therefore used the Internet to compensate for the social & communicative aspects of this deficit.

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However, while these findings are certainly compelling they should be considered under the caveat that the sample used in the study was rather small and would need to be replicated with a larger number of participants per specific Internet activity or dimension.

Studies have also looked at specific dimensions of IA, such as social media and attachment type (Blackwell et al., 2017). In contrast to the findings in the Eichenberg et al. (2017) study, they discovered that avoidant and anxious attachment (insecure) types predicted social media addiction. However, attachment types were no longer significant when taking into account a fear of missing out (FOMO). It is conceivable that the threat of social exclusion (an aspect of FOMO) plays a role in triggering attachment behaviours, indeed they speculated that avoidant attachment might only be related to social media addiction when individuals also show high levels of anxious attachment.

In another study looking at Facebook use and attachment types (Nitzburg & Farber, 2013) they identified anxious attachment as predicting feelings of intimacy when using social media. It was suggested that this intimacy might reflect an online need for comfort via connecting to others through the use of social networks. This seems particularly pertinent when considering core attachment features of proximity, responsiveness and availability during moments of distress or perceived threat (Ainsworth, 1970; Bowlby, 1973). Indeed, Nitzburg et al. (2013) also found that disorganized and anxious-ambivalent attachment predicted the use of social networking sites for avoiding face-to-face communication with others but still wishing to build relationships at a distance and in a way where they felt more comfortable. Interestingly, they found no connection between avoidant insecure attachment and problematic Facebook use. This might suggest that avoidant types are more likely to use the Internet for other types of behaviours, rather than building or maintaining relationships or that they may be using Facebook in a less interactive and more passive way.

It does appear rather intuitive to interpret the use of social media and Internet messaging through the lens of attachment theory, particularly when considering the immediate availability of such activities via an always-online mobile Internet device. With such portable Internet access increasingly widespread, it might be reasonable to presume that individuals with insecure attachment might use their device as a transference object of a kind (Winnicott, 1969). In which case, that object brings a

sense of proximity and potential responsiveness or availability to an attachment figure through a range of messaging or social media applications. Indeed, it has even been speculated that the device itself becomes the attachment figure, one that is ever available and entirely under the control of the individual (Hertlein & Twist, 2018; Konok, Gigler, Bereczky & Miklósi, 2016). It is perhaps therefore not entirely surprising that phenomenon such as nomophobia have arisen to describe the separation anxiety experienced by a person when they lose proximity with their smartphone device (King et al., 2014;Tams, Legoux & Leger, 2018). In which case, this scenario of loss might be, in some way, akin to the Strange Situation experiment where the caregiver leaves the room and the child is left on their own (Ainsworth, 1970). Indeed, in a recent study individual adults were left on their own in somewhat of a strange situation, those without access to their phones reported significantly higher levels of anxiety to those who were allowed access to them (Schmidt et al., 2018).

In another study looking at attachment style in relation to mobile phone use, researchers found that higher attachment anxiety predicted a need for constant contact with others through their phone (Konok et al., 2016). However, in their sample of 142 young Hungarian adults, they found proximity to their device to be equally important independent of attachment type, which suggests that the activities or behaviours (apps) provided by the device are of primary importance. As such, they found a small but significant association between those who were anxiously attached and the use of chatting or social media while they used their device less for calls or text messages (SMS-s). This fits with findings in other studies which point towards a desire to remain connected and to gain a sense of closeness, without the risk of more complex social exchanges which might be challenging or anxiety-provoking (Eichenberg et al., 2017; Nitzburg et al., 2013). In the same study, they found gender differences in terms of females being more inclined to use their smartphone for social purposes, while males tended to spread activities across information seeking, business purposes or playing games (Konok et al., 2016).

This present study aims to identify connections between attachment types and IA beyond the use of social media or messaging. Therefore it will be interesting to discover whether similar findings to previous studies are achieved, such as avoidant insecure types being less prone to encounter IA within social media or social networking sites (SNS) and instead favouring other online behaviours (Nitzburg et al., 2013). In which case, anxious attachment type may therefore be more firmly

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connected to social media and perhaps, messaging, where individuals are able to fulfill their need to stay connected (Konok et al., 2016), conjure up a feeling of intimacy and security without the otherwise potentially troubling aspects of face-to-face communication.

Indeed, it will also be curious to find out how such differences might be further explained through more detailed examination of the wider attachment system e.g. ability to identify and describe difficult emotions (alexithymia) and through behavioural strategies (experiential avoidance). Alexithymia in this sense confounds present attachment issues by reducing the ability to reflect upon, process or manage emotional states (either positive or negative). This could be proposed as a theory for why attachment is seen as particularly enduring over time, as individuals with high levels of alexithymia may have difficulty communicating problems with others and thus, not seek help or develop the ability to process or manage their difficult emotional states in less damaging ways (Taylor, 2000).

1.4 Alexithymia

In order to further explore the relationship between attachment type and Internet Addiction, this present study will look to examine the degree of alexithymia and its role in both appraising and regulating emotion.

1.4.1 Background

Alexithymia is a term that first originated in the early 1970's via the work of Peter Sifneos and John Nemiah (Nemiah & Sifneos, 1970; Sifneos, 1973; Sifneos, Freyberger & Nemiah, 1976) and refers to a personality trait where an individual suffers from a deficiency in emotional functioning, a bereft fantasy life and inability to describe their emotions with language. The concept evolved, much like attachment theory, from psychoanalytic thought related to the idea that deficits in the development of an emotion based symbolic representational system (Ruesch, 1948) are at the core of psychosomatic disorders.

Sifneos first examined this trait among psychosomatic patients in 1970, discovering that the majority of the (admittedly) small sample had such characteristics and concluded that such patients are likely to benefit less from psychotherapy as a result (Nemiah & Sifneos, 1970). Sifneos and Nemiah pointed to these characteristics as

being part of an inherent deficit in the way emotions are symbolized, leading to a variety of psychopathologies such as a higher tendency towards impulsive behaviour, impaired self-regulation and problems with social relationships (Nemiah & Sifneos, 1970).

Indeed, research since has led to more robust empirical evidence connecting alexithymia with depression (Hendryx, Haviland & Shaw, 1991), anxiety (Marchesi, Brusamonti & Maggini, 2000), eating disorders (Westwood, Kerr-Gaffney, Stahl & Tchanturia, 2017), substance abuse (Hamidi, Rostami, Farhoodi & Abdolmanafi, 2010) and addictive behaviours such as problem gambling (Bonnaire et al., 2017; Lumley & Roby, 1995; Toneatto, Lecce & Bagby, 2009) and internet addiction (Scimeca et al., 2014; Mahapatra & Sharma, 2018). Alexithymia might therefore be rather compelling termed as a collection of transdiagnostic processes that run through a range of psychopathologies, giving us pause for thought when it comes to clinical treatment possibilities and how it might apply to IA.

1.4.2   Emotion Regulation and Cognitive Processing

It seems intuitive that those who have difficulty recognising or articulating their own feelings may also have problems regulating their emotions. Indeed, alexithymia has been explained as a set of deficits within an individuals cognitive and emotion processing system (Taylor, Bagby & Parker, 1999). This inability to reflect upon, process and manage emotional states also results in a difficulty within communicating such problematic emotional states to others. This therefore avoids both the potential for help or support and the opportunity to develop the identification and management of such problem emotions (Taylor, 2000). Various forms of psychopathology, such as addiction, have therefore been hypothesized as arising as a way for alexithymic individuals to try and regulate their emotions through both impulsive and compulsive behaviours (Taylor, Bagby & Parker, 1991).

It has been argued that, as a personality trait, aspects of alexithymia develop during childhood and through a disruption in the creation of early cognitive schemas (Lane & Schwartz, 1987). This model of cognitive-emotional development, called levels of emotional awareness (Lane & Schwartz, 1992) identify alexithymia as being an impairment relating to development of language and the ability to verbalise awareness of emotional affect. Such cognitive schemas relate to the emergence of increasingly complex and varied emotions. However, it has been argued that this

includes both the verbal and non-verbal, thus extending the definition of alexithymia beyond a focus on language and into one which includes the creation of internal symbols representing different somatic states (Bucci, 1997). Alexithymia can therefore be described as a deficit in this phase of development not limited to the inability to put feelings into words, where individuals may experience physiological arousal or bodily sensations when a strong emotion is triggered, yet they do not have sufficiently manifested cognitive or symbolic states in order to efficiently regulate them.

This inability to internally symbolise challenging emotional states, reminiscent of Bowlby's internal working model, appears to extend to the ability to read and interpret the emotional states of others. A handful of studies have demonstrated that individuals with high levels of alexithymia determine the emotional facial expressions of others with less accuracy than those with lower levels of alexithymia (Parker, Taylor & Bagby, 1993). Such studies therefore provide compelling evidence that, as with the difficulty in perceiving emotional states, this also relates to a wider deficit in emotional processing which encompasses the non-verbal as well as the verbal (Lane, Lee, Reidel, Weldon, Kaszniak & Schwartz, 1996).

1.4.3   Attention-appraisal model of Alexithymia

As a recent advancement in theory and expanding upon the cognitive processing and emotion regulation model of alexithymia, Preece et al., (2017) have developed the *attention-appraisal model*. This model was built upon the extended process model of emotion regulation (Gross, 2015) and aimed to integrate it with Lane and Schwartz's (1992) levels of emotional awareness model.

The attention-appraisal alexithymia model is comprised of the three key factors; difficulty identifying feelings (DIF), difficulty describing feelings (DDF) and externally-orientated thinking (EOT), with each existing within what is called a valuation systems framework (Preece et al., 2017). Such a framework contains a four-stage *situation-attention-appraisal-response* sequence (Gross, 2015), within which an individual evaluates or values the meaning of a specific stimulus.

An individual with high levels of alexithymia might therefore encounter an issue with a particular stage in that four-stage process e.g. DIF and DDF would impact upon the *appraisal* stage, while EOT may create problems with the *attention* stage (Preece,

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Becerra, Robinson, Dandy & Allan, 2018). Such an individual would therefore struggle with directing their focus towards an emotion response that may be prompted by a particular situation, which in turn would result in difficulty making any sense of it. Again, this has been identified as a deficit in their cognitive and emotional development (Lane & Schwartz, 1992), where an individual with high levels of alexithymia may well have trouble identifying more detailed or complex emotions.

Indeed, this model does account for why individuals with alexithymia are more likely to respond with greater intensity to negative affect over positive. In which case, they might use an emotion regulation strategy to up-regulate their positive feelings in order to experience them more, whilst down-regulating their negative feelings (Gross, 2014). Arguably, individuals with more efficient and better-developed emotion regulation may therefore experience a greater balance or equality of intensity between both positive and negative feelings. According to Preece et al. (2017), this model of alexithymia therefore does not define itself as an absence of affect, rather it is better described as a problem inherent within the indistinct structure of that affect. However, it should be noted that Preece et al. (2017) highlight a difference in how EOT is viewed within this model in comparison to past definitions, which is that EOT is a result of a difficulty in affect-awareness rather than simply referring to a preoccupation with external objects or events.

Preece et al. (2017) also use this model to separate alexithymia into what they call *ability deficit* alexithymia and *avoidance* alexithymia. Both refer to problems with the attention and appraisal phase, however ability deficit arguably exists as a trait while avoidance can be considered contextual and a defense that gets triggered by distress within specific situations. This distinction was developed to address prior uncertainty in studies, where alexithymia has been found to be both a trait and a state (de Haan et al., 2012; de Haan et al., 2014; Marchesi, Ossola, Tonna & De Panfilis, 2014; Taylor et al., 1999; Taylor, 2000). Within this model, ability deficit individuals therefore have underdeveloped emotion schemas where they cannot pay attention to emotions, nor appraise them. Avoidant individuals do have the capacity to pay attention to more complex emotions and appraise them, however they avoid doing so during moments of distress. It has been suggested that it may be possible for those who habitually avoid such emotions or feelings may develop maladaptive schemas as a result, in which case avoidance may eventually then become ability deficit alexithymia. In which case, they argue that it is therefore possible for an individual to have both types of alexithymia (Preece et al., 2018).

1.4.4 Alexithymia and Addiction

Alexithymia has been widely connected with an array of addictions, including substance based (Cruise & Becerra, 2017; El Rasheed, 2001; Ghalehban & Besharat. 2011; Thorberg, Young, Sullivan & Lyvers, 2009), behavioural and Internet Addiction (Lumley & Roby, 1995; Toneatto, Lecce & Bagby, 2009). However, it remains unclear just how alexithymia influences the development or maintenance of such addictions. It has been identified as a risk factor and evidence exists which suggests high levels predate the emergence of the addiction (De Rick et al., 2009; Stasiewicz et al., 2012). If indeed this is the case, then it might point towards such addictive disorders as a way of compensating for deficits in emotion regulation, helping to alleviate specific negative affects relating to alexithymia. This section will review key themes in relation to alexithymia and addiction.

There has been much debate with regard to the nature of alexithymia being trait or state-based with regard to addiction (de Haan et al., 2012; de Haan et al., 2014). Older studies have pointed towards alexithymia being regarded as a trait (Taylor et al., 1999). Some studies have suggested it is both, with the de Haan et al. study (2014) finding that alexithymia was both a state and trait that did not appear to be related to changes in depression or anxiety-based symptoms encountered during the addiction withdrawal phase. In which case, while it is clear that alexithymia indicates an increased vulnerability for mental health disorders such as addiction, it is unclear whether it is primary (a cause) or secondary (a defensive strategy) or a combination of both. This demonstrates the need for further research that might examine alexithymia in greater detail and indeed the need for new models such as the attention-appraisal approach (Preece et al., 2017).

Lumley and Roby (1995) were one of the first team of researchers to look at the role of alexithymia in relation to gambling disorder. They had recognised the role it had in other addictive disorders such as alcohol and binge-eating, discovering that both cognitive (externally orientated thinking style) and affective aspects (difficulty identifying feelings) of alexithymia were associated with problem gambling. Additionally, they found that these associations existed independent of depression or health-related issues. However, their findings were more suggestive than conclusive and while the association appeared fairly robust, confounding issues were identified

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in relation to gender, age and ethnicity. They concluded that problem gambling is strongly influenced by social and cultural factors rather than mere personality.

More recent studies have looked at PG as a way of compensating for deficits in emotion or affect regulation as a result of alexithymia (Mitrovic & Brown, 2009; Maniaci, Picone, Dimarco, Lipari, Brancato & Cannizzaro, 2015; Parker, Wood, Bond & Shaughnessy, 2005). In this sense, those individuals with alexithymia may well discharge their problematic or negative emotions into impulsive or compulsive gambling as a way of regulating their affect (Mitrovic & Brown, 2009).

Indeed, in the Mitrovic & Brown study (2009) they found slightly conflicting evidence in terms of which aspects of alexithymia were most associated with PG. They found that only difficulty identifying feelings (DIF) emerged as a significant factor separating the non-PG and PG groups in their study. They also found no correlation between gambling severity and alexithymia. As they noted, they looked at a clinical population of PGs rather than the student populations used in prior studies which had highlighted externally orientated thinking (EOT) and difficulty describing feelings (DDF) as being significant (Lumley & Roby, 1995; Parker et al., 2005).

In the Maniaci et al. (2015) study, they also looked at a clinical population of PGs and found that they presented with higher levels of alexithymia, including increased difficulty describing feelings and externally-orientated thinking versus non-PGs. They identified alexithymia as a strong predictor for PG and found it to be independent of any comorbid psychopathology such as personality disorders or other clinical syndromes. It is curious to note the difference in findings with this study over what Mitrovoic & Brown (2009) found in terms of significant alexithymic factors. It is quite possible that their clinical samples differed in terms of the population, cultural factors, demographics and indeed the role of depression may have also been significant depending upon the subtypes of gamblers participating in the study (Bonnaire, Barrault, Aïte, Cassotti, Moutier & Varescon, 2017). Additionally they noted that the role of alexithymia might also be important to consider in terms of treatment for PGs, particularly in terms of assessment and a focus on difficulty describing feelings or externally-orientated thinking.

Bonnaire et al. (2017) examined the relationship between alexithymia, PG and gambling type. They found that gambling type (strategic and non-strategic) was a key variable within the relationship between PG, depression and alexithymia. Alexithymia

was positively correlated with the intensity of gambling behaviour, with difficulty identifying feelings again the significant factor. However, this was depended upon gambling type. Alexithymia was only associated with PG with regard to one type of gambling (strategic) and only depression was associated with PG when considering the non-strategic gambling type. They therefore hypothesised that the difficulty identifying feelings factor in alexithymia could be recognised as a constant personality trait, where PGs selected gambling activities in relation to it. As an example, they suggested that gamblers might opt for gambling activity that is more exciting, creating arousal and an intensity to their feelings as a way of helping them to both experience and regulate them. In contrast, non-strategic gamblers opted for gambling activity that was more chance-based and passive in nature, thus being seen as a way to avoid negative emotions and help alleviate depression.

Aside from PG, other addictive behaviours have also been associated with alexithymia including problematic videogame use (Gaetan, Bréjard & Bonnet, 2016) and hypersexual behavaviour (Reid, Carpenter, Spackman & Willes, 2013). With findings not dissimilar to the Bonnaire et al. (2017) PG study, Gaetan et al. (2016) discovered that regular gamers expressed emotions less, had higher levels of alexithymia and specifically, difficulty identifying feelings when compared with non-regular gamers. They suggested that emotion regulation for regular gamers consisted of increasing the intensity of the emotion, a consequence of their low emotional reactivity and trouble feeling arousal or feeling. They concluded that the emotional functioning of the regular gamers might be an attempt to manage the alexithymia dynamic. In this sense, gamers with high levels of alexithymia and difficulty identifying feelings in particular, might find gaming helpful in terms of being able to recognize the feeling, respond and express them within the game world. Indeed, this gives a safe outlet for practicing emotion regulation and processing emotions within a virtual world that may well be more consistent and understandable than the real world. It should be noted that the sample used was predominantly male and adolescent while the definition of 'regular' gamer differed somewhat to the classifications used for PGs.

However, it is relevant to note the significance of difficulty identifying feelings within both PG and problem gaming, particularly in relation to the characteristics of the chosen behaviour (e.g. exciting or intense). It may be reasonable to hypothesise, therefore, that the characteristics of the type of IA in this study may well reflect the nature of any significant deficit relating to alexithymia.

1.4.5   Alexithymia and Internet Addiction

As studies have found with PG and problematic video game use, significant correlations have been found between alexithymia and IA in terms of difficulty identifying feelings (Scimeca, Bruno, Cava, Pandolfo, Muscatello & Zoccali, 2014), difficulty describing feelings (Dalbudak, Evren, Aldemir, Coskun, Ugurlu & Yildirim, 2013) and externally-orientated thinking.

It has been suggested that alexithymia may play a role in the pathogenesis and maintenance of IA, with individuals potentially using the Internet as a compensatory way of expressing their feelings, as has been found with mobile phone internet use (Mei, Xu, Gao, Ren & Li, 2018). In this sense, it could be argued that those with alexithymia may be more inclined to use the Internet to help alleviate interpersonal issues or problems they encounter with social experiences. Socialising online might therefore prove easier and a more comfortable way of communicating that might prove helpful for several reasons, including the ability to take time when composing, preparing and responding to messages (Kandri, Bonotis, Floros & Zafiropoulou, 2014; Scimeca et al., 2014).

Another study explored this further when looking at the relationship between alexithymia and social media (Zarins, Johnson, Ustymchuk, Tutrow & Konrath, 2015). They found that higher levels of alexithymia were indeed associated with greater use of social media and interestingly, the type of social media use was marginally associated with Facebook and Instagram but not for Twitter. Reminiscent of findings associated with strategic (active) vs non-strategic (passive) gambling types (Bonnaire et al., 2017), Zarins et al. (2015) found that higher alexithymia levels were associated with active (posting) social media use rather than passive (checking). This could be interpreted as individuals with alexithymia looking for a more intense experience and thus, helping to regulate their emotions through social media much the same as PGs or videogamers aim to do the same through their specific behaviour. Although it is unclear why the higher use of social media was associated with Facebook and Instagram but not Twitter, considering they all include active (posting) and passive (reading) features. It may well be that an active or passive use model may be too simplistic to describe more complex ways of interacting with such Internet applications, or perhaps that the emphasis on short and limited posts on Twitter leads to a less intense experience.

Additionally, it is possible to surmise that this kind of social media use points towards trait (or ability deficit) alexithymia rather than state (or avoidance) type. The latter type has more often been associated as a secondary symptom triggered by depression or anxiety (Gao et al., 2018; Honkalampi et al., 2001) and linked to more passive activity types in problem gambling (Bonnaire et al., 2017).

In another study investigating the relationship between alexithymia, attachment and problematic internet use (PIU) in Turkish adolescents (Bolat et al., 2017), they found that alexithymia increases the risk of PIU while higher attachment quality acts as a protective factor for both. Their findings supported previous evidence relating to individuals with alexithymia feeling more comfortable with social communication via the Internet in contrast to face-to-face (Scimeca et al., 2014). They speculated that this might be due to the increased sense of control that such individuals experience in terms of being able to stop communication if it becomes uncomfortable. Therefore, in a sense using such forms of communication (social media/messaging rather than video) helps those with alexithymia to 'level the playing field' and to empower them with a sense of control that helps to alleviate anxiety. However, as pointed out by Bolat et al. (2017), this can lead to a negative cycle of set of self-defeating safety behaviours where the opportunity to learn verbal/nonverbal social communication is avoided.

The connection here between high levels of alexithymia and insecure attachment type is also of interest in relation to our present study, where Bolat et al. (2017) connected both to emotional problems, low levels of self-confidence and interpersonal avoidance. This helps add weight to the theory that alexithymia forms part of a wider attachment system relating to an inner symbolic representational model, affect regulation and as has been demonstrated in studies looking at other addiction types (de Rick et al., 2009; Fonagy et al., 2018).

While the relationship between Internet Addiction and alexithymia has been explored in a small number of studies, they are yet to clearly examine a variety of dimensions as proposed in this present study. Nor do any existing studies use the more recently developed Perth Alexithymia Questionnaire, which brings with it the ability to capture information on an individual's appraisal model (Preece et al., 2017).

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Additionally, no studies (at the point of writing) have examined the related domain of psychological flexibility and specifically, experiential avoidance with Internet Addiction.

1.5 Psychological Flexibility

Experiential avoidance provides the third major area of investigation into Internet Addiction within this present study and overlaps with both attachment and alexithymia. It does so by providing an additional focus on a person's willingness to engage with or avoid difficult situations, thoughts or unwanted internal experiences (Hayes & Gifford, 1997).

1.5.1 Background

Psychological flexibility is as a model that forms part of the Acceptance & Commitment Therapy (ACT) approach and is one which believes most psychopathology, including addiction, emerges from the way language and cognition interact with direct contingencies (Hayes, Luoma, Bond, Masuda & Lillis, 2006). This inflexibility can lead to what has been termed experiential avoidance (EA), where an individual seeks to avoid intolerable emotions, bodily sensations, thoughts, memories and private experiences in a way that negatively impacts upon their health (Hayes, Wilson, Gifford, Follette & Strosahl, 1996). This extends to behaviours or actions that are undertaken in order to change the problematic experience or events leading up to them.

With origins in third wave cognitive and behavioural therapy, EA aims to be a functional transdiagnostic dimension that can be practically explored across a range of theoretical and clinical approaches. Indeed, the core concept of avoidance is nothing new and exists across a broad range of therapeutic approaches in some shape or form, from repression in psychoanalysis to the central goal of openness to experience in client-centred therapy (Hayes et al., 1996). While traditional cognitive and behavioural therapies have, among other things, focused on changing negative private experiences, psychological flexibility includes a third wave focus on contextual and experiential change strategies (Carvalho, Martins, Almeida & Silva, 2017). Acceptance rather than change is key here and this approach argues that change itself can be a form of EA that may actually lead to reinforcement of the original problem or indeed make the negative affect more accessible and powerful (Wenzlaff & Wegner, 2000). While both attachment theory and alexithymia feature a

focus on avoidance, they do so with an emphasis on early developmental deficits while EA represents a transdiagnostic process which may help mediate them.

This present study therefore aims to establish what role EA may play in the emergence of problematic Internet use in relation to attachment types and alexithymia.

1.5.2   Experiential Avoidance and Addiction

Substance abuse has often been put forward as an obvious example where EA may play a role and indeed, is seen as a highly effective strategy for short-term experiential adjustment (Hayes et al., 1996). While EA may not be the original route into substance abuse, it has been argued that EA may play a key role in maintenance of the problem as a result of the related negative affects such as cravings and withdrawal (Baker, Piper, McCarthy, Majeskie & Fiore, 2004).

However, evidence has been rather mixed in relation to EA and addiction. One study identified it as a significant predictor of drinking in relation to both negative (coping) and positive (enhancement) reinforcement whilst mediating the relationship between anxiety sensitivity and greater coping mechanisms for drinking (Stewart, Zvolensky & Eifert, 2002). Another study looking at a clinical sample of veterans, in contrast to the previous study using university students, failed to find any such predictive value for EA in relation to drug use severity or drug choice (Forsyth, Parker & Finlay, 2003).

Another more recent study found EA and distress tolerance to be significantly associated with alcohol and illicit drug cravings, with only EA remaining significantly and negatively associated with cravings when both were examined as predictors at the same time (Shorey, Gawrysiak, Elmquist, Brem, Anderson & Stuart, 2017). This study used a clinical sample of men and women based within a residential substance use treatment facility and was the first to show that EA is associated with such cravings even when factoring in distress tolerance. It is of course quite possible that distress tolerance may be a part of EA, while it is also suggested by the authors of the study that attempts to avoid cravings may well result, paradoxically, in increased cravings. It therefore seems quite plausible that treatment interventions targeting EA may well help to reduce cravings and therefore help decrease the risk of addiction.

Lastly, a novel study exploring EA and smoking looked at the effectiveness of treatment at varying stages (Farris, Zvolensky & Schmidt, 2015). They found smoking-specific EA to be a malleable cognitive vulnerability, with EA predicting pre-quit withdrawal, craving and negative affect. In addition, they provided evidence that reductions in EA predicted quit-day abstinence and less reduction lead towards early cessation withdrawal (Farris et al., 2015). Therefore increased cognitive flexibility that was related to distress caused by smoking could be used in helping achieve the initial first stage of abstinence during treatment. Interestingly, they found that those with increased flexibility and a greater willingness to experience smoking-related distress also experienced a lower degree of initial nicotine withdrawal. They also suggested that future treatment research may benefit from examining two distinct areas of EA in terms of 1) thoughts and feelings that related to the behaviour (smoking) and 2) somatic sensations related to the behaviour (smoking). Data will be collected in this present study through the use of both EA and Alexithymia scales which may help shed light on how these distinct areas operate within a non-clinical population in relation to IA.

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All of these studies looking at EA and substance abuse have been cross-sectional and therefore rather limited in terms of what they can tell us. It is important to note the use of the Acceptance and Action Questionnaire, Substance Abuse version (AAQ-SA) as a commonly used scale, along with earlier iterations which have come under criticism for their construct validity (Rochefort, Baldwin & Chmielewski, 2018). The Acceptance and Action Questionnaire-II (AAQ-II) for example, is a scale that has been devised to measure EA, however when reviewed it was found to be overly saturated with neuroticism and negative affect rather than experiential avoidance (Rochefort et al., 2018). Therefore, it has been suggested that the Brief Experiential Avoidance Questionnaire (BEAQ), as has been used in this present study, or the Multidimensional Experiential Avoidance Questionnaire (MEAQ) are used instead in order to improve research, theory and practice of therapies which focus on improving psychological flexibility and reducing EA.

Based on the association between EA and substance addictions, it seems intuitive to speculate about a similar state of affairs when considering behavioural addictions and their function in regulating negative private experiences. Indeed, EA has been connected to a range of problem behaviours including compulsive buying (Williams, 2012), gambling (Riley, 2014), trichotillomania (Begotka, Woods & Wetterneck, 2004;

Norberg, Wetterneck, Woods & Conelea, 2007) and binge eating (Lillis, Hayes & Levin, 2011).

A study in Australia found EA to predict problem gambling in a sample of 103 treatment seeking gamblers (Riley, 2014). They found that the relationship between two constructs (thought suppression and mindfulness) and problem gambling were mediated by EA. This provides compelling evidence for the role of EA as a mechanism or process for emotion or affect regulation, through which self-defeating psychological strategies operate. Of course, whether this applies to a non-clinical sample is yet to be established and as a cross-sectional study using the commonly used but contested AAQ-II scale in terms of what constructs are actually being measured as EA.

1.5.3   Experiential Avoidance and Internet Addiction

EA and IA have been explored in a range of studies exploring online pornography (Levin, Lee & Twohig, 2018; Wetterneck, Burgess, Short, Smith & Cervantes, 2012), technological addiction (Garcia-Oliva & Piqueras, 2016), disordered online social networking (Hormes, Kearns & Timko, 2014), depression and suicidality (Chou, Yen & Liu, 2018).

In a notable study examining EA and IA in a sample of 500 college students in Taiwan, they found evidence that EA was directly related to IA and indirectly related to IA via mental health related problems (Chou et al., 2017). They speculated that individuals prone to EA may therefore be additionally vulnerable to negative affect and problematic emotional states, making them more likely to pursue Internet use as a form of self-medication (Chou et al., 2017). Interestingly, they also proposed that people with EA might develop hostility as a result of difficulties in interacting with others as well as issues with problem solving. Hostility has been a well-known phenomenon online (Ko, Liu, Wang, Chen, Yen & Yen, 2014; Yen, Ko, Yen, Wu & Yang, 2007), where the ability to remain anonymous lends itself to expressions of anger without apparent consequence. Other mental health issues connected with EA and IA in their study included anxiety, depression and interpersonal sensitivity, with the severity of these issues corresponding to the severity of IA. Lastly, they also applied the neurobiological model of addiction to IA where continued use may impact upon dopamine levels, thus contributing to the development and maintenance of the behaviour (Chou et al., 2017).

In another study looking at EA and disordered online social networking within a sample of 253 undergraduates in Northeastern United States, researchers found that EA was significantly associated with disordered online social networking use (Hormes et al., 2014). In particular, they noted that maladaptive social networking use relating to issues with emotion regulation, lack of acceptance of emotional responses, poor impulse control and limited access to emotion regulation strategies. This study looked primarily at the use of Facebook while using a modified version of a substance use scale to measure specific disordered online social networking use (OSN) alongside Young's Internet Addiction Test (IAT). Interestingly, while the association between each score was found to be significant the effect size was small to medium, suggesting a distinction of sorts between generalized IAT and specific dimensions such as OSN (Hormes et al., 2014). This certainly fits with the rather intuitive perspective that specific types or groups of online activities should be explored in relation to IA, particularly when considering the need for better approaches to treatment (Griffiths, 2018).

1.6 Attachment, Alexithymia and Experiential Avoidance as Collective Processes

1.6.1 Attachment Types and Alexithymia as an Attachment System

In this present study, both attachment type and alexithymia are being explored as significant factors for IA. While attachment theory relates to the development of an interpersonal style of relating to others (secure or insecure) or indeed a secondary representational structure (De Rick et al., 2009; Fonagy et al., 2002) modeled by the primary caregiver and triggered in times of distress, alexithymia might be defined as a reflection of the internal symbolic representational system. Borrowing from this key approach by De Rick et al. (2009), the degree of alexithymia and resulting abilities to identify and describe emotions therefore helps to inform upon the way an individual's attachment system is organised. This present study therefore looks to identify the role of the attachment system (relational style and emotion regulation) in IA.

As with the De Rick et al. (2009) study, it is not anticipated that the attachment system will mediate the severity of IA. Psychological flexibility (specifically EA) will be explored as a possible factor in doing this. However, specific IA dimensions may be important here in terms of reflecting which may be more problematic in relation to a

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persons attachment system. As De Rick et al. (2009) state, the attachment system can be seen as a continuum or spectrum in terms of development, with secure attachment and alexithymia (with severely impaired attachment system) on one end and insecure and alexithymia (well developed internal representational system) at the other end. Where an individual is located on that spectrum is therefore important in terms of what treatment may be more appropriate.

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In addition, the inclusion of the *attention-appraisal* model of alexithymia allows for the finer exploration of cognitive and emotion information processing in relation to attachment type and Internet Addiction. This will help with the ability to tease out how an individual with a specific attachment type might appraise the actions or behaviours of others, positive or negative. Those with anxious attachment have been reported as being more likely to perceive threats, anger and to respond to what others may describe as 'positive' event in a negative manner (Shaver & Mikulincer, 2008). In which case, they may score higher on difficulty appraising positive feelings within the *attention-appraisal* model, due to this bias towards experiencing negative emotions. Within that context, a key function of compulsive or impulsive behaviours (such as IA) may have a primary function of reducing that anxiety. In contrast, avoidant attachment types are more likely to demonstrate less of an emotional reaction, either positive or negative, which may be reflected in higher levels of difficulty appraising feelings generally.

1.6.2 Experiential Avoidance and the Attachment System

This present study seeks to build upon the model of the attachment system (attachment type and alexithymia) via exploration of how experiential avoidance may further help explain Internet Addiction. As alexithymia primarily looks at the role of identifying/describing emotions, appraisal of situations and externally orientated cognitions, experiential avoidance offers a potential explanation for why individuals remain stuck with a specific coping mechanism or addictive behaviour.

Experiential avoidance provides a strategy, conscious or otherwise, for avoiding situations or experiences that have been appraised as a threat or source of pain or distress (Hayes & Gifford, 1997). In which case, those who are anxiously attached and have hyper-vigilance to such threats are more likely to engage in experiential avoidance when it may not be necessary. This can result in behaviours that are protective, such as seeking close proximity to an attachment figure, but are also

preservative and prevent any adaptation of the attachment system. Equally, those with an avoidant attachment style may employ experiential avoidance in order to deactivate their attachment behaviours rather than acknowledge threat, pain or distress. Mikulincer (1998) expands upon this from an attachment perspective, pointing out that such avoidance can lead to compulsive and repressive-dissociative mechanisms adapted to promote or protect a sense of self-reliance.

In this sense, experiential avoidance offers a model of psychological flexibility and with it, a promise of adaptation that may help manage or indeed change developmental deficits that result in an increased or decreased propensity for Internet Addiction.

1.6.3 Experiential Avoidance as a Mediating Process for Internet Addiction

EA has been found to be a key mechanism or mediating variable that bridges alexithymia and emotion dysregulation (Anderson and Crowther, 2012; Panayiotou et al., 2015; Venta, Hart and Sharp, 2013). In the Venta et al. (2013) study, which looked at the relation between EA, alexithymia and emotion regulation in a small sample of inpatient adolescents based in the USA, they found that EA impacted upon a person's ability to regulate negative emotions and respond to their environment in an adaptive manner.

This present study therefore aims to explore the previous proposition that EA can be considered an extension of the attachment system, acting as an emotion regulation strategy that can mediate the effects of alexithymia, particularly difficulty identifying, describing negative feelings and general appraisal. Indeed, further to this it is theorised that EA will mediate the affect of both attachment type and alexithymia on IA.

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1.7   Rationale for present study

1.7.1   Limitations and Gaps in Existing Literature

At the point of undertaking this present study, there is no known research that examines the role of attachment, alexithymia and EA in IA. In addition, no research has sought to identify how these mechanisms work within IA dimensions such as social media, porn or gaming.

Most studies looking at alexithymia have been cross-sectional and used either the 20 item Toronto Alexithymia Scale (TAS-20) or the Bermond–Vorst Alexithymia Questionnaire (BVAQ), while this present study will employ a more recently developed scale focusing on the attention-appraisal model of alexithymia (PAQ). Using the PAQ will allow us to do something that has not been possible with previous scales nor in prior studies, which is the ability to distinguish between both positive and negative affect in relation to DIF, DDF and EOT (Preece et al., 2017). This may allow us, in tandem with measuring EA, to tease out a distinction between the proposed two types of alexithymia; ability deficit alexithymia and avoidance alexithymia. In which case, it is expected that individuals will be more likely to employ EA as an emotion regulation strategy in response to negative emotions and most likely at the appraisal stage (Preece et al., 2018).

Another limitation of past research has been the type of scales used for measuring EA. As previously mentioned, the AAQ and AAQ-II have both of which have been questioned in terms of what they measure (Rochefort et al., 2018) and therefore a scale called the BEAQ will be used that aims to better reflect the EA construct (Gámez, Chmielewski, Kotov, Ruggero, Suzuki & Watson, 2014). Additionally, the most frequently used scale for IA has been the IAT, developed two decades ago (Young, 1998) and designed to measure a generalized form of IA rather than specific dimensions. IA has since become a rather broad description of a rich array of quite different online behaviours, each with different characteristics and arguably a different function in relation to what might classify them as addictive behaviours. In which case, by studying such behaviours in relation to attachment, alexithymia and EA, a better understanding may be reached which may then inform upon future treatment strategies.

1.7.2   Hypotheses

This present study seeks to explore the relationship between attachment type, alexithymia, EA and IA. Hypothesis A states that there will be significantly higher levels of insecure attachment within the IA group when compared to the non-IA group. Hypothesis B states that specific attachment types will have significantly higher scores across different IA dimensions e.g. anxious attachment will have significantly higher scores within the Social Media addiction group, while avoidant attachment will score higher within non-communication based IA addiction groups. Hypothesis C states that there will be significantly higher levels of alexithymia within

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both the general Internet Addiction group and dimension groups over non-IA groups. Hypothesis D states that EA will have a role in mediating the attachment type within general IA. Finally, hypothesis E states that there will be significantly higher levels of both depression and anxiety within both general IA and specific dimensions of IA over non-IA groups (Van Ameringen et al., 2018).

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The field of IA is a contentious one and this present study is an exploratory one, aiming to provide additional evidence that will contribute to the debate on whether IA can be considered a valid Addictive Disorder. Further to this, there is an aim to explore whether specific IA dimensions may be appropriately labeled in this manner if mechanisms, such as attachment system and EA, mirror those found in established Addictive Disorders.

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2   CHAPTER 2: METHOD

2.1   Overview

The research strategy chosen for this study exploring Internet Addiction is quantitative and therefore could be said to echo a relatively recent movement towards positivism in counselling and psychotherapy based research (Rennie & Frommer, 2015). However, while the majority of this shift has manifested in mixed-method approaches, quantitative is still rarely used by itself in this field. Choosing this approach demonstrates my own post-positivist (and at times, pragmatist) philosophical leanings, based on a belief that the world has an objective reality that can be effectively observed and measured by us (Philips & Burbules, 2000). Within this, is the belief and pluralistic stance that research can feed into that objective, real-world practice, where therapeutic treatment outcomes can be improved (Tilley, McLeod & McLeod, 2015). Such outcomes may therefore be improved via exploration of attributes and factors associated with potential addictions such as IA.

This chapter will describe the epistemological framework and theoretical orientation used in this present study, while explaining the research design and various methodological decisions that were taken. It will also provide information on recruitment, measures used, procedures, ethical considerations and data analysis.

2.2   Epistemological framework

The nomothetic, quantitative strategy used in this present study reflects my own post-positivist stance. This stance is distinct from positivism in that this also takes the role of the researcher into consideration, along with the limitations of using a single research paradigm (Creswell, 2017).

In which case, an exploratory observation of that complex, objective reality is not one devoid of bias or one that pursues any universal truths. It is an approach also influenced by Karl Popper (1972) and the evolutionary concept that all knowledge is conjecture, awaiting replacement by a newer theory or model that may provide further clarity matched with better predictive accuracy. Indeed while the questionnaires used in this study may help to shine a light on a person's subjective experience, that experience can never be perfectly quantified and unique individual differences will be lost in the acquisition of such larger-scale data. Yet there are also significant benefits in approaching this topic from a quantitative angle, allowing the

ability to make general inferences about problematic Internet use in the wider population. It is possible to uncover general patterns of behaviour that may be associated with increased vulnerability and therefore predict where these may occur. Therefore within this acknowledgement of the limitations of his research approach, is the pragmatic belief and pluralistic stance that such nomothetic research can feed into that objective, real-world practice, where therapeutic treatment outcomes might then be improved (Tilley, McLeod & McLeod, 2015).

While seeking to honour individual differences and each of our own unique experiences of the world, I believe a movement towards evidence-based approaches can weigh favourably in helping to provide improved therapeutic treatment direction (Rowland & Goss, 2013). Equally, it is important to remain conscious of the reductionist nature of such a research methodology and that no claim to absolute knowledge is being made here. It is within this context that this research opts for an approach belonging to the scientific method (Creswell, 2017). It is one that arguably befits the scientist-practitioner identity of the counselling psychologist (Barker, Pistrang & Elliot, 1994), yet is not one that has always appeared congruent with the phenomenological traditions within the field. Indeed, it can clearly be a notable challenge to balance the roles of scientist and practitioner, with one focused on simplifying, while the other is often steeped in complexity (Bowlby, 1988). Yet it is my belief that these two, separate disciplines are complementary.

In addition, it is also my belief that as a counselling psychologist, there is a requirement to be open to using every available method of gathering data and a commitment to bring a reflexive approach to that requirement (Hanson et al., 2005). An approach therefore based on understanding our own role in the research process, along with an aim towards clarity relating to the limitations of the chosen strategy and that distinction between scientist and practitioner.

2.3 Design

This present study uses a cross-sectional, non-experimental quantitative design employing an online questionnaire methodology in order to test the hypotheses within a non-clinical general population sample. The dependent variables (DV) were IA (with associated dimensions or subtypes) along with depression (PHQ-9) and anxiety (GAD-7). The independent variables (IV) included insecure attachment (anxious and avoidant), alexithymia (DIF, DDF, EOT, DAF) along with experiential

avoidance. Additional demographic data was collected. Where possible, shorter-versions of questionnaires were used (ECR-S and BEAQ) in order to minimise potential survey fatigue and encourage a greater number of participants (Galesic & Bosnjak, 2009).

2.4   Power calculation

Power calculations were made in order to determine the sample size for a multiple regression analysis using G*Power software version 3.1.9.4 (Faul, Erdfelder, Lang & Buchner, 2009). Owing to the complexity of the mediation model being tested with multiple predictors, a medium effects size (.25) was used along with 95% power (.95) that demanded a sample size of 140.

2.5   Participants

A general adult population sample was chosen for this present study. Participants were therefore required to be 18 or more years of age, English speaking and with access to the Internet.

2.6   Recruitment

Participants were recruited via a range of online websites that included social media. Specialized survey sites were also used, such as Survey Circle (https://www.surveycircle.com) and Survey Tandem (http://surveytandem.com). These specialist sites publicise studies and find participants for online studies, attracting a wide audience across regions and across industries. Links to this present study were also placed on Facebook groups that encourage an exchange between researchers in terms of participating in each others studies. The latter has been shown to consist of a high proportion of academic studies and therefore provides a mostly student sample population. Additional links were placed on Twitter and Instagram and finally, fellow psychology doctorate students at City University were also encouraged to share the research.

2.7   Measures

Six scales were used in this present study (DPIU, ECR-S, PAQ, BEAQ, PHQ-9 and GAD-7) along with demographic questions. A copy of each questionnaire can be found in Appendix 6.2.

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2.7.1   Dimensions of Problematic Internet Use (DPIU)

The DPIU is a self-report measure of problematic Internet use and IA (Van Ameringen et al., 2018) based on DSM-IV criteria for addiction (APA, 2013). It examines 9 dimensions of Internet use, with respondents asked to respond YES/NO to 3 initial screener questions. Should the respondent answer YES to 2 or more of those questions, they are then asked to answer a further 5 questions where they must answer using a 6-point Likert-scale. This scale ranges from 0 (not at all) to 5 (a lot), with 3 or more scores of 3 or above indicating potential addiction for that dimension. Note that there is, at the point of writing, no recommendations for this scale in relation to final sum or cut-off scores, nor any indication of severity e.g. moderate-to-severe. In this present study, the DPIU is therefore used to indicate the presence of addiction in a categorical manner.

Due to this scale not being fully validated in past studies, an exploratory principle component analysis (PCA) was conducted and can be found in the results section. A previous study has found the DPIU to identify a much higher prevalence of IA over more traditional and arguably, outdated, scales (Ameringen et al., 2016). They argued that Young's Internet Addiction Test may not provide an accurate representation of the modern methods of using the Internet. Thus, new tools such as the DPIU may be better positioned to screen for such problematic behaviours. Additionally, they found that those who qualified for Internet Addiction also had significantly more symptoms of Anxiety, Depression, Stress and higher rates of ADHD symptoms (Ameringen et al., 2016).

Dimensions of problematic use include Entertainment and Video Streaming (such as Netflix/Youtube), Social Media (such as Facebook/Twitter), Gaming (such as Fortnite/Candy Crush), Messaging (including SMS/WhatsApp), Dating Apps (such as Tinder/Bumble), Gambling (including sports bettering/online casinos), Sexual Content (including porn/sexting), Online Shopping (such as Amazon/Ebay) and Information Shopping (including Wikipedia/Googling). Examples in brackets were in some instances updated to include references to websites or applications that would be more applicable for a non-US sample. Respondents were able to skip a category if they did not engage in any of those behaviours.

Commented [RP40]: Revised to reduce use of different terms e.g. problematic behaviour and addiction as per point 14.

2.7.2   Experience of Close Relationships Short Form (ECR-S)

The ECR-S is a 12-item self-report measure of attachment anxiety and attachment avoidance (Wei, Russell, Mallinckrodt & Vogel, 2007). It is a shortened version of the original 36-item ECR scale. Respondents must answer using a 7-point Likert-scale, ranging from 1 (strongly disagree) to 7 (strongly agree), with some items reverse scored. Higher avoidance or anxiety scores indicate higher levels of attachment avoidance or attachment anxiety.

It has demonstrated good construct validity and a stable factor structure, with significant correlations found between attachment anxiety and avoidance with measures of negative emotional states such as depression, anxiety and psychological distress (Wei et al., 2007). Distinct attachment avoidance and attachment anxiety dimensions have been demonstrated, including negative associations between avoidance and fear of intimacy along with comfort with self-disclosure. It has also shown acceptable internal consistency (.77 to .86 for the Anxiety subscale and .78 to .88 for the Avoidance subscale) and test-retest reliability over a 3 week period (r = 82 for Anxiety and .89 for Avoidance) across a non-clinical sample (Wei et al., 2007). Additionally, a translated version of this scale has also found very similar levels of internal consistency and construct validity in a non-clinical Korean sample (Lee & Shin, 2018).

2.7.3   Perth Alexithymia Questionnaire (PAQ)

The PAQ is a 24-item self-report measure of alexithymia (Preece, Becerra, Robinson, Dandy & Allan, 2018). It measures Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF) and Externally Orientated Thinking (EOT) aspects of alexithymia in adolescents and adults by asking respondents to respond to statements on a 7-point Likert scale. This scale ranges from 1 (strongly disagree) to 7 (strongly agree), with higher scores indicating higher levels of alexithymia (Preece et al., 2018). It has shown excellent internal consistency and reliability across all subscales (Cronbachs = 0.87 to 0.91) and the overall score (Cronbach = 0.90 to 0.95) was also excellent (Preece et al., 2018). Concurrent and discriminate validity have also been found to be more than adequate. The PAQ correlated with other established measures of emotion regulation and psychopathology, including higher levels of depression and anxiety within non-clinical sample (Preece et al., 2018).

The questionnaire works within the attention-appraisal model of alexithymia and provides a total of 5 subscales; Negative-Difficulty identifying feelings (N-DIF), Positive-Difficulty identifying feelings (P-DIF), Negative-Difficulty describing feelings (N-DDF), Positive-Difficulty describing feelings (P-DDF) and General-Externally orientated thinking (G-EOT). These subscales can also be combined therefore creating a General-Difficulty identifying feelings (G-DIF) and General-Difficulty describing feelings (G-DDF). Additionally, as DIF/DDF have been found to correspond to the appraisal stage, broader scores can be derived where N-DIF and N-DDF can be combined into a Negative-Difficulty appraising feelings score (N-DAF), with P-DIF and P-DDF being combined to form a Positive-Difficulty appraising feelings score (P-DAF). A combination of N-DAF and P-DAF can then be combined into a General-Difficulty appraising feelings score (G-DAF). Finally, all of the subscales can be combined into an overall Alexithymia score (Preece et al., 2018).

2.7.4 Brief Experiential Avoidance Questionnaire (BEAQ)

The BEAQ is a 15-item measurement of Experiential Avoidance (EA) and shortened version of the Multidimensional Experiential Avoidance Questionnaire (MEAQ) (Gámez et al., 2014). Employing a 6-point Likert-scale (strongly disagree through to strongly agree), participants report the extent to which they agree with a statement. It has previously shown good internal consistency, with alphas ranging from .80 to .89 across both clinical and non-clinical samples (Gámez et al., 2014). It includes content from the 6 subscales in the MEAQ and has been shown to exhibit nearly identical convergent and discriminate associations. However, unlike the MEAQ it has been deemed as only being suitable for assessing overall EA rather than specific subsections (Gámez et al., 2014).

The BEAQ has demonstrated anticipated associations with related measures, including strong associations with measurements of avoidance (Gámez et al., 2014; Gámez et al., 2011). It also demonstrates robust associations with measures of psychopathology and quality of life. It has additionally shown to be robust across a range of sample populations, measuring avoidance rather than negative emotionality, poor quality of life or neuroticism, all of which have been criticisms relating to the AAQ-II as a more common measurement of EA in the past (Gámez et al., 2014; Gámez et al., 2011; Rochefort, Baldwin & Chmielewski, 2018).

2.7.5   Patient Health Questionnaire (PHQ-9)

The PHQ-9 is a brief self-report measure for measuring depression (Kroenke, Spitzer & Williams, 2001) and is based on DSM-IV diagnostic criteria (APA, 2013). It asks respondents to comment on the frequency of depressive symptoms over the previous two weeks and consists of 9 items, with a 4-point Likert-scale with 0 (not at all) through to 3 (nearly every day). Internal reliability has been reported as excellent (Cronbach = 0.89), as was the test-retest reliability and effect sizes were deemed to be moderate to large between group differences (Kroenke et al., 2001).

The PHQ-9 can establish provisional depressive disorder diagnosis and grade symptom severity, thus can be viewed as a dual-purpose instrument (Kroenke & Spitzer, 2002). Strong associations with functional status, disability days and symptom related difficulties also indicated construct validity, with PHQ-9 scores generalising across a range of clinical samples (Kroenke et al., 2001). It has also been found to be effective for assessing both major and sub-threshold depressive disorder in the general population (Martin, Rief, Klaiberg & Braehler, 2006).

Levels of depression are measured via the totaled score, with cutoff points including 5 (mild), 10 (moderate), 15 (moderately severe) and 20 (severe). According to Kroenke & Spitzer (2002), scores of 10 or less do not usually occur with major depression, while scores of 15 and above usually indicate the presence of major depression. More recently, a meta-analysis recommended a cutoff score of between 8-11 depending upon the setting (Kroenke, 2012; Manea, Gilbody & McMillan, 2012).

2.7.6   Generalised Anxiety Disorder Assessment (GAD-7)

The GAD-7 is a brief self-report measure for assessing Generalised Anxiety Disorder (Spitzer, Kroenke, Williams & Löwe, 2006). It asks respondents to comment on frequency of anxiety related symptoms over the last two weeks and consists of 7 items, using a 4-point Likert-scale with 0 (not at all) through to 3 (nearly every day). It can therefore be used as a measure for continuous severity, or indeed as a single measurement to assess recent levels of GAD. This scale has shown excellent internal consistency (Cronbach =.92), good test-retest reliability (intraclass correlation=0.83) and good procedural validity (Spitzer et al., 2006).

GAD-7 has demonstrated good convergent validity, correlating with two other anxiety scales, providing strong criterion validity for identifying anxiety and increased scores

strongly associated with functional impairment (Spitzer et al., 2006). Strong associations have been found with self-reported disability days and modest association with increased use of health care. Additionally, factor analysis has demonstrated distinct dimensions with GAD when assessing samples that also include high levels of depression (Spitzer et al., 2006). These findings lend support to the use of GAD-7 in both primary care settings and it has also shown to be a reliable and valid measurement of anxiety in the general population (Löwe et al., 2008). It has also shown to be reliable and valid across a range of age groups (Hinz et al., 2017; Tiirikainenet et al., 2019).

Levels of anxiety are assessed via the totaled response values, with a score of 10 or greater being associated with GAD. Scores of 5, 10 and 15 may indicate mild, moderate and severe levels of anxiety (Spitzer et al., 2006). More recent research has indicated that the cut-off score for GAD may be a score of 7-10 (Plummer, Manea, Trepel & McMillan, 2016) that shall be used in this present study.

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2.7.7 Demographic Questions

Demographic information was gathered via 13 questions, including gender identity, age, ethnicity and race, education and location (see Appendix 6.2.6). Additional questions were also asked about, relationship status, employment, religion, history of mental health, social class and sexual orientation.

> **Commented [RP42]:** Updated with revised Appendix as per feedback point 22.

Questions were based on recommendations made to improve descriptions of research samples (Hughes et al., 2016). This included reducing limited options where possible and allowing for simple open-ended questions, such as when specifying age in years or asking for gender identity as opposed to gender. Additional information, such as ethnicity and socio-economic data, was collected in order to assess possible disparities in health, protective factors and risk based on recommendations made by Hughes et al. (2016) and the Office for National Statistics (GSS, 2015).

2.8 Procedures

Participants were asked to click on a secure online link which took them to the website where the research questionnaires were hosted. Upon arriving at the site they were asked to read through the participant information brief (see Appendix

6.1.1), followed by completion of the participant consent form (see Appendix 6.1.2). In order to help reduce the possibility of social desirability bias, the consent form clearly conveyed that the data being collected was anonymous and would be aggregated prior to analysis (King, Liu, Haney & He, 2007). At which point, if they chose not to consent, they were taken immediately to the participant debrief information page (see Appendix 6.1.3) at the end of the study. Participants who consented were all initially taken to the demographics page. This information was collected at the beginning of the study in order to ensure they were a suitable sample and in order to gather information on those who did not choose to complete the entire study (Hughes, Camden & Yangchen, 2016).

Participants were then asked to complete the DPIU questionnaire followed by the rest of the scales (PAQ/BEAQ/ECR-S/PHQ-9 and GAD-7). Item-order was randomised within each scale in order to minimize both order-effect (McFarland,1981) and item priming effects (King et al., 2007). Additionally, the order of the scales following the DPIU were all randomised within Qualtrics in order to reduce possible item effects relating to the grouping of items or constructs (Tourangeau & Rasinski,1988). In total, the questionnaires took roughly 10-15 minutes to complete, with shorter versions used where appropriate (ECR-S and BEAQ) in order to reduce survey fatigue and reduce the effect of participants answering later questions in a increasingly faster, shorter and more uniform manner (Galesic & Bosnjak, 2009). Upon completion of all of the questionnaires, the participant was then taken to the debrief information section, giving further information about the study, providing links to support and researcher contact information. Additionally, they were given an opportunity to submit feedback or comments via an open-ended box if they so wished.

2.9   Ethical considerations

No significant risk was anticipated for participants in terms of completing the range of questionnaires that constituted this present study. Directions were taken as per the BPS guidelines for Internet-mediated Research (2017), acknowledging requirements for privacy online, valid consent and the option to withdraw from the study. Further, the lack of face-to-face contact with participants was also noted and solutions provided for not being able to monitor reactions, feelings nor assist with support or termination of the data collection. As questions did involve potentially distressing topics, clear sign-posting was therefore given within both the information brief and

debrief in terms of seeking further help or guidance, including NHS services and pathways to private counseling if required. As part of the brief and consent information, it was clearly stated that the data being gathered was both anonymous and aggregated at the point of analysis, with all data being stored in a secure and encrypted manner.

Consideration was given to the platform used to access the online questionnaire, with options available to complete it on a mobile device as well as desktop. Additionally, the participants were able to participate online and from a place and time of their choosing, with it being made clear that they could terminate the data collection at any time. Levels of control were utilized where possible in order to compensate for such challenges and to uphold scientific integrity as per the Internet-mediated Research (BPS, 2017). Checks were made by the proprietary survey software to ensure multiple submissions were not made from the same IP addresses. This was also used as a way of verifying demographic information relating to location. Of course, high levels of procedural control were simply not possible due to the online nature of data collection and careful consideration was given within the data screening process in order to identify outliers.

Ethics approval was granted by the City University Department of Ethics Committee with the code PSYETH (P/L) 17/18 189 (see Appendix 6.3).

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2.10 Data analysis

All analysis was performed using IBM's Statistical Package for Social Sciences (SPSS) version 25, with data exported via Qualtrics in a SPSS format. Factor analysis (Principle Component Analysis) and reliability analysis were required for the DPIU scale, due to the lack of available data regarding construct validity. All questionnaires were scored according to their specific criteria (see Measures) and data screened prior to any analysis being performed. Data screening included checking for any anomalous entries, including missing or incomplete answers, suspicious response times or participants who did not meet the required selection criteria.

2.11 Data analysis strategy

Following initial data screening, data distribution was checked for normality across each of the scales and groups. Normality of data was checked according to the recommendations for larger sample sizes (Field, 2013; Howell, 2012; Kim, 2013). Field (2013) recommends that that when using larger samples, the shape of the distribution should be viewed visually and alongside the statistics for skewness and kurtosis (see Table 3). Data collected was deemed to be large (N = >300) across each scale (Field, 2013) and therefore checks were performed for normal distribution across each variable via inspecting histograms, box-plots, Q-Q plots along with measures of skewness and kurtosis. This was followed by tests for multicollinearity, with variance inflation factor (VIF) testing is also recommended (Field, 2013). Correlation analysis used to identify any confounding variables. Levene's test for homogeneity of variance was performed across each set of variables for the Internet Addiction and Non-Internet Addiction group. The results of which were then used to define the chosen approach for descriptive analysis. Where assumptions for the normality of distribution and homogeneity of variance were met, bootstrapped tests were used to analyse group differences.

T-tests were used for simple group comparisons and mediation regression for further analysis. It was decided that, due to the exploratory nature of the study, adjustment for multiple comparisons was not desirable and instead effect sizes and confidence intervals were reported alongside *p* values (Althouse, 2016). While the total sample was relatively large (*n*=441), which leads to a more unlikely issue of error (Field, 2013), more robust (bootstrapped) tests were still used where assumptions of normality or variance were not met. Upon careful deliberation, the decision was made to continue with parametric tests even where sample sizes were smaller (e.g. with specific Internet Addiction dimensions), as there is a general agreement that t-tests are robust against mild violation of assumptions (Glass, Peckham & Sanders, 1972; Shinohara, Frangakis & Lyketsos, 2012). However, for less robust analysis, such as the correlational analysis to compare each scale, square-root transformations were used in order to achieve adequate levels of skewness and kurtosis (Field, 2013; Tabachnick & Fidell, 2007).

The dependent variable scales included the DPIU (IA), which consisted of two levels and nine subscales and both the PHQ-9 (depression) and GAD7 (anxiety) contained five-levels. The predictor scales included the PAQ (alexithymia), which had six levels and a further five subscales, the ECR-S (attachment) had two-levels and the BEAQ

> **Commented [RP44]:** Added brief comment and reference to explain decision not to use multiple corrections.

(experiential avoidance) had one. Where appropriate, such as between categorical data within the IA and non-IA groups and demographic data, Chi-square or Fisher's tests were carried out in order to explore their relationships. Following the results from these tests, correlations were carried out in order to further explore the relationships between the variables and to ensure no confounding variables were present. *T*-tests were then used for exploration of the relationships between measures and both overall Internet Addiction and the dimension behaviours. Process mediation regression analysis (Hayes, 2017) was then used to examine whether experiential avoidance functioned as a mediating variable for Internet Addiction through which attachment type and alexithymia functioned.

3   CHAPTER 3: RESULTS

3.1   Chapter overview

This chapter will begin with information relating to the data screening process. This will be followed by examination of the data distribution across the sample, homogeneity of variance, multicollinearity, followed by descriptive statistics that will explore the characteristics of the demographic data. It will then present the principle component analysis in order to demonstrate the reliability and factor validity for the Dimensions of Problematic Internet Use scale. Cross-sectional analysis will then be performed, including group comparisons and mediation regression analysis.

3.2   Data screening

All data was screened for missing entries and Little's MCAR test (Little & Rubin, 1989) was used to determine if the missing data was deemed to be random or not. If missing items constituted 5% or less of the total responses on an item level, mean scores then replaced any random missing data (Downey & King, 1998). Using Qualtrics to collect data online meant that a high number of respondents began the questionnaire (608). However, 90 of those did not proceed past the research brief, 21 opted not to consent and 5 respondents were removed for being under the age criteria of 18.

For those respondents who progressed past the research brief and consented, there was a completion rate of 91%. This suggests that survey fatigue was, for the most part, not an issue and as any missing data was deemed to be random (Little et al., 1989) this also suggests that respondents were not dissuaded by the sensitive nature of some of the questions. In total, 441 respondents participated fully in this study.

Outliers were detected using univariate analysis of Z-scores and multivariate analysis using Mahalanobis distance. According to Tabachnick & Fidell (2007), cases with standardised scores in excess of 3.29 ($p < .001$, two-tailed test) are potential outliers and any such cases were therefore investigated (see Table 1 below). After individual inspection, 7 outliers were removed.

Table 1: Table of minimum and maximum standardised z-scores

	Minimum	Maximum
DPIU	-2.454	3.324

PAQ	-1.460	3.315
BEAQ	-2.400	3.209
ECR-S	-2.109	2.971
PHQ9	-1.204	3.350
GAD7	-1.132	2.810

Additionally, response times were checked and standard deviation tests were performed on z-scores, with 2 further outliers removed due to either taking too long or completing the study much faster than other respondents. No between group analysis was performed on the specific Internet Addiction dimensions of Dating Apps or Gambling due to the low numbers classified with these problem behaviours.

3.3 Normality of data

Data distribution was checked for normality via histograms, box-plots, Q-Q plots along with measures of skewness and kurtosis. These showed that data was approximately distributed normally across each scale, aside from the Perth Alexithymia Questionnaire (PAQ), the Patient Health Questionnaire (PHQ-9) and General Anxiety Disorder (GAD-7). Each of these demonstrated a positive skew, with the majority of respondents reporting lower scores. This is not particularly surprising when taking into account that this was a non-clinical sample and therefore levels of depression, general anxiety and alexithymia were therefore lower. For correlational analysis of these scales, square-root transformations were used in order to achieve adequate levels of skewness and kurtosis (Field, 2013; Tabachnick & Fidell, 2007).

As recommended (Field, 2013), the Kolmogorov-Smirnov (KS) test for normality was only used with smaller sample sizes, such as when testing assumptions of normality on specific DPIU subscales. Each small DPIU subscale (N = <50, Field, 2013) was therefore examined. The DPIU Dating subscale scores, D (21) = 0.135, p = .200, did not deviate significantly from normal, nor did the DPIU Gambling subscale scores, D (15) = 0.13, p = .200. However, as the KS test reported the results as within the lower bound of the true significance, it was deemed necessary to run an additional test. With smaller sample sizes, Field (2013) stipulates that a distribution can be considered normal when z-scores are less than 1.96 for both skewness and kurtosis (p<.05). Both DPIU Dating (Z_{skew} = 0.725, $Z_{kurtosis}$ = -0.253) and DPIU Gambling (Z_{skew} = 1.212, $Z_{kurtosis}$ = -0.340) scores demonstrated a normal distribution in this respect.

Table 2: Table showing skewness, kurtosis and normality tests for a characteristic of interests across each sample

	Sample Size *(n)*	Skewness	*SEskewness*	Kurtosis	SEkurtosis	Kolmogorov-Smirnov* Statistics	p-value	Shapiro-Wilk Statistics	p-value
DPIU	441	0.739	0.127	0.127	0.254	0.071	0	0.965	0
ECR-S	441	0.173	0.173	-0.567	-0.567	0.047	0.022	0.989	0.002
BEAQ	441	0.002	0.116	0.116	-0.232	0.035	.200*	.200*	0.127
PAQ	441	0.755	0.116	0.116	0.255	0.09	0	0.952	0
PHQ9	441	1.127	0.116	0.781	0.232	0.158	0	0.895	0
GAD7	441	1.053	0.116	0.394	0.232	0.152	0	0.89	0

3.4 Homogeneity of Variance

For ECR-S, the variances were equal, $F(1, 439) = 0.007$, $p = .933$. For BEAQ, the variances were also equal, $F(1, 439) = .169$, $p = .689$. For PAQ, the variances were also equal, $F(1, 439) = 2.044$, $p = .154$. For PHQ-9, the variances were also equal, $F(1, 439) = .380$, $p = 538$. For GAD-7, the variances were also found to be equal, $F(1, 439) = .015$, $p = .902$. Homogeneity of variance can therefore be assumed.

3.5 Multicollinearity

According to Field (2013), multicollinearity can affect the parameters of a regression model when there is a strong correlation between two or more predictors. As this study includes regression analysis in order to determine how attachment type, alexithymia and experiential avoidance might predict Internet Addiction, it was therefore deemed necessary to test for multicollinearity. In doing so, scanning a correlation matrix for the predictor variables is recommended in order to observe any problematic highly correlated variables ($r>.8$).

Tests found no issue with collinearity. No predictor variables correlated highly, VIF values were all well below 10 and tolerance statistics were also well below 0.2.

3.6 Demographic information and Descriptive statistics

Four hundred and forty-one participants completed the study and provided data. The majority of the total sample were female (66.7%) and of white ethnicity (80.3%), with a mean age of 34.9%. Further demographic data is displayed in Table 3 below.

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Table 3: Showing demographic characteristics of the Total, Internet Addiction and Non-Internet Addiction samples.

	Total	IA Group	Non IA Group	
	N = 441	*N*=191	*N*=250	P-value*
		(43.3%)	(56.6%)	
Gender: N (%)				*P = .257*
Female	294 (66.7)	135 (70.7)	159 (63.6)	
Male	140 (31.7)	56 (29.3)	84 (33.6)	
Age in Years: Mean (SD)	34.9 (11.04)	31.1 (9.2)	36.3 (11.7)	*P <.001*
<25	128 (29)	72 (56.3)	56 (43.7)	
26-32	105 (23.8)	53 (50.5)	52 (49.5)	
33-41	102 (23.1)	31 (30.4)	71 (69.6)	
42>	106 (24)	35 (33)	71 (67)	
Ethnicity: N (%)				*P = .259*
Asian/Asian British	58 (13.2)	30 (15.7)	28 (11.2)	
Black/African/Caribbean/Black British	8 (1.8)	6 (3.1)	2 (0.8)	
Mixed/Multiple Ethnic groups	14 (3.2)	6 (3.1)	8 (3.2)	
White	354 (80.3)	146 (76.4)	208 (83.2)	
Education: N (%)				*P = .393*
High School (GCSE or Equivalent)	14 (3.2)	6 (3.1)	8 (3.2)	
High School (A-level or Equivalent)	37 (8.4)	16 (8.4)	21 (8.4)	
Vocational	12 (2.7)	4 (2.1)	8 (3.2)	
Undergraduate Degree	192 (43.5)	81 (42.4)	111 (44.4)	
Masters Degree	135 (30.6)	68 (35.6)	67 (26.8)	
PhD or Doctorate	47 (10.7)	15 (7.9)	32	
Region: N (%)				*P = .652*
England, Wales, Scotland and Ireland	287 (65.1)	123 (64.4)	164 (65.6)	
Rest of Europe	58 (13.2)	23 (12.0)	35 (14.0)	
Rest of the World	96 (21.8)	45 (23.6)	51 (20.4)	
Working Hours Per Week: N (%)				*P < .001*
35 or more hours	248 (56.2)	89 (46.6)	159 (63.6)	
Less than 35 hours	182 (41.3)	95 (49.7)	87 (34.8)	
Relationship Status: N (%)				*P = .275*
Not in a Romantic relationship	116 (26.3)	56 (29.3)	60 (24.0)	
Romantic relationship with one partner	317 (71.9)	132 (41.6))	185 (58.4)	
Romantic relationship with multiple partners	4 (0.9)	3 (1.6)	1 (0.4)	
Married/Civil Partnership and living together	120 (27.2)	42 (35.0)	78 (65.0)	
Married/Civil Partnership and living apart	42 (9.5)	13 (31.0)	29 (69.0)	
Not Married and living together	67 (15.2)	34 (50.7)	33 (49.3)	
Not Married and living apart	33 (7.5)	15 (45.5)	18 (54.5)	
Social Class: N (%)				
Poor	7 (1.6)	5 (7.2)	2 (0.8)	
Working Class	108 (24.5)	49 (25.7)	60 (24.0)	
Middle-class	291 (66.0)	134 (70.2)	180 (72.0)	
Affluent	24 (5.4)	10 (5.2)	14 (5.6)	
Type of Device (used in research): N (%)				
Mobile	211 (47.8)	87 (45.5)	124 (49.6)	
Laptop	210 (47.6)	99 (51.8)	111 (44.4)	
Tablet	19 (4.3)	5 (2.6)	14 (5.6)	

* Chi-square test.

3.6.1 Gender

A Pearson's Chi-square test was used to determine if there were any differences between gender and frequencies of Internet Addiction. There was no significant association between gender and Internet Addiction, $\chi2$ (1) = 1.35, p = .257. However, within the IA dimensions, there was a significant associations between gender and Social Media, $\chi2$ (1) = 7.66, p = .007, Gaming, $\chi2$ (1) = 5.99, p = .018, Messaging, $\chi2$ (1) = 15.76, p < .001, Sexual Content, $\chi2$ (1) = 23.19, p < .001 and Shopping Addiction, $\chi2$ (1) = 7.79, p = .009.

Based on the odds ratio, the odds of having Social Media Addiction were 2.22 times higher if the respondent was female rather than male, 2.28 times higher for Gaming Addiction if male, 6.46 times higher for Messaging Addiction if female, 16.34 times higher for Sexual Content Addiction if male and 4.80 times higher for Shopping Addiction if female rather than male.

3.6.2 Age

For information on age means please refer to table 4. Age was grouped in order to explore Internet Addiction prevalence across specific age-groups (see Figure 1 below). A Pearson's Chi-square test was used to determine if there were any differences between Age and Internet Addiction. There was a significant association between Age and Internet Addiction, $\chi2$ (3) = 22.43, p < .001. IA dimensions were also tested in order to explore any differences between Age and Internet Addiction. Significant associations were found between Age and Entertainment, $\chi2$ (3) = 44.31, p < .001, Social Media, $\chi2$ (3) = 16.63, p < .001 and Shopping addiction, $\chi2$ (3) = 16.63, p = .020. A Fisher's exact test was used due to the Sexual Content dimension not meeting necessary assumptions in relation to sample size and a significant association was found between Age and Sexual Content Addiction, P = .003.

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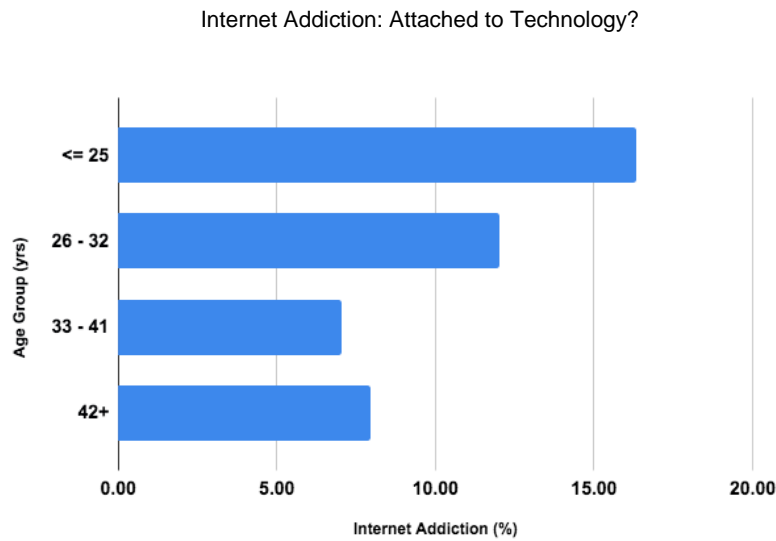
Figure 1: Bar-chart showing Internet Addiction percentage across each age group.

3.6.3 Ethnicity

Respondents were from a variety of ethnic backgrounds, with the largest being White (N=354) and the second largest being Asian/Asian British (N=58).

Due to the low sample of respondents in some Ethnicity groups, assumptions were not met and therefore Fisher's Exact Test was used instead of Pearson's Chi-square test in order to explore any association between Ethnicity and Internet Addiction. No significant association was found between Ethnicity and Internet Addiction, P = .259. Significant associations were found between Ethnicity and Entertainment, P = .004, and Sexual Content Addiction, P = .021.

3.6.4 Education

The Undergraduate degree group was largest in the sample with 192 (43.5%), followed by those with a Masters Degree (30.6%). Fisher's exact test was again used to explore the association between Education and the overall Internet Addiction group. No significant association was found between levels of Education and Internet Addiction, P = .393. A significant association was only found between Education and Messaging Addiction, P = .026.

3.6.5   Region

The majority of participants in the total sample were based in England, Wales, Scotland and Ireland with 287 respondents (65.1%). Rest of Europe had 58 (13.2%) participants and the Rest of the World had 96 (21.8%). A Pearson's Chi-square test was used to explore any association between Region and Internet Addiction and no significant association was found, χ2 (2) = .836, p = .652. A significant association was found between Region and Gaming, χ2 (2) = 6.564, p = .037, and Sexual Content, *P* = .018 (Fisher's exact test).

3.6.6   Working Hours

A total of 248 (56.2%) participants worked 35 or more hours in a week, with 182 (41.3) working less than 35 and 11 (2.5%) preferring not to answer. A Person Chi-square test found a significant association between Working Hours per week and Internet Addiction, χ2 (2) = 13.272, p < .001. Significant associations were found between Working Hours and Entertainment, χ2 (2) = 19.725, p < .001, Social Media, χ2 (2) = 9.783, p = .007, and Gaming, χ2 (2) = 7.106, p = .028.

3.6.7   Relationship Status

A Pearson's Chi-square test did not find any significant association between Relationship Status (in a romantic relationship versus not in a romantic relationship) and Internet Addiction, χ2 (1) = 1.340, p = .275. An additional Pearson's Chi-square test examined the other levels of Relationship Status. Being married or not had no significant association with Internet Addiction, χ2 (3) = 6.169, p = .104. However, a significant association was found between those who were living together in a relationship (married or not) and Internet Addiction, χ2 (3) = 4.419, p = .044. Further tests included a Fisher's exact test, which found a significant association between those living together in a relationship and Entertainment, *P* = .011.

3.6.8   Social Class

Middle-class was the largest category in the total sample of participants, with 291 (66.0%) followed by Working Class with 108 (24.5%). A Fisher's exact test was used to analyse the relationship between Social Class and Internet Addiction. No significant association was found between Social Class and Internet Addiction, *P* = .667. No significant associations were discovered when exploring the relationship

between Social Class and Internet Addiction subscales. Additionally, no significant associations were discovered when exploring the type of device used to collect data in this study.

Table 4: Table showing demographic characteristics of the Total and Internet Addiction subscale samples

	Total N = 441	IA Q1: Entertainment N = 60 (13.6%)	IA Q2: Social Media N = 86 (19.5%)	IA Q3: Gaming N = 38 (8.6%)	IA Q4: Messaging N = 51 (11.6%)	IA Q5: Dating N = 2 (0.5%)	IA Q6: Gambling N = 4 (0.9%)	IA Q7: Sexual Content N = 16 (3.6%)	IA Q8: Shopping N = 31 (7.0%)	IA Q9: Info Seeking N = 34 (7.7%)
Gender: N (%)										
Female	294 (66.7)	43 (14.6)	69 (23.5)	19 (6.5)	47 (16.0)	2 (0.7)	1 (0.3)	2 (0.7)	28 (9.5)	20 (6.8)
Male	140 (31.7)	17 (12.1)	17 (12.1)	19 (13.6)	4 (2.9)	0 (0)	3 (2.1)	14 (10)	3 (2.1)	14 (10)
Non-binary***	1 (0.2)	-	-	-	-	-	-	-	-	-
Prefer not to answer***	6 (1.4)	-	-	-	-	-	-	-	-	-
P-Value		P = .007*	P = .018*	P < .001*			P < .001*	P = .009*		
Age in Years: Mean (SD)	34.9 (11.04)									
<25	128 (29)	37 (28.9)	38 (29.7)	11 (8.6)	19 (14.8)	1 (0.8)	1 (0.8)	7 (5.5)	8 (6.3)	8 (6.3)
26-32	105 (23.8)	16 (15.2)	23 (21.9)	11 (10.5)	10 (9.5)	0 (0.0)	0 (0.0)	8 (7.6)	14 (13.3)	8 (7.6)
33-41	102 (23.1)	3 (2.9)	14 (13.7)	6 (5.9)	9 (8.8)	0 (0.0)	3 (2.9)	0 (0.0)	6 (5.9)	9 (8.8)
42>	106 (24)	4 (3.8)	11 (10.4)	10 (9.4)	13 (12.3)	1 (0.9)	0 (0.0)	1 (0.9)	3 (2.8)	9 (8.5)
P-Value		P < .001*	P < .001*					P = .003**		
Ethnicity: N (%)										
Asian/Asian British	58 (13.2)	15 (25.9)	18 (31.0)	6 (10.3)	7 (12.1)	1 (1.7)	1 (1.7)	4 (6.9)	9 (15.5)	2 (3.4)
Black/African/Caribbean/Black British	8 (1.8)	2 (25.0)	3 (37.5)	1 (12.5)	0 (0.0)	0 (0.0)	0 (0.0)	2 (25.0)	0 (0.0)	0 (0.0)
Mixed/Multiple Ethnic groups	14 (3.2)	5 (35.7)	2 (14.3)	0 (0.0)	1 (7.1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.1)	0 (0.0)
White	354 (80.3)	37 (10.5)	63 (17.8)	31 (8.8)	42 (11.9)	1 (0.3)	3 (0.8)	10 (2.8)	21 (5.9)	32 (9.0)
Other	10 (2.3)	3 (30.0)	1 (10.0)	0 (0.0)	1 (10.0)	0 (0.0)	0 (0.0)	1 (10.0)	0 (0.0)	0 (0.0)
Prefer not to answer***	1 (0.2)	-	-	-	-	-	-	-	-	-
P-Value		P = .004**						P = .021**		
Education: N (%)										
High School (GCSE or Equivalent)	14 (3.2)	2 (14.3)	1 (7.1)	1 (7.1)	3 (21.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.1)
High School (A-level or Equivalent)	37 (8.4)	7 (18.9)	8 (21.6)	4 (10.8)	2 (5.4)	0 (0.0)	0 (0.0)	2 (5.4)	3 (8.1)	5 (13.5)
Vocational	12 (2.7)	0 (0.0)	2 (16.7)	2 (16.7)	3 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (8.3)	0 (0.0)

Undergraduate Degree	192 (43.5)	25 (13.0)	36 (18.8)	19 (9.9)	20 (10.4)	0 (0.0)	2 (1.0)	7 (3.6)	16 (8.3)	10 (5.2)
Masters Degree	135 (30.6)	25 (18.5)	31 (23.0)	9 (6.7)	21 (15.6)	2 (1.5)	2 (1.5)	6 (4.4)	8 (5.9)	14 (10.4)
PhD or Doctorate	47 (10.7)	1 (2.1)	7 (14.9)	3 (6.4)	1 (2.1)	0 (0.0)	0 (0.0)	1 (2.1)	2 (4.3)	4 (8.5)
Prefer not to answer***	4 (0.9)	-	-	-	-	-	-	-	-	-
P-Value					*P* = .026**					
Region: N (%)										
England, Wales, Scotland and Ireland	287 (65.1)	34 (11.8)	62 (21.6)	18 (6.3)	40 (13.9)	2 (0.7)	4 (1.4)	6 (2.1)	22 (7.7)	18 (6.3)
Rest of Europe	58 (13.2)	8 (13.8)	8 (13.8)	6 (10.3)	5 (8.6)	0 (0.0)	0 (0.0)	2 (3.4)	5 (8.6)	7 (12.1)
Rest of the World	96 (21.8)	18 (8.8)	16 (16.7)	14 (14.6)	6 (6.3)	0 (0.0)	0 (0.0)	8 (8.3)	4 (4.2)	9 (9.4)
P-Value				*P* = .037*			*P* = .018**			
Working Hours Per Week: N (%)										
35 or more hours	248 (56.2)	18 (7.3)	36 (14.5)	16 (6.5)	21 (8.5)	1 (0.4)	4 (1.6)	6 (2.4)	13 (5.2)	18 (7.3)
Less than 35 hours	182 (41.3)	39 (21.4)	46 (25.3)	19 (10.4)	29 (15.9)	1 (0.5)	0 (0.0)	10 (5.5)	18 (9.9)	15 (8.2)
I prefer not to answer	11 (2.5)	3 (27.3)	4 (36.4)	3 (27.3)	1 (9.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.1)
P-Value		*P* < .001*	*P* = .007*	*P* = .028*						
Relationship Status: N (%)										
Not in a Romantic relationship	116 (26.3)	20 (17.2)	30 (25.9)	9 (7.8)	15 (12.9)	1 (0.9)	0 (0.0)	5 (4.3)	9 (7.8)	9 (7.8)
Romantic relationship with one partner	317 (71.9)	40 (12.6)	55 (17.4)	27 (8.5)	36 (11.4)	1 (0.3)	4 (1.3)	11 (3.5)	22 (6.9)	25 (7.9)
Romantic relationship with multiple partners***	4 (0.9)	-	-	-	-	-	-	-	-	-
Married/Civil Partnership and living together	120 (27.2)	7 (5.8)	15 (12.5)	10 (8.3)	10 (8.3)	0 (0.0)	1 (0.8)	4 (3.3)	6 (5.0)	8 (6.7)
Married/Civil Partnership and living apart	42 (9.5)	4 (9.5)	5 (11.9)	3 (7.1)	4. (9.5)	0 (0.0)	1 (2.4)	0 (0.0)	1 (2.4)	7 (16.7)
Not Married and living together	67 (15.2)	14 (20.9)	13 (19.4)	7 (10.4)	6 (9.0)	0 (0.0)	1 (1.5)	5 (7.5)	7 (10.4)	5 (7.5)
Not Married and living apart	33 (7.5)	6 (18.2)	3 (9.1)	4 (12.1)	4 (12.1)	0 (0.0)	0 (0.0)	1 (3.0)	2 (6.1)	2 (6.1)
Prefer not to answer***	4 (0.9)	-	-	-	-	-	-	-	-	-
P-Value		*P* = .011**								

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Social Class: N (%)										
Poor***	7 (1.6)	-	-	-	-	-	-	-	-	-
Working Class	108 (24.5)	15 (13.9)	24 (22.2)	9 (8.3)	11 (10.2)	1 (0.9)	2 (1.9)	3 (2.8)	7 (6.5)	6 (5.6)
Middle-class	291 (66.0)	40 (13.7)	53 (18.2)	26 (8.9(	36 (12.4)	1 (0.3)	2 (0.7)	12 (4.1)	19 (6.5)	23 (7.9)
Affluent	24 (5.4)	1 (4.2)	4 (16.7)	2 (8.3)	2 (8.3)	0 (0.0)	0 (0.0)	0 (0.0)	4 (16.7)	3 (12.5)
Prefer not to answer	11 (2.5)	1 (9.1)	2 (18.2)	1 (9.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.1)	1 (9.1)
P-Value										

*Chi-square test

**Fisher's exact test

***Any demographic level data with a sample of under 10 participants has not been included in this table.

3.7 Factor & reliability analysis

A principle component factor analysis was conducted on each of the Dimensions of Problematic Internet Use subscales. All subscales had above adequate reliabilities with a range of Cronbach's alpha = .71-.88. Additionally, all subscales had adequate Kaiser-Meyer-Olkin values, KMO = .5-.7 and all KMO values for individual items were also equal to or greater than the acceptable level of .5 (Field, 2013). For all dimensions, aside from Dating Apps, Shopping and Info Seeking, one factor had eigenvalues over Kaiser's criterion of 1 and explained between 51.9-69.0% of the variance. Note that for the above-mentioned dimensions the scree plots were ambiguous and showed inflexions that would justify retaining either 1 or 2 factors. 2 factors were retained in these cases, due to the convergence of the screen plots and Kaiser's criterion on this value. Factor loadings after Varimax rotation for the Dating Apps dimension can be seen in Appendix 6.6 (6.6.1.5). The items that cluster on the same factor suggest that factor 1 represents withdrawal and factor 2 represents cravings.

Given that this information allies to all of the dimensions, the researcher has taken the pragmatic decision not to repeat all individual results below, rather to provide an example for the first dimension and provide links to where additional data can be found for other dimensions in the Appendix. For Scree plots, rotated factor matrix and tables, see Appendix 6.6.

3.7.1 DPIU Subscale 1: Entertainment

The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .7 ('good' according to Hutcheson & Sofroniou, 1999) and all KMO values for individual items were greater than .6, which is above the acceptable limit of .5. The Entertainment subscale of the DPIU appeared to have acceptable internal consistency, Cronbach's alpha = .78.

An initial analysis was run to obtain eigenvalues for each factor in the data. One factor had eigenvalues over Kaiser's criterion of 1 and this explained 53.1% of the variance. The scree plot was ambiguous and showed inflexions that would justify retaining either 1 or 2 factors. 1 factor was retained because of the moderate sample size and the convergence of the screen plot and Kaiser's criterion on this value. See tables 3.31-3.39 for all dimensions.

Commented [RP46]: Removed use of 'we'

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3.8 Correlations between Attachment, Alexithymia, Experiential Avoidance, Depression, Anxiety and Internet Addiction Measures

In order to check for potential covariates and explore the relationship between attachment (ECR-S), alexithymia (PAQ), experiential avoidance (BEAQ), depression (PHQ-9), anxiety (GAD-7) and IA (DPIU), a Pearson's Correlation analysis was run across the entire participant sample (*N*=441). As previously noted, transformed scores were used for this specific analysis and all results are displayed in the correlation table below (table 5).

This analysis revealed significant positive correlations between all predictor and dependent variables. For the most part, these were found to be weak to moderate correlations, however a strong positive correlation (>.7) was found between the PHQ-9 (depression) and GAD-7 (anxiety) measures. As these are both dependent variables, no further action was required in terms of avoiding confounding variables (Tabachnick and Fidell, 2007). Additionally, a moderate strength significant correlation was found between the BEAQ (Experiential Avoidance) and PAQ (Alexithymia).

Table 5: Pearson's Correlation matrix showing Correlations between Measures within the total sample of participants.

	1	2	3	4	5	6
1) ECRS	-	-	-	-	-	-
2) BEAQ	.492**	-				
3) PAQ	.479**	.592**	-			
4) PHQ-9	.476**	.457**	.417**	-		
5) GAD-7	.437**	.410**	.353**	.757**	-	
6) DPIU	.287**	.365**	.221**	.396**	.340**	-

**p<.001 (2-tailed).

3.9 Differences Between Groups: Internet Addiction

3.9.1 Dimensions of Problematic Internet Use (DPIU)

When screened according to the DPIU scale, where scores of 3 and above on 3 or more of the questions equate to a problematic behaviour, 191 (43.3%) participants were classified with Internet Addiction. This formed the IA Group categorical variable within the present study. Within the IA total, 101 (22.9%) were classified with one type of problem online behaviour, 60 (13.6%) were classified with two types of problem online behaviour and finally, 30 (6.8%) were classified with three or more

separate problem online behaviours. See Figure 2 below for prevalence relating to specific dimensions.
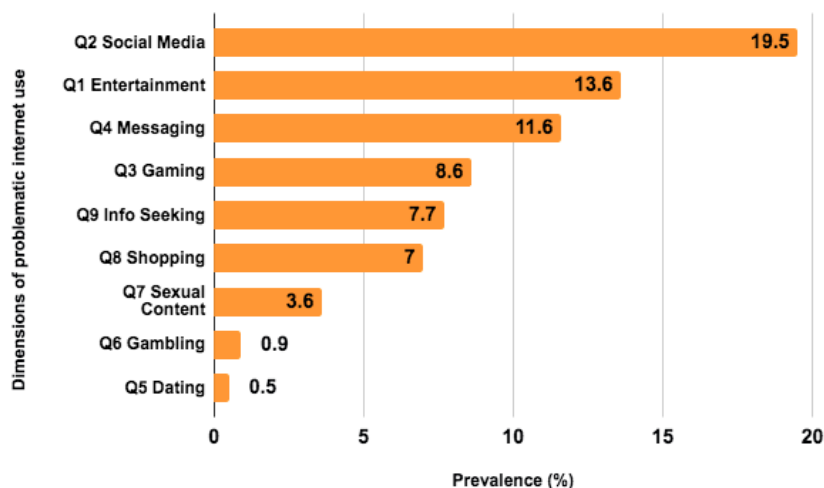

Figure 2: Bar-chart showing prevalence (%) of each Dimension of problematic internet use within the total sample.

3.9.2   Attachment Type (ECR-S) and Internet Addiction

It was hypothesised that there would be higher levels of insecure attachment in the IA addiction group rather than the non-addiction group. Additionally, it was hypothesised that specific attachment types would be associated with specific IA dimensions, such as higher anxious attachment scores within the social media or messaging addiction groups when compared to the non-addiction groups. Avoidant attachment scores would also be higher in the addiction groups relating to non-communication based dimensions. See table 6 below for means and standard deviations for Attachment across Internet Addiction and non-Internet Addiction groups.

Table 6: Means, SD, t-tests, Cohen's d, confidence intervals and p-values for ECR-S between IA and non-IA groups.

Measure	Subscale	Group	Mean	SD	t	d	CI (BCa 95%)	P-value
ECR-S								
Attachment		IA	40.26	11.76	4.78	0.46	3.19, 7.63	<.001
(Composite)		Non-IA	34.85	11.75				
	Anxious	IA	23.47	7.33	4.80	0.45	2.07, 4.94	<.001
		Non-IA	19.96	7.81				
	Avoidant	IA	16.79	7.45	2.81	0.30	0.57, 3.22	.005

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Non-IA   14.89   6.40

A *t*-test was run to explore the relationship between Attachment (ECR-S) and Internet Addiction (DPIU). On average, participants classified with Internet Addiction had higher overall Attachment, anxious and avoidant attachment scores then those in the non-Internet Addiction group. These differences were significant for overall attachment, $p<.001$, anxious attachment, $p<.001$ and avoidance attachment, $p = .005$.

These represented respective medium effects of $d = 0.46$ (overall), $d = 0.45$ (anxious), $d = 0.30$ (avoidance). See table 7 (above) for t values and confidence intervals.

The null hypothesis can therefore be rejected and the alternative hypothesis that higher levels of Attachment insecurity (including anxious and avoidance types) are significantly associated with Internet Addiction can be accepted.

3.9.3   *Alexithymia (PAQ) and Internet Addiction*

In order to explore the second hypothesis that Alexithymia would be significantly associated with Internet Addiction, a bootstrapped *t*-test was performed to examine the relationship between Alexithymia and Internet Addiction. See table 7 below for means and standard deviations.

Table 7: Means, SD, t-tests, Cohen's d, confidence intervals and p-values for PAQ between IA and non-IA groups.

Measure	Subscale	Group	Mean	SD	t	d	CI (BCa 95%)	P-value
PAQ								
Alexithymia	Composite	IA	70.31	28.66	3.75	0.37	4.71, 14.60	.002
		Non-IA	60.45	26.30		0.45		
	General Difficulty Identifying Feelings	IA	22.46	10.30	-4.28		-5.62, -2.34	.001
		Non-IA	18.47	8.78				
	General Difficulty Describing Feelings	IA	24.90	10.93	-3.54	0.35	-5.91, -1.45	.001
		Non-IA	21.30	10.34				
	General External-Orientated Thoughts	IA	22.95	11.04	-2.23	0.23	-4.32, -0.27	.031
		Non-IA	20.68	10.01				
							-	

Participants in the Internet Addiction group had higher overall Alexithymia, Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF) and Externally-orientated Thinking (EOT) scores then the non-Internet Addiction group. These differences, were significant, $p = 0.002$ (overall alexithymia), $p =.001$ (DIF), $p =0.001$

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(DDF) and finally, EOT with p =.031.Overall alexithymia had a small to medium effect of d = 0.37, DIF had a medium effect of d = 0.45, DDF had a small to medium effect of d = 0.35 and finally, EOT had a small effect of d = 0.23. See table 8 (above) for t-scores and confidence intervals.

The null hypothesis can therefore be rejected and the alternative hypothesis that Alexithymia (and the subscales tested above) does have a significant association with Internet Addiction can be accepted.

3.9.4 Experiential Avoidance (BEAQ) and Internet Addiction

Prior to any mediation analysis, a t-test was performed to examine the relationship between Experiential Avoidance and Internet Addiction. See table 8 below for means and standard deviations between groups.

Table 8: Means, SD, t-tests, Cohen's d, confidence intervals and p-values for BEAQ between IA and non-IA groups.

Measure	Group	Mean	SD	t	d	CI (BCa 95%)	P-value
BEAQ							
Experiential Avoidance	IA	50.21	11.70	7.09	0.68	-10.36, -6.01	<.001
	Non-IA	42.43	11.83				

Participants in the Internet Addiction group had higher overall Experiential Avoidance scores then the non-Internet Addiction group. This difference was significant, t(439) = -7.09, p< 0.001, and represented a medium effect of d = 0.68. See table 9 (above) for t-score and confidence intervals.

3.9.5 Depression (PHQ-9), Generalised Anxiety Disorder (GAD-7) and Internet Addiction

In order to explore the hypothesis that there would be significant associations between depression, anxiety and Internet Addiction, a number of Pearson's Chi-square tests were carried out. See table 9 below.

There were a total of 158 (35.8%) participants in the total sample who were categorised as reporting mild-to-severe levels of depression according to the PHQ-9. This included mild depression with 57 (12.9%), moderate with 45 (10.2%), moderate-severe with 37 (8.4) and severe with 19 (4.3%). When comparing the prevalence of

mild-to-severe depression between groups, the IA group had a total of 98 (51.3%) participants compared to the Non-IA group with 60 (24.0%).

Depression

A Pearson's Chi-square test found a significant association between levels of Depression and Internet Addiction, χ2 (4) = 38.792, p <.001.

Generalised Anxiety Disorder

A total of 160 (36.3%) participants were also categorised as reporting mild to severe levels of Generalised Anxiety Disorder according to the GAD-7. This included mild anxiety with 79 (17.9%), moderate with 41 (9.3%), moderate-severe with 30 (6.8) and severe with 10 (2.3%). When comparing the prevalence of mild-to-severe GAD between groups, the IA group had a total of 100 (52.3%) participants compared to the Non-IA group with 60 (24.0%).

A Pearson's Chi-square test found a significant association between levels of Generalised Anxiety Disorder and Internet Addiction, χ2 (4) = 39.920, p <.001.

The null hypothesis can therefore be rejected and the alternative hypothesis that there are significant differences between IA and non-addiction groups in relation to both depression, generalised anxiety disorder can be accepted.

Table 9: Characteristics of the sample, showing prevalence of Depression, Generalised Anxiety Disorder (GAD) within total, Internet Addiction and Non-Internet Addiction samples.

	Total N (%) N = 441 (100)	IA Group (%) N=191 (43.3%)	Non IA Group (%) N=250 (56.6%)	P-value*
PHQ-9: N (%)				P <.001
No Depression	283 (64.2	93 (32.9)	190 (67.1)	
Mild	57 (12.9)	30 (52.6)	27 (47.4)	
Moderate	45 (10.2)	29 (64.4)	16 (35.6)	
Moderate-Severe	37 (8.4)	25 (67.6)	12 (32.4)	
Severe	19 (4.3)	14 (73.7)	5 (26.3)	
GAD-7: N (%)				P <.001
No Anxiety	281 (63.7)	91 (32.4)	190 (67.6)	
Mild	79 (17.9)	45 (57.0)	34 (43.0)	
Moderate	41 (9.3%)	28 (68.3)	13 (31.7)	
Moderate-Severe	30 (6.8)	21 (70.0)	9 (30.0)	

Severe	10 (2.3%)	6 (60.0)	4 (40.0)

*Chi-square test

3.10 Differences Between Groups: Internet Addiction Dimension Subscales

3.10.1 Attachment Type (ECR-S) and Internet Addiction Subscales

In order to test the second part of our hypothesis, *T*-tests were used to explore the relationship between Attachment type and individual IA subscale behaviours.

Attachment and DPIU Entertainment & Video Streaming

Participants in the Entertainment addiction group had higher Attachment scores (M = 40.78, SE = 1.53) then the non-Entertainment addiction group (M = 36.63, SE = 0.63). This difference, -4.15, 95% CI [-7.42, -0.89], was significant, $t(439)$ = -2.50, p =.013, and represented a small-medium effect of d = 0.35.

Further t-tests were run in order to explore the Attachment subscales (anxious and avoidance) and Entertainment. Participants in the Entertainment addiction group had higher Attachment anxiety scores (M = 24.20, SE = 0.92) then the non-Entertainment addiction group (M = 21.05, SE = 0.40). This difference, -3.15, 95% CI [-5.26, -1.04], was significant, $t(439)$ = -2.93, p =.004, and represented a small-medium effect of d = 0.35.

Participants in the Entertainment addiction group also had higher Attachment avoidance scores (M = 16.58, SE = 0.96) then the non-Entertainment addiction group (M = 15.58, SE = 0.35). This difference, -1.01, 95% CI [-2.90, 0.89], was not significant, $t(439)$ = -1.05, p =.296, and represented an effect of d = 0.15.

In conclusion, higher levels of Attachment (a combination of anxiety and avoidance), along with Attachment anxiety are significantly associated with Entertainment addiction while Attachment avoidance is not.

Attachment and DPIU Social Media

Participants in the Social Media addiction group had higher overall Attachment scores (M = 42.59, SE = 1.28) then the non-Social Media addiction group (M = 35.89, SE = 0.62). This difference, -6.71, 95% CI [-9.48, -3.93], was significant, $t(439)$ = -4.75, p<.001, and represented a small-medium effect of d = 0.35.

Participants in the Social Media addiction group also had higher Attachment anxiety scores (*M* = 24.91, *SE* = 0.80) then the non-Social Media addiction group (*M* = 20.66, *SE* = 0.41). This difference, -4.25, BCa 95% CI [-45.95, -2.60], was also significant, *t*(439) = -4.64, *p*<.001, and represented a medium effect of *d* = 0.56.

Participants in the Social Media addiction group also had higher Attachment avoidance scores (*M* = 17.69, *SE* = 0.84) then the non-Social Media addiction group (*M* = 15.24, *SE* = 0.34). This different, -2.45, BCa 95% CI [-4.38, -0.46], was significant, *t*(439) = -2.62, *p* =.010. This represented a small to medium effect of *d* = 0.37.

Attachment and DPIU Gaming

Participants in the Internet Gaming addiction group had higher overall Attachment scores (*M* = 39.42, *SE* = 1.75) then the non-Internet Gaming addiction group (*M* = 36.99, *SE* = 0.63). This difference, -2.42, BCa 95% CI [-6.18, 1.17], was not significant, *t*(439) = -1.19, *p* =.235.

No significant differences were found between the Attachment anxiety scores in the Internet Gaming addiction group (*M* = 22.47, *SE* = 1.10) and the non-Internet Gaming addiction group (*M* = 21.39, *SE* = 0.41), -1.08, BCa 95% CI [-3.20, 1.28], *t*(439) = -.817, *p* =.414.

Nor were any significant differences found between Attachment avoidance scores in the Internet Gaming addiction group (*M* = 16.95, *SE* = 1.03) and the non-Internet Gaming addiction group (*M* = 15.60, *SE* = 0.35), -1.35, BCa 95% CI [-3.63, 0.75], *t*(439) = -1.15, *p* =.253.

Attachment and DPIU Messaging

Participants in the Internet Messaging addiction group (*M* = 38.39, *SE* = 1.81) had higher scores of overall Attachment then the non-Internet Messaging addiction group (*M* = 37.05, *SE* = 0.61). This difference, -1.35, BCa 95% CI [-5.26, 2.76], *t*(439) = -.750, *p* =.453, was not significant.

Additionally, while those in the Internet Messaging addiction group (M = 23.04, SE = 1.12) also had higher Attachment anxiety scores than those in the non-Internet Messaging addiction group (M = 21.28, SE = 0.40), this difference, - 1.76, BCa 95% CI [-4.05, 0.54], t(439) = -1.52, p =.130 was not significant.

Finally, those in the Internet Messaging addiction group (M = 15.35, SE = 1.04) had a lower Attachment avoidance score than those in the non-Internet Messaging addiction group (M = 15.76, SE = 0.35). This difference, 0.41, BCa 95% CI [-1.77, 2.66], was not significant, t(439) = .398, p =.691.

Attachment and DPIU Dating Apps & Gambling

No comparisons were made between Internet Dating App addiction, nor Internet Gambling addiction groups due to the low numbers of those classified with addiction.

Attachment and DPIU Sexual Content

Participants in the Internet Sexual Content addiction group (M = 46.88, SE = 2.63) had higher scores of overall Attachment then the non-Internet Sexual Content addiction group (M = 36.84, SE = 0.59). This difference, -10.04, BCa 95% CI [-14.79, -4.98], t(439) = - 3.31, p<0.001, was significant. This represented a large effect of d = 0.84.

In addition, participants in the Internet Sexual Content addiction group (M = 25.81, SE = 2.06) had higher scores of Attachment anxiety then the non-Internet Sexual Content addiction group (M = 21.32, SE = 0.37). This difference, -4.49, BCa 95% CI [-8.59, -0.27], t(439), p =.024, was significant. This represented a medium effect of d = 0.58.

Lastly, participants in the Internet Sexual Content addiction group (M = 21.06, SE = 1.39) had higher scores of Attachment avoidance then the non-Internet Sexual Content addiction group (M = 15.52, SE = 0.35). This difference, -5.55, BCa 95% CI [-8.07, -2.87], t(439) = -3.17, p =.002, was significant. This represented a large effect of d = 0.80.

Attachment and DPIU Shopping

Participants in the Internet Shopping addiction group (*M* = 40.81, *SE* = 2.24) had higher overall Attachment scores than in the non-Internet shopping addiction group (*M* = 36.93, *SE* = 0.59). This difference, -3.88, BCa 95% CI [-8.79, 0.93], *t*(439) = -1.73, p =.084, was not significant. This represented a small effect of *d* = 0.32.

In addition, participants in the Internet Shopping group (*M* = 24.48, *SE* = 1.51) scored higher in Attachment anxiety then those in the non-Internet Shopping group (*M* = 21.26, *SE* = 0.38). This difference, -3.23, BCa 95% CI [-6.39, -0.02], *t*(439) = -2.23, *p* =.026, was significant. This represented a small effect of *d* = 0.42.

Lastly, participants in the Internet Shopping group (*M* = 16.32, *SE* = 1.46) scored marginally higher in Attachment avoidance then those in the non-Internet Shopping group (*M* = 15.67, *SE* = 0.34). This difference, -0.65, BCa 95% CI [-3.68, 2.14], *t*(439) = -0.50, *p* = 0.614, was not significant.

Attachment and DPIU Info Seeking

Participants in the final IA subgroup (Internet Info Seeking addiction) scored higher in overall Attachment (*M* = 42.24, *SE* = 1.75) then the non-Internet Info seeking addiction group (*M* = 36.78, *SE* = 0.58). This difference, -5.45, BCa 95% CI [-9.08, -2.05], *t*(439) = -2.55, *p* =.011, was significant. This represented a medium effect of *d* = 0.45.

In addition, participants in the Internet Info seeking addiction group scored higher in Attachment anxiety (*M* = 24.15, *SE* = 1.23) then the non-Internet Info Seeking addiction group (*M* = 21.26, *SE* = 0.37). This difference, -2.88, BCa 95% CI [-5.38, -0.42], was significant, *t*(439) = -2.08, *p* =.038. This represented a small to medium effect of *d* = 0.37.

Lastly, participants in the Internet Info seeking addiction group (*M* = 18.09, *SE* = 1.23) also scored higher on Attachment avoidance over the non-Internet Info seeking addiction group (*M* = 15.52, *SE* = 0.36). This difference, -2.57, BCa 95% CI [-5.25, 0.06], was also significant, *t*(439) = -2.08, *p* =.038. This represented a small to medium effect of *d* = 0.37.

3.10.2 *Alexithymia (PAQ) and Internet Addiction Subscales*

In order to further explore the hypothesised significant relationship between Alexithymia and individual Internet Addiction dimensions, bootstrapped *t*-tests were performed.

Alexithymia and DPIU Entertainment

Participants in the Internet Entertainment addiction group (M = 74.87, SE = 3.94) scored higher in overall Alexithymia then the non-Entertainment addiction group (M = 63.12, SE = 1.39). This difference, -11.74, BCa 95% CI [-20.64, -3.27], was significant, $t(439)$ = -3.08, p =.006. This represented a small to medium effect of d = 0.44.

Additional *t*-tests were run on Alexithymia subscales, including Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DF) and Externally Orientated Thinking (EOT). Participants in the Internet Entertainment addiction group (M = 24.28, SE = 1.43) scored higher in Difficulty Identifying Feelings then the non-Entertainment addiction group (M = 19.55, SE = 0.47). This difference, -4.73, BCa 95% CI [-7.54, -2.27], was significant, $t(439)$ = -3.11, p =.004. This represented a medium effect of d = 0.51.

Participants in the Internet Entertainment addiction group (M = 26.75, SE = 1.41) scored higher in Difficulty Describing Feelings then the non-Entertainment addiction group (M = 22.27, SE = 0.55). This difference, -4.48, BCa 95% CI [-7.71, -1.42], was significant, $t(439)$ = -3.03, p =.003. This represented a small to medium effect of d = 0.42.

Participants in the Internet Entertainment addiction group (M = 23.83, SE = 1.55) scored higher in Externally Orientated Thinking then the non-Entertainment addiction group (M = 21.30, SE = 0.52). This difference, -2.53, BCa 95% CI [-5.71, 0.47], was not significant, $t(439)$ = -1.73, p =.118. This represented a small effect of d = 0.25.

Alexithymia and DPIU Social Media

Participants in the Internet Social Media addiction group (M = 71.07, SE = 3.00) scored higher in overall Alexithymia then the non-Social Media addiction group (M =

63.18, *SE* = 1.47). This difference, -7.89, BCa 95% CI [-14.14, -1.90], was significant, *t*(439) = -2.38, *p* =.022. This represented a small effect of *d* = 0.29.

Additional *t*-tests were run on Alexithymia subscales, including Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DF) and Externally Orientated Thinking (EOT). Participants in the Social Media addiction group (*M* = 22.76, *SE* = 1.07) scored higher in Difficulty Identifying Feelings then the non-Social Media addiction group (*M* = 19.57, *SE* = 0.50). This difference, -3.18, BCa 95% CI [-5.66, -0.80], was significant, *t*(439) = -2.76, *p* =.007. This represented a medium effect of *d* = 0.34.

Participants in the Social Media addiction group (*M* = 25.62, *SE* = 1.19) scored higher in Difficulty Describing Feelings then the non-Social Media addiction group (*M* = 22.21, *SE* = 0.54). This difference, -3.41, BCa 95% CI [-6.22, -0.60], was significant, *t*(439) = -2.66, *p* =.012. This represented a medium effect of *d* = 0.32.

Participants in the Social Media addiction group (*M* = 22.69, *SE* = 1.13) scored higher in Externally Orientated Thinking then the non-Social Media addiction group (*M* = 21.40, *SE* = 0.53). This difference, -1.29, BCa 95% CI [-4.06, -1.37], was not significant, *t*(439) = -1.02, *p* =.319.

Alexithymia and DPIU Gaming

Participants in the Internet Gaming addiction group (*M* = 75.79, *SE* = 4.83) scored higher in overall Alexithymia then the non-Gaming addiction group (*M* = 63.68, *SE* = 1.36). This difference, - 12.11, BCa 95% CI [-21.57, -2.76], was significant, *t*(439) = - 2.59, *p* =.015. This represented a small to medium effect of *d* = 0.44.

Additional *t*-tests were run on Alexithymia subscales, including Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF) and Externally Orientated Thinking (EOT). Participants in the Gaming addiction group (*M* = 23.71, *SE* = 1.71) scored higher in Difficulty Identifying Feelings then the non-Gaming addiction group (*M* = 19.86, *SE* = 0.47). This difference, -3.35, BCa 95% CI [-7.52, -0.53], was significant, *t*(439) = -2.36, *p* =.035. This represented a small to medium effect of *d* = 0.41.

Participants in the Gaming addiction group (*M* = 27.26, *SE* = 1.83) scored higher in Difficulty Describing Feelings then the non-Social Media addiction group (*M* = 22.47,

SE = 0.51). This difference, -4.80, BCa 95% CI [-8.83, -1.12], was significant, *t*(439) = -2.65, *p* =.012. This represented a small to medium effect of *d* = 0.45.

Participants in the Gaming addiction group (*M* = 24.82, *SE* = 1.96) scored higher in Externally Orientated Thinking then the non-Gaming addiction group (*M* = 21.35, *SE* = 0.51). This difference, -3.47, BCa 95% CI [-7.50, 0.49], was not significant, *t*(439) = -1.95, *p* =.100. This represented a small effect of *d* = 0.34.

Alexithymia and DPIU Messaging

In contrast, participants in the Internet Messaging addiction group (*M* = 61.00, *SE* = 3.84) scored lower in overall Alexithymia then the non-Messaging addiction group (*M* = 65.21, *SE* = 1.41). This difference, 4.21, BCa 95% CI [-4.80, 12.61], was not significant, *t*(439) = 1.02, *p* =.328.

Additional *t*-tests were run on Alexithymia subscales, including Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DF) and Externally Orientated Thinking (EOT). Participants in the Messaging addiction group (*M* = 19.37, *SE* = 1.32) scored lower in Difficulty Identifying Feelings then the non-Messaging addiction group (*M* = 20.30, *SE* = 0.49). This difference, 0.92, BCa 95% CI [-1.81, 3.50], was not significant, *t*(439) = 6.44, *p* =.491.

Participants in the Messaging addiction group (*M* = 22.47, *SE* = 1.83) again scored lower in Difficulty Describing Feelings then the non-Messaging addiction group (*M* = 22.47, *SE* = 1.59). This difference, 0.46, BCa 95% CI [-3.02, 3.89], was not significant, *t*(439) = 0.29, *p* =.778.

Participants in the Messaging addiction group (*M* = 19.16, *SE* = 1.32) again scored lower in Externally Orientated Thinking then the non-Messaging addiction group (*M* = 21.97, *SE* = 0.53). This difference, 2.82, BCa 95% CI [-0.74, 5.76], was not significant, *t*(439) = 1.80, *p* =.052. Interestingly, this represented a small effect of *d* = 0.29, suggesting that those in the non-Messaging addiction group had close to significant levels of increased EOT.

Alexithymia and DPIU Sexual Content

Participants in the Sexual Content addiction group (*M* = 75.79, *SE* = 4.83) scored higher in overall Alexithymia then the non-Sexual Content addiction group (*M* = 75.79, *SE* = 4.83). This difference, -17.48, BCa 95% CI [-27.05, -7.92], was significant, *t*(439) = -2.49. *p* =.001. This represented a medium effect of d = 0.63.

Additional *t*-tests were run on Alexithymia subscales, including Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DF) and Externally Orientated Thinking (EOT). Participants in the Sexual Content addiction group (*M* = 27.50, *SE* = 2.17) scored higher in Difficulty Identifying Feelings then the non-Sexual Content addiction group (*M* = 19.92, *SE* = 0.47). This difference, -7.58, BCa 95% CI [-11.92, -3.15], was significant, *t*(439) = -3.11, *p* =.003. This represented a large effect of *d* = 0.79.

Participants in the Sexual Content addiction group (*M* = 29.75, *SE* = 2.18) scored higher in Difficulty Describing Feelings then the non-Sexual Content addiction group (*M* = 22.62, *SE* = 0.52). This difference, -7.13, BCa 95% CI [-11.25, -2.30], was significant, *t*(439) = -2.62, *p* =.002. This represented a medium to large effect of *d* = 0.66.

Participants in the Sexual Content addiction group (*M* = 24.31, *SE* = 2.16) scored higher in Externally Orientated Thinking then the non-Sexual Content addiction group (*M* = 21.55, *SE* = 0.51). This difference, -2.76, BCa 95% CI [-6.95, 1.70], was not significant, *t*(439) = -1.03, *p* =.195. This represented a small effect of *d* = 0.26.

Alexithymia and DPIU Shopping

Participants in the Internet Shopping addiction group (*M* = 71.39, *SE* = 5.28) scored higher in overall Alexithymia then the non-Shopping addiction group (*M* = 64.22, *SE* = 1.30). This difference, -7.17, BCa 95% CI [-18.69, 4.14], was not significant, *t*(439) = -1.39, *p* = .180.

Additional *t*-tests were run on Alexithymia subscales, including Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DF) and Externally Orientated Thinking (EOT). Participants in the Shopping addiction group (*M* = 23.65, *SE* = 2.02) scored higher in Difficulty Identifying Feelings then the non-Shopping addiction group (*M* = 19.93, *SE* = 0.47). This difference, -3.71, BCa 95% CI [-8.12, 0.10], was not significant, *t*(439) = -2.07, *p* =.079. This represented a small effect of *d* = 0.39.

Participants in the Shopping addiction group (*M* = 26.61, *SE* = 2.29) scored higher in Difficulty Describing Feelings then the non-Shopping addiction group (*M* = 22.60, *SE* = 0.53). This difference, -4.02, BCa 95% CI [-9.08, 1.01], was not significant, *t*(439) = -2.02, *p* =.088. This represented a small effect of *d* = 0.38.

Participants in the Shopping addiction group (*M* = 21.13, *SE* = 1.79) scored lower in Externally Orientated Thinking then the non-Shopping addiction group (*M* = 21.69, *SE* = 0.54). This difference, 0.56, BCa 95% CI [-2.96, 4.34], was not significant, *t*(439) = 0.29, *p* =.748.

Alexithymia and DPIU Info Seeking

Lastly, participants in the Internet Info Seeking addiction group (*M* = 71.50, *SE* = 4.47) scored higher in overall Alexithymia then the non-Info Seeking addiction group (*M* = 64.15, *SE* = 1.39). This difference, -7.35, BCa 95% CI [-16.86, 2.45], was not significant, *t*(439) = -1.49, p =.118.

Additional *t*-tests were run on Alexithymia subscales, including Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DF) and Externally Orientated Thinking (EOT). Participants in the Info Seeking addiction group (*M* = 23.12, *SE* = 1.71) scored higher in Difficulty Identifying Feelings then the non-Info Seeking addiction group (*M* = 19.95, *SE* = 0.47). This difference, -3.17, BCa 95% CI [-6.68, 0.03], was not significant, *t*(439) = -1.84, *p* =.067. This represented a small effect of *d* = 0.33.

Participants in the Info Seeking addiction group (*M* = 24.59, *SE* = 1.78) scored higher in Difficulty Describing Feelings then the non-Info Seeking addiction group (*M* = 22.74, *SE* = 0.53). This difference, -1.85, BCa 95% CI [-5.63, 1.93], was not significant, *t*(439) = -0.97, *p* =.299.

Participants in the Info Seeking addiction group (*M* = 23.79, *SE* = 1.90) scored higher in Externally Orientated Thinking then the non-Info Seeking addiction group (*M* = 21.47, *SE* = 0.52). This difference, -2.32, BCa 95% CI [-6.44, 1.80], was not significant, *t*(439) = -1.24, *p* =.224.

3.10.3 Experiential Avoidance (BEAQ) and Internet Addiction Subscales

A series of t-tests were performed to examine the relationship between Experiential Avoidance and Internet Addiction subscales.

Experiential Avoidance and DPIU Entertainment & Video Streaming

Participants in the Entertainment addiction group had higher overall Experiential Avoidance scores ($M = 53.58$, $SE = 1.48$) then the non-Entertainment Addiction group ($M = 45.17$, $SE = 0.63$). This difference, -8.41, BCa 95% CI [-11.56, -5.40], was significant, $t(439) = -4.92$, $p = 0.001$, and represented a medium effect of $d = 0.68$.

Experiential Avoidance and DPIU Social Media

Participants in the Social Media addiction group had higher overall Experiential Avoidance scores ($M = 52.45$, $SE = 1.18$) then the non-Social Media Addiction group ($M = 44.83$, $SE = 0.69$). This difference, -7.62, BCa 95% CI [-10.31, -5.16], was significant, $t(439) = -5.17$, $p = 0.001$, and represented a medium effect of $d = 0.61$.

Experiential Avoidance and DPIU Gaming

Participants in the Gaming addiction group had higher overall Experiential Avoidance scores ($M = 52.42$, $SE = 2.11$) then the non-Gaming Addiction group ($M = 45.74$, $SE = 0.64$). This difference, -6.68, BCa 95% CI [-11.20, -2.43], was significant, $t(439) = -3.15$, $p = 0.002$, and represented a medium effect of $d = 0.53$.

Experiential Avoidance and DPIU Messaging

Participants in the Messaging addiction group had higher overall Experiential Avoidance scores ($M = 49.24$, $SE = 1.95$) then the non-Messaging Addiction group ($M = 45.94$, $SE = 0.63$). This difference, -3.30, BCa 95% CI [-7.39, -0.49], was not significant, $t(439) = -1.76$, $p = 0.079$. However, there was a small effect of $d = 0.26$.

Experiential Avoidance and DPIU Dating Apps & Gambling

Due to the small sample size for both DPIU Dating ($n=2$) and Gambling ($n= 9$) addiction groups, no *t*-test comparisons were made.

Experiential Avoidance and DPIU Sexual Content

Participants in the Sexual Content addiction group had higher overall Experiential Avoidance scores (M = 56.38, SE = 2.75) then the non-Sexual Content Addiction group (M = 45.94, SE = 0.63). This difference, -10.44, BCa 95% CI [-15.77, -4.87], was significant, t(439) = -3.28, p = 0.001, and represented a large effect of d = 0.83.

Experiential Avoidance and DPIU Shopping

Participants in the Shopping addiction group had higher overall Experiential Avoidance scores (M = 48.77, SE = 2.11) then the non-Shopping Content Addiction group (M = 46.13, SE = 0.64). This difference, -2.64, BCa 95% CI [-6.10, 1.47], was not significant, t(439) = -3.28, p = 0.262. This represented a small effect of d = 0.21.

Experiential Avoidance and DPIU Info Seeking

Participants in the Info Seeking addiction group had higher overall Experiential Avoidance scores (M = 54.00, SE = 1.80) then the non-Info Seeking Addiction group (M = 45.68, SE = 0.64). This difference, -8.32, BCa 95% CI [-12.33, -4.83], was significant, t(439) = -3.75, p< 0.001. This represented a medium effect of d = 0.66.

3.10.4 *Depression (PHQ-9), Generalised Anxiety Disorder (GAD-7) and Internet Addiction Subscales*

In order to further test the hypothesis that depression and generalized anxiety disorder were significantly associated with Internet Addiction, Pearson's Chi-square tests were used to explore individual Internet Addiction behaviours. Significant associations were found between Depression and Entertainment, χ2 (4) = 31.696, p < .001, Social Media, χ2 (4) = 32.832, p < .001. Fisher's exact tests were also run where appropriate, with significant associations found between Depression and Sexual Content, P = .006, Shopping, P = .010.

Additional Pearson's Chi-square tests were also run to explore associations between levels of GAD and Internet Addiction subscales. Significant associations were found between GAD and Entertainment, χ2 (4) = 14.729, p = .007, Social Media, χ2 (4) = 42.200, p < .001. Fisher's exact tests were also run, with significant associations found between GAD and Messaging, P = .010 , Sexual Content, P = .005, along with GAD and Shopping, P = .016.

3.11 Mediation Regression Analysis

In order to test the hypothesis that Experiential Avoidance acts as a mediator variable between Attachment and Internet Addiction, a Process mediation analysis was performed. This was conducted in order to explore the role of Experiential Avoidance (BEAQ) in explaining the variance between Attachment (ECR-S) and Internet Addiction (DPIU), (IV: Attachment, Mediator: Experiential Avoidance, DV: Internet Addiction).

Against what was anticipated, while higher levels of Attachment were associated with higher levels of Experiential Avoidance, there was no significant indirect effect of Attachment on Internet Addiction through Experiential Avoidance, $b = 0.026$, 95% BCa CI [0.015, 0.039].
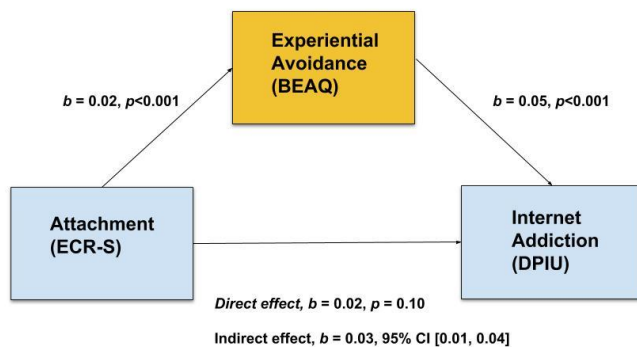
Figure 2: model of Attachment as a predictor of Internet Addiction, mediated by Experiential Avoidance. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 2000 samples.

A further set of mediation tests were performed on the two subtypes of Attachment (anxiety and avoidance) in order to explore whether Experiential Avoidance mediated their effect on Internet Addiction (IV: Attachment anxiety, Mediator: Experiential Avoidance, DV: Internet Addiction). Higher levels of Attachment anxiety were associated with higher levels of Experiential Avoidance and there was a significant indirect effect of Attachment anxiety on Internet Addiction through Experiential Avoidance, $b = 0.035$, 95% BCa CI [0.021, 0.053].
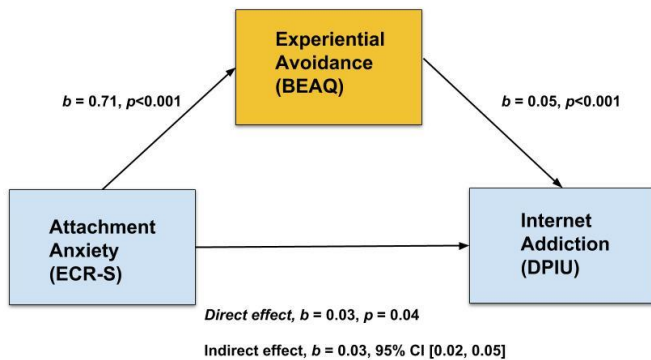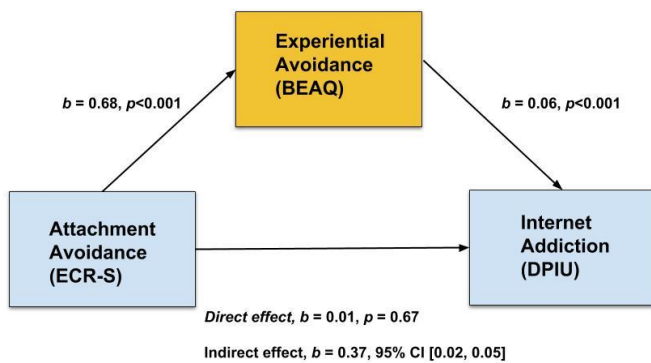
Figure 3: model of Attachment anxiety as a predictor of Internet Addiction, mediated by Experiential Avoidance. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 2000 samples.

Higher levels of Attachment avoidance were associated with higher levels of Experiential Avoidance although there was no significant indirect effect of Attachment avoidance on Internet Addiction through Experiential Avoidance, *b* = 0.372, 95% BCa CI [0.025, 0.055].

Figure 4: model of Attachment avoidance as a predictor of Internet Addiction, mediated by Experiential Avoidance. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 2000 samples.

In conclusion, variance between insecure Attachment anxiety and Internet Addiction is significantly mediated by Experiential Avoidance, while overall insecure Attachment and Attachment avoidance is not.

4 CHAPTER 4: DISCUSSION

4.1 Chapter overview

The aim of this cross-sectional study was to advance understanding of the relationship between attachment, alexithymia, experiential avoidance and Internet Addiction. It did this by exploring differences between Internet Addiction and non-addiction groups. Additionally, it sought to examine differences between Internet Addiction as a generalised concept and as a group of specific online behaviours. This is particularly pertinent when considering new technologies, the width and breadth of new online activities and the need for further research in this area following the creation of the DSM-5 category 'Substance Use and Addictive Disorders' (APA, 2013).

Previous studies have shown that attachment is related to both Internet Addiction and individual problematic behaviours (Blackwell et al., 2017; Bolat et al., 2017; Eichenberg et al., 2017). However, it has not been explored across a range of dimensions within a single study. Thus, hypothesis A in this present study asserted that there would be significantly higher levels of insecure attachment, including anxious and avoidant attachment, in the IA groups than the non-IA groups. Hypothesis B stated that there would be significant differences in insecure attachment type (anxious/avoidant) and IA group dimensions e.g. anxious attachment would have significantly higher scores within the Entertainment addiction group, while avoidant attachment would not.

Support for both hypothesis A and B were found in the results. *T*-tests were used to establish significant differences between groups, with higher levels of insecure attachment (sum, avoidant and anxious) being significantly related to the IA group. Significantly higher levels of insecure attachment were also found between IA dimension groups and non-IA groups, of which the details will be further expanded upon later in the discussion.

Hypothesis C related to the role of alexithymia in IA and the IA dimensions. As with attachment, alexithymia has also been examined in previous IA research (Scimeca et al., 2014; Dalbudak et al., 2013). However, prior studies had not investigated both general and specific dimensions of IA, nor had they used the *attention-appraisal* model for alexithymia. Hypothesis C therefore examined the relationship between alexithymia and IA, with the assertion that higher levels of alexithymia would be

associated with both general and specific IA dimensions. Indeed, the findings gave support for this with significantly higher levels of alexithymia (including subscales) found in the IA group then the non-IA group. Additionally, this significant difference between groups extended to the IA dimension groups, although curiously not with Messaging or Shopping addiction. All findings will be expanded upon later in the discussion.

Hypothesis D examined the role of experiential avoidance in mediating between attachment and IA. There have been numerous studies connecting experiential avoidance with IA and demonstrating a role in mediating other types of psychopathy (Chou et al., 2018; Levin et al., 2018). However, previous research has not looked specifically at the role of experiential avoidance in mediating the effect of attachment type on IA. Partial support for this hypothesis was found, with significant mediating effects found for attachment anxiety, but not avoidant or general insecure attachment.

Finally, hypothesis E stated that there would be significantly higher levels of depression and anxiety with both IA and IA dimensions over and non-IA groups, Support for this was found, with significant differences between general IA and non-IA groups. Additionally, significant differences between IA dimension groups were also found, with associations between depression and Entertainment, Social Media, Sexual Content and Shopping. Anxiety was also associated with Entertainment, Social Media, Messaging, Sexual Content and Shopping.

Commented [RP48]: Revised with updated hypothesis titles as per feedback point 28.

This chapter will first review the demographic characteristics, followed by group comparisons where each hypothesis will be discussed with explanations relating to the findings. Additionally strengths and limitations of the study will be discussed, followed by theoretical and therapeutic implications. Lastly, future research options will be reviewed and deliberated upon.

4.2   Demographics

This present study aimed to explore a sample of Internet users from a varied set of demographics. Indeed, it was successful with that aim, with a mean age of 35 years and range of 18-72 years. Therefore it had the advantage of not being focused primarily on students of a certain younger age like many other Internet Addiction studies (Van Ameringen et al., 2018). It did however have a gender bias that has also been common in other fellow studies (Van Ameringen et al., 2018), with female

respondents being greater in number (66.7%) then male counterparts. This may well be a result of the recruitment method in this present study e.g. online and using social media channels that may have a gender bias in terms of usage numbers.

While no significant differences in gender were found between the Internet Addiction and non-Internet Addiction groups, significant differences were found when analysing dimension behaviours. Females had significantly greater chances of addiction for Social Media (2.2 times more likely then males), Messaging (6.5 times more likely then males) and finally, Shopping (4.8 times more likely then males). On the other side, males were significantly more likely to become addicted to Gaming (2.3 times more likely then females) and Sexual Content (16.3 times more likely then females). Unfortunately due to the low numbers reporting Gambling or Dating Apps addiction, no analysis was possible and thus, it is unknown whether such activities may have been more prone to any specific gender. However, the gender differences relating to specific online activities are not unusual and the findings in this present study match those that have seen a gender bias elsewhere, particularly in relation females having a higher chance of becoming addicted to Social Media and males being more likely to become addicted to Gaming (Andreassen et al., 2016; Estevez et al., 2017; Konok et al., 2016).

Exact reasons for such gender differences are unclear, however, Andreassen et al. (2016) proposed different motivations relating to both e.g. social affiliation is a core aim for Social Media, while escapism, achievement and immersion were suggested as reasons for Gaming. Another study by the same group of researchers (Andreassen et al., 2017), found that problematic Social Media use was connected to being young, female and single. However, they also found that low self-esteem was significant (with a medium effects size) and speculated that individuals would go online and use Social Media in order to boost their self-esteem or escape negative affect. This matches, to an extent, the findings in this present study, where the largest majority age group in the Social Media Addiction group was 25 years and below (see Table 5 in the Results chapter). However, this study found no significant relationship between being single with a higher use of Social Media, thus suggesting there are other factors involved which need to be explored. Indeed, the social affiliation motivation may well also apply to Messaging too, which indicated that there is a notable bias towards increased communication with females over men. Although interestingly, this present study found Social Media and Messaging to be quite distinct in terms of the investigated measures. The former had higher anxious

attachment (medium effect size), which might be expected, along with higher (small effect size) levels of alexithymia (difficulty identifying and describing feelings), which supports both the social affliation and escape negative affect proposal (Andreassen et al., 2017). Indeed, the connection between Social Media and anxious attachment in this present study supports that idea. Messaging, however, appears quite different according to our findings, which no significantly higher attachment, alexithymia or experiential avoidance scores. While surprising, when considering the relational role of attachment, this suggests very different motivations between the two addictive behaviours and highlights the need for further research on specific types of use in relation to both behaviours.

Sexual Content addiction were notably favoured by males over females, which is not particularly surprising although the odds are by far the largest out of all of the dimensions in relation to gender differences. This also matches findings in previous studies (Levin, Lee & Twohig, 2018; Wetterneck, Burgess, Short, Smith & Cervantes, 2012), although such difference may also highlight the inherent issues with self-report data collection. It is possible to speculate, particularly when considering the social affiliation motivation, that females are less likely to self-report use of pornography or use of sexual content then men, particularly when being directed to fill in the report via a social media portal. This, of course, must be considered with data collected across all dimensions of Internet use, with it being likely this may also apply to men and shopping. This is where the collection of actual user data would be of supreme value in the potential to draw comparisons with self-reported online activity. The findings in this present study thus support the notion that there is more value in investigating individual dimensions of Internet Addiction rather than overall, particularly in relation to gender.

A significant difference was found between Age and Internet Addiction, with the highest proportion of addiction found in the <25 years group (56%), with it reducing in the following age-groups; 26-32 years (50%), 33-41 years (30%) and rising marginally within the 42> years age group (33%). This reflects, to some extent, findings in the Ofcom report (Ofcom report, 2018), where there is lower penetration of Internet technology use in older age groups. It is possible to speculate about different life conditions across these age groups and a reduction in psychological triggers that may lead to addiction, as suggested in previous studies (Cheng & Li, 2014; Chern & Huang, 2018). This significant difference also extended to the following Internet Addiction dimension behaviours; Entertainment, Social Media,

Shopping and Sexual Content. Entertainment addiction has its highest proportion in the <25 years age group (29%), followed by the 26-32 years age group (15%) and a drop after that for the next group aged 33-41 years (3%). This again suggests that new technology and ways of using the Internet has a gradual attachment rate depending upon the necessity and effort it takes for older age groups to find value in such new approaches. Social Media addiction reflects a similar pattern. Other online behaviours that do not have significant differences between age groups arguably have a tendency to closer resemble older technology e.g. Messaging, Gaming or Info Seeking.

While no significant differences were found between Ethnicity and Internet Addiction, they were found with Entertainment and Sexual Content. Due to the predominance of white ethnicity (N=354) and the low numbers of other ethnic groups in the rest of the sample, with Asian/Asian British being the second largest group (N=58) these results should be taken with caution and further research with larger samples may be required. This also applies to education level, a significant difference was found with the Messaging dimension, although it should be noted again that the sample sizes were small and thus, inferences about plausible explanations may be limited.

In terms of demographic region, data was collected primarily in the UK (65%), however as the research was conducted online data was also accepted from the rest of Europe (13%) and indeed, the rest of the World (22%). No significant differences were found between Internet Addiction and non-addiction groups when considering region, although prevalence rates were far higher then previously recorded which again reflects the choice of measure (DPIU). However, significant differences were found within the Gaming and Sexual Content Internet dimensions. Rest of the world region had the highest prevalence rate for Gaming (15%) in comparison to the UK with the lowest (6%). Again, the rest of the world had the highest prevalence for Sexual Content (8%) in comparison to the UK with the lowest (2%). It is not clear why this might be the case, although this does, to some extent correspond with previous research findings relating to both region and socio-economic factors (Cheng & Li, 2014; Chern & Huang, 2018). Cheng & Li (2014) found that such socio-economic factors were key in explaining different prevalence rates, emphasizing the connection with quality of life. Evidence for this was also found using other measurements of quality of life (Chern & Huang, 2018), which connected IA with economic status, where those with greater financial expenditure on the Internet may experience a lower environmental quality of life.

While this present study did not collect specific data on socio-economic factors, it did look at working hours and self-perceived social class status, with partial support found for Chern & Huang's findings (2018). A significant relationship was found for working hours, but not social class. This might be due to the belief in the UK that social class is inherently stable and independent of particular working hours. Within the Internet Addiction group, the split between working 35 hours or more (47%) and working 35 hours or less (50%) was almost equal. However, this was markedly different in the non-Internet Addiction group, with a higher number working 35 hours or above (64%) in contrast to those working 35 hours or less (35%). This appears to indicate evidence for the intuitive suggestion that Internet Addiction can negatively impact upon employment, in part due to the preoccupation and increasing amount of time required due to increased tolerance (APA, 2013). This may also apply to the significant differences found within the Internet Addiction dimensions, which were found with Entertainment, Social Media and Gaming subtype groups. Entertainment was the most significant of those three problematic dimensions and it is easy to speculate why, considering the way in which streaming video services (such as Netflix or Youtube) encourage users to continue watching consecutive episodes with such features as auto-play. It is quite possible to speculate that users gain a sense of achievement or social validation through completing a box-set or watching a film recommended by others.

In terms of relationship status, no significant differences were found between status (in a relationship or not) and the two Internet Addiction or non-addiction groups, which might seem surprising considering negative impact on relationships is part of the DSM-5 criteria for addiction (APA, 2013). However, inspecting the data further revealed that there was a significant difference between Internet Addiction and non-addiction groups when it came to those who were living together in a relationship, rather than those who were living apart. Indeed, this was significantly linked to one specific problem dimension; Entertainment. This suggests that, while watching online videos is not seen as problematic for those in a relationship but living apart, it becomes a problem for those living together. As found in this present study, those presenting with Entertainment addiction are more likely to have an anxious attachment type rather than avoidant, with elevated levels of alexithymia and notable levels of experiential avoidance (medium-large effect size). This might suggest those living together use Entertainment/Video streaming as a form of alleviating anxiety and to help with difficulty identifying feelings. However, clearly while this puts

> **Commented [RP49]:** Removed 'we'.

pressure on the relationship, it may not necessarily end the relationship. When considering the DPIU scale criteria for addiction, it may well be that the negative consequences relating to relationships and receiving criticism about online activities from a partner is relevant here. It could be speculated that for someone who has anxious attachment, the perception of receiving criticism may well be elevated and this may even lead to increased use of Entertainment in order to help navigate and indeed, regulate their emotions (Flores, 2004). Future studies may well consider investigating whether those in a relationship engage with potential problem activities with their partners or not.

Lastly and against what was expected, there were no significant differences between Internet and no-addiction groups in relation to social class. Previous research has indicated (Chern & Huang, 2018) that those with lower social class are more likely to engage in addictive behaviours. However, this has not been the case with the population tested in this present study, although this could be due to the nature of what was being asked (e.g. working class, middle-class, affluent) rather than being asked for a specific number relating to yearly financial earnings.

4.3   Internet Addiction

4.3.1   DPIU Internet Addiction Prevalence

Overall, 43% of the 441 participants in the present study were classified according to the Internet Addiction criteria in the Dimensions of Problematic Internet Use scale. This prevalence is consistent with the rate found in a previous study (42%), using the same scale on a smaller sample of 254 student participants in North America (Van Ameringen et al., 2018).

Within that total, 23% were classified with one problem dimension, 14% were classified with two dimension types and finally, 7% were classified with three or more distinct problem dimensions. This indicates just how widespread Internet Addiction is when using diagnostic criteria based on the DSM-5 addictive disorder category. It also shows that caution may be required here, particularly in light of criticisms leveled at such diagnostic criteria in relation to IA behaviours (Kuss et al., 2017). Such caution extends to the lack of any defined method for assessing severity of the problematic behaviour and whether it occurs in the short-term or long-term.

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Indeed, as argued in the Van Ameringen et al. (2018) study, it also suggests that older scales based on prior Internet technology may no longer be appropriate in measuring current addiction, particularly when considering the variety of problem dimensions now available. Indeed, this present study found that Social Media had the highest prevalence out of the numerous dimensions (20%), followed by Entertainment (14%), Messaging (12%) and Gaming (9%). The least reported problem dimensions were Dating Apps (1%) and Gambling (1%). This also mirrored the Van Ameringen et al. (2018) study in terms of the most commonly reported problem dimensions, although they found that Entertainment (video streaming services) had the highest prevalence, followed by Social Media and then Messaging.

Such prevalence levels differ markedly from older estimates that cited 1.2% for overall IA within the general UK population back in 2010 (Morrison & Gore, 2010). It is likely that this is, at least in part, due to the scale used to measure general Internet Addiction (DPIU) as a set of dimensions in comparison to older and more commonly used scales e.g. Young's Internet Addiction Test (1998). That said and as pointed out by Van Ameringen et al. (2018), the use of a modern scale based on more recent DSM-5 criteria (APA, 2013) may well better reflect actual prevalence in the general population. While it may be tempting to draw conclusions based on ever increasing access to Internet technology, the evidence for this is rather mixed. The meta-analysis by Cheng and Li (2014) found no connection between Internet penetration rates and IA prevalence, while the Lei et al. (2018) research (also a meta-analysis) found regions with the most developed Internet infrastructure had the highest IA prevalence.

Based on the differences found between separate dimensions of Internet Addiction found in this present study, it is clear that the type of behaviour is key and looking at general IA prevalence arguably provides limited value. The Lei et al. study (2018) was more recent and may better reflect changes in the way the Internet is used. Such new ways of using the Internet rely not simply on access to the Internet alone, but on the types of technology available. In which case, type of access/technology may be a key part of this discussion, particularly when considering ever-increasing access to more advanced and rapidly evolving Internet technology (ONS report, 2018; Offcom report, 2018).

4.3.2 *Internet Addiction, Depression and Anxiety*

Findings in this present study revealed that 36% of participants within the total sample were classified with mild-to-severe depression according to the PHQ-9. Numbers of those classified with mild-to-severe generalised anxiety according to the GAD-7 were virtually identical (36%). This is notably higher then UK prevalence of depressive disorders reported in the general population (5%) in 2015 (ONS, 2019). However this may well be a case of measurement, as the numbers are closer when only considering those with severe depression (4%). A significant difference was also found between Internet Addiction (51%) and non-addiction (24%) groups in relation to prevalence of depression. This significant difference was, perhaps unsurprisingly, mirrored between the Internet Addiction group (52%) and non-addiction group (24%) in relation to prevalence of generalised anxiety. Additionally, Internet Addiction dimensions with a significant relationship to both depression and anxiety were Entertainment, Social Media, Sexual Content, Shopping, while anxiety was uniquely connected to Messaging.

While it does appear intuitive to associate Messaging and anxiety based on wising to pursue support, comfort or to alleviate negative affect, it remains surprising that this is not connected to anxious attachment. This may well warrant further investigation and perhaps, the use of a different type of attachment scale that may focus on wider adult attachments rather than romantic ones. Additionally, while Gaming had been associated with depression in past studies (Andreassen et al., 2016) this was not found in the present study, which may suggest that alternative online behaviours are instead preferred or that available gaming options were different in the sample used here. Again, this stresses the need for more specific data relating to the type of game being played.

In which case, the relationship between both depression and anxiety as outlined in previous studies (Kardefelt-Winther, 2014; Van Ameringen et al., 2018) is replicated here and indicates that Internet Addiction may well be the consequence of such psychopathology (Cho et al., 2013), or indeed part of the cause. Kardefelt-Winther (2014) suggested that Internet Addiction might be a coping strategy for depression and anxiety. While this present study does not have a central focus on this relationship, there is partial support for this notion with the advantage of highlighting specific Internet Dimensions related to both depression and anxiety. Cho et al. (2013) found that childhood depression/anxiety were significantly related to future

Internet Addiction and thus, it is possible to theorise that depression, anxiety and Internet Addiction are all by-product of an inadequate attachment system.

4.3.3   Attachment System & Internet Addiction

This study contained a core aim of investigating an extended attachment system based on secure/insecure (avoidant or anxious), alexithymia and experiential avoidance. It was hypothesised that insecure attachment would result in a higher chance of addictive behavours, based on Internet Addiction providing a compensatory strategy for both anxious and avoidant individuals (Blackwell et al., 2017; Bolat et al., 2017; Eichengerb et al., 2017; Schimmenti et al., 2014). Additionally, it was hypothesised that the addictive behaviours would differ depending upon the specific characteristics of avoidant or anxious attachment types (Nitzberg & Farber, 2013; Lin et al., 2011).

Significant differences were found between Internet Addiction and non-addiction groups when considering overall attachment levels, including both anxious/avoidant attachment. Effect sizes were deemed to be medium for overall attachment (0.5), anxious attachment (0.5) and small for avoidant (0.3). This connection between insecure attachment and Internet Addiction confirmed what had been hypothesised in this present study and indeed, replicated a number of previous studies (Blackwell et al., 2017; Bolat et al., 2017; Osborne & Liss, 2017). This provides further support for the idea that Internet Addiction may act as an external regulator for internal emotional states that are otherwise hard to tolerate (Flores, 2004). Additionally, it replicates the findings in the study by Eichenber et al. (2017), which found a stronger relationship between anxious ambivalent insecure attachment and Internet Addiction in contrast to avoidant attachment. This seems intuitive, particularly when deploying the presumption that Internet Addiction is used primarily for communication and connecting to others. In that sense, those with impaired interpersonal relationships (anxious insecure attachment) use the Internet to compensate for social and communicative deficits. Of course, there are many dimensions and types of Internet Addiction and thus, this will be explored further when discussing those.

Significant differences were also found between Internet Addiction and non-addiction groups in relation to overall levels of alexithymia. This therefore adds weight to the theory that alexithymic individuals try to regulate their emotions through both impulsive and compulsive behaviours (Taylor et al., 1991). While this was a small to

medium effect size (0.4), it should be noted that the subscales tested for alexithymia were also significant. Difficulty Identifying Feelings had a medium effect size (0.5), while Difficulty Identifying Feelings (0.4) and Externally-orientated Thinking (0.2) both had smaller effects. This replicates previous research that also found significant connections with Internet addiction, particularly the greater influence of DIF and less impactful (but still significant) EOT. This is the first time the *attention-appraisal* model of alexithymia has been used for exploring Internet Addiction (Preece et al., 2017). When applying this theory, this suggests that the core components (according to effect size) of DIF and DDF relate to the appraisal stage within the four-stage sequence, while the lesser component of EOT relates to the attention stage (Gross, 2015; Preece et al., 2018). This suggests that those with Internet Addiction may experience a situational trigger and be attentive to it, however the way they then appraise and understand that trigger is problematic in terms of both grasping the feeling and then being able to communicate it. EOT suggests a lesser problem with the attention stage, where they may struggle to direct their focus towards an emotional response.

In which case, the findings here suggest that those with Internet Addiction have quite specific methods of processing both cognitions and emotions (Lane & Schwartz, 1992) within their extended attachment system. This study therefore adds to prior evidence, such as the study by Mei et al. (2018), that those with alexithymia use the Internet as a compensatory way of experiencing or expressing their feelings. However, such theories will be explored in further detail when considering individual Internet Addiction dimensions.

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There was also a significant difference between Internet Addiction and non-addiction groups when considering levels of experiential avoidance. This was a medium to strong effect size (0.7) and provides further evidence that Internet Addiction is more likely when a person more often avoids painful or difficult thoughts, feelings, memories and physical sensations (Hormes et al., 2014). This corresponds with previous research (Baker et al., 2014) connecting experiential avoidance with other addictive behaviours and adds weight to the proposed theory that higher levels of EA increase the solidity of an attachment system, reducing the adaptable mechanisms within the Internal Working Model. Baker et al. (2014) argued that EA might play a key role in the maintenance of addictive behaviours through avoidance of negative affect such as craving and withdrawal. Indeed, the findings in this present study

support this idea in relation to Internet Addiction, particularly in light of the DSM-5 criteria used in the DPIU.

A mediation analysis confirmed a significant mediating effect of EA between attachment anxiety and Internet Addiction, thus providing evidence for previous findings that had related to other types of addiction (Baker et al., 2014; Farris et al., 2015; Riley, 2014; Stewart et al., 2002). However, while those studies all contained clinical populations and were related to either substance abuse or gambling disorder, the findings in the present study are the first that have identified EA as a mediating factor in relation to Internet Addiction and within a non-clinical population. Farris et al. (2015) identified EA as a malleable cognitive vulnerability which predicted levels of pre-quit withdrawal, craving and negative affect in smokers. Together with the findings in this present study, this raises the fascinating prospect of exploring how reducing EA, via increasing a willingness to experience previously intolerable feelings, may help with potential treatment for Internet Addiction. There are limitations here, however, with EA not found to function as a mediating factor for avoidant attachment or overall attachment (both anxious and avoidant). This is a curious result and suggests that avoidant attachment maintains a stable relationship with Internet Addiction even when levels of EA are reduced. In which case, it is possible to speculate that those with attachment avoidance may not recognise patterns of avoidance relating to intolerable private experience.

The findings in this present study suggest that Internet Addiction is connected to an impaired attachment system, based on insecure attachment, difficulty identifying, describing and appraising feelings along with an overall inability to remain in contact with negative private experiences. With anxious insecure attachment, it is likely that the role of experiential avoidance (medium-large effect size) reduces the opportunities for resolving Internet Addiction or indeed, evolving the internal symbolic representation of self (De Rick et al., 2009). However, the mediating role of experiential avoidance does not appear to apply to avoidant attachment, which suggests a more rigid attachment system, even when being willing to face intolerable feelings, thoughts or private experiences. Framing this within attachment theory, this supports the idea that Internet Addiction is a result of a maladaptive attachment system and acts as a delayed attachment transition (Hofler & Kooyman, 1997). At a general level, it remains unclear what the motivations may be for Internet Addiction, however when considering an impaired attachment system, we might consider the pursuit of proximity, availability, responsiveness (Bowlby, 1969), contact and comfort

(Khantzian, 1978) and a way of alleviating distress (Flores, 2004) as a form of emotional self-regulation. These concepts will be further explored within specific Internet Addiction dimensions.

4.4   Dimensions of Internet Addiction

4.4.1   Entertainment/Video Streaming

Another core aim of this present study was to examine Internet Addiction in terms of individual dimensions. It was hypothesised that individual dimensions would differ enough to be distinct in their own right in terms of the specific attachment system (attachment types and alexithymia). Previous research suggested that attachment type might relate to the way a specific online behaviour is used in a way that may contribute to it being problematic (Di Trani et al., 2017; Estevez et al., 2017; Tonioni et al., 2014).

The Entertainment & Video Streaming addiction group had a significantly higher level of both overall attachment and anxious attachment over non-addiction groups. Both had a small to medium effect size (0.4) and while avoidant attachment was not significantly different, it still showed a small effect size (0.2). This makes sense when considering the proposed function of IA as helping to regulate emotions and being in pursuit of comfort and contact (Khantzien, 1978). It is possible to speculate, based on past research, that those who are anxiously attached may be able to help deactivate their attachment system through the medium of Entertainment and the proxy of fictional (or non-fictional) role-models or attachment figures. Silver and Slater (2019) found that those with anxious attachment are more likely to become more engaged with fictional narratives, suggesting that the medium of entertainment allows for the creation of a safe space to explore otherwise overwhelming situations or difficult feelings. In this sense, they get to practice what might be too difficult to tackle in the real world e.g. separation or loss. Equally, they found that those with avoidant attachment exhibited characteristics befitting their relational style e.g. they avoided connecting closely with fictional characters and showed avoidance behaviours, such as losing attention or become distracted. In which case, those who are anxiously attached may gain a sense of comfort and perhaps a kind of proximity with characters they watch on-screen, while also practicing the regulation of emotions or difficult feelings.

Alexithymia levels were also significantly higher in the Entertainment & Video Streaming addiction group when compared to the non-addiction group, with a small to medium effect size (0.4). Additionally, the alexithymia subscales also showed a significant and marginally larger effect size for Difficulty Identifying Feelings (0.5) and Difficulty Describing Feelings (0.4), while Externally-orientated Thinking was not significant yet had a small effect size (0.3). As observed with general Internet Addiction, this alexithymia profile with Entertainment suggests core issues with the appraisal stage (DIF/DDF) and to a lesser extent, the attention stage (EOT). In which case, an individual might be able to pay attention to an emotion but then struggle to make sense of it.

At the point of writing, this may be the first set of results that connect high levels of alexithymia and specifically, DIF and DDF with the specific problematic behaviour of Entertainment & Video Streaming. This appears to add weight to the idea that those who have issues with emotion regulation may look to external assistance through attachment figures within Television/Film or services like Youtube that do not risk rejection (Silver & Slater, 2019). In which case, such individuals who have difficulty identifying or describing their own feelings might find that assistance in experiencing such feelings safely through the fiction or through the elevated sense of comfort and safety initiated by a sense of proximity and availability (Bowlby, 1973).

Additionally, experiential avoidance was significantly higher in the Entertainment & Video Streaming addiction group when compared to the non-addiction group, with a medium to large effect size (0.7). In accordance to the proposed idea in this present study, this suggests low adaptability in terms of an internal working model, with a reluctance to engage with private experiences and high levels of avoidance. This therefore results in the use of Entertainment & Video Streaming as an experiential avoidance strategy to regulate such negative private experiences emerging through the insecure attachment system. These findings reflect the role experiential avoidance has played in other Internet Addiction studies (Chou et al., 2017), where the Internet was deemed to be a form of self-medication in response to interpersonal difficulties. This was certainly found in this present study when considering the role of anxious attachment and alexithymia. Chou et al. (2017) proposed that experiential avoidance was associated with increased vulnerability to negative affect and this is, in part, evidenced by the findings in this present study with regard to Entertainment & Video Streaming addiction.

4.4.2   Social Media

Attachment scores were significantly higher (overall, anxious and avoidant) within the Social Media addiction group in comparison to the non-addiction group. Anxious attachment had a larger effect size (0.6) then either overall or avoidant (0.4). This matches previous research (Blackwell et al., 2017; Nitzburg & Farber, 2013), where increased use of Social Media for those who are anxiously attached, may allow for a sense of closeness or intimacy through a sense of connecting to others. Nitzburg & Farber (2013) suggested that those who are anxiously attached wished to avoid face-to-face communication, while still wishing to build relationships from a safe distance and did so through Facebook. The results in this present study are therefore different to Nitzburg & Farber (2013), in that they found no connection between avoidant attachment and problematic Facebook use. This goes against what was anticipated and based on avoidant attachment characteristics, it was hypothesised that alternative forms of Internet use without a social component would be preferred. In which case, it may well be that Social Media applications have changed and expanded in terms of functionality over the past five years since the Nitzburg & Farber (2013) study was published. Indeed, more recent Social Media apps like Instagram may well be favoured by those with avoidant attachment, due to the focus on photography rather than communication. Equally, Bartholomew's adult attachment model (1990) may provide an explanation in terms of the fearful avoidant attachment type, where an individual desires closeness and intimacy but maintains a distance in order to avoid rejection. This could explain the findings in the present study and provides a motivation for using Social Media in a very specific way, equally, future research may benefit from collecting actual data relating to this kind of use.

It is possible to again use the idea of a safe space here (Silver & Slater, 2019), where social media helps to mitigate attachment anxiety that may otherwise be too overwhelming. In which case, it can both function as a way that reduces fear of rejection and anxiety that may accompany more complex, in-person social exchanges (Eichenberg et al., 2017). This equally applies to fearful avoidant attachment although unfortunately it was not possible to tease out such details with the measure used. Thus, a connection through Social Media may allow for an individual to get a reassuring sense of proximity, responsiveness and availability to attachment figures (Ainsworth, 1970; Bowlby, 1973). Indeed, as has been previously suggested (Hertlein & Twist, 2018), the device used to access Social Media may itself become an attachment figure or transitional object (Winnicott, 1969). This may

be an adequate coping strategy at first, but clearly a dependency can form that becomes problematic over time depending upon the overall attachment system.

Alexithymia levels were also found to be significantly higher in the Social Media addiction group when compared to the non-addiction group, although the effect size was small (0.3). Significant differences were again found in the Difficulty Identifying and Difficulty Describing Feelings subscales, both again with small effect sizes (0.3 for each). No significant findings related to Externally-orientated Thinking, indicating that issues therefore exist within the appraisal rather than attention phase according to the *attention-appraisal* model (Preece et al., 2018). In which case, anxiously attached individuals with problematic Social Media use may be able to pay attention to a particular situation, but then experience difficulty appraising the feelings or emotions that follow, perhaps after being faced with an interpersonal trigger. This may well lead towards a preference for what might be a more comfortable mode of communication, particularly in terms of the ability to take time when responding and to take a break, without risk of rejection, if it becomes overwhelming or distressing (Kandri et al., 2014; Scimeca et al., 2014).

Findings in this present study therefore echo those found in previous studies linking higher levels of alexithymia with problematic Social Media use (Bolat et al., 2017; Zarins et al., 2015). Zarins et al. (2015) further found that higher levels of alexithymia were associated with specific types of Social Media, a detail that was unfortunately not attainable in this present study but is worth investigating in future research. Additionally, they lend weight to the theory that while Social Media may assist in alleviating anxiety in relation to interpersonal communication, it can result in a negative cycle of self-defeating safety behaviours (Bolat et al., 2017). Indeed, it then follows that such safety behaviours become further engrained through experiential avoidance and the wider attachment system.

Experiential avoidance was also found to be significantly higher within the Social Media addiction group when compared to the non-addiction group, with a medium effect size (0.6). This corresponds with previous research looking at experiential avoidance and Social Media use (Hormes et al., 2014). Hormes et al. (2014) found that maladaptive use of Social Media related to issues with emotion regulation and limited access to emotion control strategies. Indeed, this fits with the findings within the present study in terms of the overall attachment system, with experiential avoidance effectively reducing the ability to adapt towards a different strategy. When

considered alongside insecure attachment and higher levels of alexithymia, experiential avoidance may indicate use of Social Media to be a safety behaviour where the opportunity to learn is then avoided (Bolat et al., 2017). It thus follows that the opportunity for any adaptation to the internal working model may also be missed.

4.4.3   Gaming

Unlike the first two problematic dimensions, no significant differences were found between the Gaming addiction group and the non-addiction group in relation to attachment type. This is surprising when considering previous studies linking insecure attachment and videogames (Estevez et al., 2017). This is particularly curious when considering the expectation that Internet Gaming often involves a relational, social communication aspect, which makes it distinct from offline Gaming. Further research with larger samples would be advised upon specific types of Internet Gaming and addiction severity.

However, a significant difference was found with higher alexithymia scores evident within the Gaming addiction group when compared to the non-addiction group, with a small to medium effect size (0.4). This extended to the Difficulty Identifying Feelings (0.4) and Difficulty Describing Feelings (0.5) subscales but not Externally-orientated Thinking. This indicates an issue with the appraisal stage in the cognitive and emotional processing, where an individual may get be consciously aware of the feelings or emotions they are feeling but then struggle to appraise them, resulting in Gaming as an self-regulatory emotional processing strategy (Preece et al., 2018). This differs marginally from the Gaetan et al. (2016) study that specifically found an emphasis on DIF. The findings in the present study suggest that both DDF and DIF are significant, with the former having a larger effect size, indicating that those in the Gaming addiction group have a greater struggle with putting emotions into language. Gaetan et al. (2016) proposed that gamers would regulate their emotions by using games to increase the intensity of the emotion, which compensated for their trouble feeling arousal or feeling. Gaming therefore becomes a way for those with high levels of alexithymia to recognize, respond and safely express them within the Gaming world. Findings in this present study are consistent with this theory and support the idea that gaming acts as an emotion regulation strategy for those who otherwise struggle with appraisal of those feelings.

A significant difference was also found with levels of experiential avoidance between groups, with a medium effect size (0.5). This would suggest that Gaming functions in a different way to the previous two problematic behaviours, particularly in terms of the extended attachment system when considering alexithymia and experiential avoidance. Therefore addiction can arise and indeed, alexithymia and experiential avoidance can lead to problematic Gaming even when securely attached, which may have treatment implications. These results suggest that those in the Gaming addiction group were securely attached, yet also had high levels of difficulty in identifying and describing feelings (appraisal stage) and high levels of experiential avoidance.

4.4.4 Messaging

As with the Gaming addiction group, there was no significant difference in attachment scores between the Messaging addiction group and non-addiction group. This is rather unexpected when considering that, like Social Media, messaging may provide a method of communicating which allows individuals to control when they respond and with arguably less anxiety then more complex social situations (Eichenberg et al., 2017). Findings here show that Messaging addiction is quite distinct from Social Media in terms of the attachment system. Thus, results do not directly support previous assertions that devices used to access the Internet may act as an extended attachment figure, unless of course the ever present device does in fact result in a more secure form of attachment (Hertlein & Twist, 2018; Konok et al., 2016). Future research may look to further explore distinctions in the type of device used in order to ascertain any differences.

Like attachment, there were no significant differences between the groups with regard to alexithymia. Additionally, no significant differences were found within the subscales between Messaging and no-addiction groups, although a small effect (0.3) was found with externally orientated thinking. This suggests that those in the Messaging addiction group are more likely to have issues with the *attention* stage rather than the *appraisal* stage, where they have a difficulty with affect-awareness (Preece et al., 2018).

There was also no significant difference between groups with regards to the levels of experiential avoidance, although again a small effect size was found (0.3). This indicates that further investigation may be warranted, both into distinct online

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Messaging app use and with regards to both alexithymia subscales and experiential avoidance. Van Ameringen et al. (2018) also found that Messaging addiction was distinct from other dimensions of Internet use, where it had no correlation with the more traditional Internet Addiction Test (Young, 1998). The findings in this current study appear to add weight to the idea that Messaging might be distinct enough from other dimensions for it to be investigated separately, particularly in terms of how it operates as an Addictive behaviour. In terms of clinical implications, the small effect size for experiential avoidance indicates that safety behaviours play a role, however further mechanisms and underlying processes need to be explored.

4.4.5   Sexual Content

Significant differences were found between the Sexual Content addiction group and non-addiction group in relation to overall attachment, anxious attachment and avoidant attachment. Effect size was large for overall attachment (0.8), avoidant (0.8) and medium for anxious attachment (0.6). This shows that in terms of the findings in this study, attachment effect sizes were largest for this particular dimension of Internet Addiction. This reflects core attachment theory, particularly Bartholomew's (1990) model for adult attachment based on avoidance of intimacy. This suggests that those with insecure attachment use sexual content, such as pornography or sexting, as an emotion regulation strategy. This may then help to regulate negative affect relating to interpersonal closeness and fear of rejection.

Alexithymia scores were also significantly higher in the Sexual Content addiction group when compared to the non-addiction group, with a medium effect size (0.6). Subscales were also significant with Difficulty Identifying Feelings having a large effect size (0.8) and Difficulty Describing feelings had a medium to large effect size (0.7). The Externally-orientated Thinking subscale was not significant, indicating an issue with the *appraisal* stage rather than *attention* (Preece et al., 2018). This matches, to some degree, findings in rather limited previous research (Reid et al., 2008) where higher levels of alexithymia were connected to higher levels of compulsive and hypersexual use of pornography.

Additionally, experiential avoidance scores were also significant between groups, with a large effect size (0.8). This provides further evidence for past research that has found a relationship between experiential avoidance and use of online pornography (Levin et al., 2018; Wetterneck et al., 2012). However, this present

study provides the additional benefit of replicating such a relationship within a more varied population in contrast to the use of adolescents/young adults (Levin et al., 2018). In conclusion, Sexual Content addiction appears to be a form of emotion regulation for insecure attached individuals who may have difficulty with intimacy, closeness and appraising difficulty feelings, thus resulting in high levels of experiential avoidance which reduce the flexibility of the attachment system.

4.4.6   Shopping

Only anxious attachment had significant differences between the Shopping addiction group and non-addiction group, although it had a small effect size (0.4). Very little prior research exists when looking at attachment type and shopping, although what is out there has proposed that shopping can act as a way of substituting relationships for objects in order to reduce anxiety relating to social interactions (Norris et al., 2012). In which case, findings in this study echo what Norris et al. (2012) found in terms of the significance of anxious attachment, although importantly this study has found this in relation to online shopping.

There were no significant differences between groups in terms of alexithymia scores, nor any of the subscales. However, even though they were not significant, small effect sizes were apparent for both Difficulty Identifying Feelings (0.4) and Difficulty Describing Feelings (0.4). Similarly, no significant differences were found between groups for experiential avoidance, although a small effect size was also found (0.2). This is a tad surprising when considering literature relating to conventional shopping (Norris et al., 2012) and cognitive models employed which suggest issues with processing (decision-making). However, shopping online may well differ from offline shopping in terms of motivation and the small effect sizes do indicate that individuals with Shopping addiction may encounter issues with alexithymia. Due to the lack of literature specific to online shopping within the psychological domain, this appears to be a rich area for future research.

4.4.7   Information Seeking

Information seeking included online activities such as using Wikipedia, general Googling and Buzzfeed. Overall attachment, anxious and avoidant attachment scores were all significantly different between Info Seeking addiction and non-addiction groups. The effect size was largest for overall attachment (0.5), while

anxious and avoidant attachment types both had a small to medium effect size (0.4). Due to the nature of this kind of activity, prior research points towards a different kind of function here and one most likely associated with a compulsive reduction in anxiety and a higher connection to anxiety or depression (Konok et al., 2016). Those with anxious attachment and thus, a negative view of self, may have an elevated habit of seeking information online in order to seek reassurance that may alleviate anxiety. Equally, those who are have avoidant attachment may well choose to search the internet rather than finding information through interpersonal means, which may risk a sense of intolerable dependency.

There were no significant differences found between groups when examining alexithymia scores, although a small effect size was found for difficulty identifying feelings (0.3). Additionally, a significant difference was found for experiential avoidance, with a medium effect size (0.7). This suggests that those who are categorised within the Info Seeking addiction group may use the Internet in an over reliant and problematic fashion as an emotion regulation strategy. Interpersonal issues though insecure attachment are key mechanisms (particularly overall attachment which consists of high levels of both anxious and avoidant), followed by experiential avoidance. Experiential avoidance thus reduces the chances of such an individual being willing to make contact with their maladaptive interpersonal style.

Overall, investigating the specific Internet dimensions has helped to draw attention to key differences in how they operate as addictive behaviours. This also confirms the hypothesis that different attachment types would be related to different individual dimensions. Entertainment, for example, was found to be significantly different between addiction and non-addiction groups in relation to overall attachment, along with anxious but not avoidant. Results therefore indicate that each dimension of Internet Addiction presents a relatively unique profile in terms of the psychological processes that were measured. There are clinical implications here in terms of what treatment approach might be used for each specific dimension. Further research is required with larger samples in order to determine how robust these findings may be.

4.5   Implications

This present study sought to develop understanding of Internet Addiction through the lens of attachment theory (Bowlby, 1970), alexithymia (Nemiah & Sifneos, 1970) and psychological flexibility (Hayes et al., 2006). Together these help form a relational

model incorporating what has previously been described as an extended attachment system (De Rick et al., 2009).

The findings in this present study therefore help expand theoretical and practical understanding of the differences between Internet Addiction as a generalised concept and as a set of specific problematic online behaviours or dimensions. A contribution has therefore been made here to the debate on the practical value of IA and how it is measured in the face of emerging technology. Indeed, considering the increasingly varied behaviour types that have come into being since the conception of Internet Addiction over twenty years ago (Young, 1996), this study helps to clarify the need for new and appropriate measurement techniques. This is particularly relevant when considering clinical implications in terms of understanding the mechanisms and processes that help or hinder such addictive behaviour. For example, while significant differences were found between general Internet Addiction and non-addiction groups in regard to the key measurements (attachment, alexithymia, experiential avoidance), this was not observed within distinct problematic online behaviours.

Dimensions such as Gaming and Messaging did not display any significant differences in terms of attachment type and in the case of the latter, no significant differences relating to alexithymia or experiential avoidance either. It is also possible to distinguish IA dimensions through attachment type, with Entertainment and Shopping being specific to anxious attachment, while no specific dimensions were unique to avoidant attachment alone. Similar distinct patterns emerge across alexithymia and experiential avoidance too, with Messaging and Shopping the only dimensions which had no significant differences in EA between addiction and non-addiction groups. This present study therefore lends support to previous arguments for the treatment of IA as a set of specific behaviours, each with their own unique psychological mechanisms and processes.

Indeed, as a potential diagnostic tool, the use of a more recently developed measure provided both strengths and weaknesses. It provided an interpretation of the DSM-5 diagnostic classification for addictive disorders (APA, 2013) based on the assumption that IA can be considered comparable to other types of behavioural addictions e.g. Gambling Disorder. However, prevalence rates were extremely high for overall IA and therefore findings in this study indicate that the DPIU might be altered to include scoring based on addiction severity and with an emphasis on specific dimensions of

IA. Additionally, a clinical diagnostic interview is recommended alongside use of a screening tool for diagnosis of IA.

Commented [RP53]: Revised as per feedback point 29.

On the one hand, research findings in this present study found evidence that attachment, alexithymia and experiential avoidance does cross-over with other addictive behaviours, while on the other hand it also highlights specific differences between addiction types, even when under the same Internet Addiction umbrella. In this sense, differences must be respected and additional research may be required to dig deeper into how such online behaviours manifest and importantly, data gathered on how they are used beyond the limitations of self-report questionnaires.

This present study also demonstrates that prevalence rates may be much higher than previously found (Morrison & Gore, 2010), both in terms of a generalised concept of IA and indeed, as a set of specific behaviours. The previous estimate of 1.2% for a general form of IA back in 2010 would appear rather redundant, particularly in light of growing Internet use (ONS report, 2018). As new technology emerges and the ways of using the Internet evolve, prevalence of Internet Addiction is likely to change. However, it is also important to note that these higher prevalence rates should be considered alongside the criticisms relating to DSM-5 diagnostic criteria and whether they are adequate for specific problem behaviours (Kuss et al., 2017). Indeed, it has been argued that applying DSM-5 criteria, such as tolerance, withdrawal or preoccupation, may not be appropriate and could lead to overpathologizing everyday behaviours (Kuss et al., 2017).

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4.5.1   Clinical Implications

The findings in this research present a framework for conceptualising Internet Addiction according to an extended attachment system. This provides several clinical implications in terms of approaching both general and specific Internet Addiction types. Additionally, it demonstrates how varied the dimensions of Internet Addiction can be and makes apparent how widespread an issue this now appears to be. Finally, it also shows the need for appropriate methods of diagnosis and the limitations of using questionnaires.

Firstly, this research provides a profile for approaching specific problematic online behaviours. It does this based on how they differ according to attachment type, alexithymia and experiential avoidance. For example, an individual who reports an

addiction to Sexual Content may well have both anxious and avoidant attachment types (with more pronounced avoidant features), combined with high levels of difficulty identifying and describing feelings (*appraisal* stage rather than *attention*). Additionally, this is likely to be reinforced by high levels of experiential avoidance that may prevent such an individual from adapting or learning from alternative behaviours or experiences. Clinically, this provides an opportunity for various targeted interventions based upon this type of presentation e.g. focusing on attachment avoidant and alexithymia issues which may negatively effect the therapeutic relationship (such as fear of intimacy). This may be followed by using ACT (Hayes et al., 2006) methods to lower levels of experiential avoidance through acceptance and contact with the present moment. All of which may then allow an ability to develop new emotional regulation skills relating to appraisal of situations and emotions.

The findings within the mediation analysis also inform upon what may be an appropriate choice when considering clinical treatment. Cognitive Behavioural Therapy approaches such as ACT may help to reduce experiential avoidance (Hayes et al., 2006). However, according to findings in this current study this would only mediate IA with those categorised as having anxious attachment. In which case, for those with avoidant or overall insecure attachment, it may be more appropriate to consider other treatments such as Mentalization-Based Therapy (Bateman & Fonagy, 2004). MBT can help with improving reflective function, the capacity to recognise emotions and has been seen to help improve representational coherence in mothers with substance addiction (Suchman et al., 2017). When considering the model of self/other found within avoidant attachment (Bartholomew, 1990), a treatment with a strong relational emphasis may well be preferable, where the development of epistemic trust and with it, a relearning of flexibility, can be developed (Fonagy & Allison, 2014).

As an additional treatment example for a person reporting with a dimension which is primarily related to anxious attachment (e.g. Entertainment), an intervention may initially focus on lowering levels of experiential avoidance prior to bringing awareness to the alexithymia *appraisal* system (DIF and DDF). Indeed, such a treatment focus would extend to those who might have secure attachment, but issues with alexithymia and experiential avoidance (e.g. Gaming). In such a case, improving reflective function and awareness of feelings may help problem gamers to recognize how their activity performs as a method of regulating emotion. This could help to

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reduce reliance on the problem behaviour and to increase the ability to tolerate uncomfortable private experiences.

It is also clear that appropriate diagnostic measures must be used for IA and the different dimensions of IA. Using a questionnaire, such as the DPIU, which is based on DSM-5 criteria, may be clinically useful as an initial screening tool but when used alone may lead to over diagnosis (Kuss etal., 2017). Again, it would therefore be advisable to also use a clinical, in-person assessment.

This research can therefore act as a framework that may help psychologists or clinicians to understand the context of specific dimensions of Internet Addiction and offer an approach to formulation. Perhaps crucially, it presents a developmental explanation for the majority of the assessed Internet dimensions, while also providing evidence for the adaptability of the internal working model based on experiential avoidance and where anxious attachment is concerned. In this sense, addiction is not viewed as a permanent problematic solution to a person inherently broken by early caregiving relationships, but offers hope and a map for resolving the disorder.

4.6   Strengths and limitations

This study has numerous strengths, including the measurements used. It uses a recently developed scale for Internet Addiction (DPIU) that is based on the suggested diagnostic criteria for Addictive Disorders used in the DSM-5 (APA, 2013). The DPIU (Van Ameringen et al., 2018) offers the ability to assess potential addiction across an array of modern ways of using the Internet, in contrast to the more popular but arguably outdated IAT (Young, 1998). At the point of writing, studies involving multiple forms of Internet addiction appear to be rare and it seems uncommon for them to be compared in the way offered within this present study. The measurement of experiential avoidance also used a more recently developed scale (BEAQ), which offers better psychometric value over the older and more commonly used AAQ (Gámez et al., 2014). Additionally, the use of a newly developed alexithymia scale (PAQ) also allowed for greater psychometric and construct validity over previous scales such as the TAS-20 or the BVAQ (Preece et al., 2017). Finally, use of the PAQ allowed for greater exploration of the *attention-appraisal* model in relation to attachment and experiential avoidance.

Secondly, unlike previous research, this study brought together multiple

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psychological processes in the form of attachment, alexithymia and experiential avoidance, looking to bridge them in a way that might help direct future clinical interventions. This forms what has been described in this study as an extended attachment system and one that takes the novel approach of using the *attention-appraisal* alexithymia model as a way of explaining emotion regulation, with the addition of experiential avoidance in order to provide a framework for understanding how relational and emotional systems may become more rigid and less flexible to change.

Thirdly, this study used a large, varied population sample across regions and age groups. This was in contrast to research in this area that has predominantly used young adult or student populations as convenient ways of researching and testing theories. The method used for data collection was also robust, using an appropriate online collection method and using approaches to mitigate the possibility of various operational biases e.g. order-effect,

However, there were also a number of limitations in this study. Sample size, while large, was not sufficient enough for the inclusion of two IA dimensions (Dating Apps and Gambling) due to low prevalence. This meant it lacked sufficient number of individuals in the relevant addiction group in order to make meaningful comparisons with the non-addiction group. There were also additional complexities involved with using new scales, particularly the DPIU for Internet Addiction. The DPIU acted as a screener for addiction, but did not define severity, nor had it been validated in any published journal in the past. This meant there was an additional need for factor analysis across each separate dimension. It also resulted in high prevalence rates for both IA and individual IA dimensions, which may show limitations with the scale and the diagnostic criteria being used. In which case, it may prove useful to explore severity in future research and within a clinical population. This may help in a bid to determine a more practical approach to scoring within this particular scale.

Additionally, there were confounding demographic factors such as gender and age, which were significant within certain dimensions of Internet Addiction and warrant further exploration in terms of their impact. The use of the ECR-S, while providing a reliable data on the required attachment dimensions, did not allow for further investigation of the more refined avoidant types (fearful and dismissive) as outlined by Bartholomew (1990).

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Additionally, this study was limited in terms of the cross-sectional self-report methodology and self-selection sample. The prevalence was high for general Internet Addiction as there may well have been a self-selection bias in terms of those with possible problematic behaviours being more likely to respond. Additionally, it is possible that those with avoidant attachment styles, due to their desire not to engage with possible attachment triggers, may have been less likely to participate or indeed may have had trouble completing all of the questions. This also applies to those who might be primarily classified as anxiously attached, who may have been more inclined to participate, particularly if they found the link shared via social media and where encouraged to by friends or attachment figures.

The methodology chosen for this study reflects the exploratory nature of the research, yet provides no effective way of detecting direction or causality, nor does it use measure use of specific types of Internet applications nor record any data on actual usage. For example, it was unclear which type of Social Media may have been more problematic than others, nor the type of activity in terms of passively reading/observing or actively posting or commenting. Finally, due to the large number of multiple comparison tests used, future research is advised in order to confirm the results (Althouse, 2016).

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4.7   Conclusion and future research

This exploratory study has provided new insight into the psychological mechanisms and processes underpinning Internet Addiction and its many dimensions. Additionally, it has brought an expanded understanding of the differences between IA as a general concept and as a specific set or dimension of online behaviours. It has looked to embrace the spirit of Bowlby's early approach into attachment theory (Bowlby, 1969), bridging different theories and ideas to expand upon the conceptualisation of an attachment system.

This research is the first to investigate the effects of attachment type, *attention-appraisal* alexithymia and psychological flexibility (experiential avoidance) on dimensions of Internet Addiction. The findings suggest that IA prevalence as a general concept is much more widespread than previously assumed, perhaps connected to the emerging technology, ease of access and variety of online behaviours. Experiential avoidance was found to mediate the effects of anxious attachment on Internet Addiction, however findings suggest it does not present the

same opportunity with overall attachment or avoidant attachment. This therefore provides clinical direction in terms of how different dimensions of Internet Addiction operate and the profiles they may present. It suggests that therapies targeting EA would be better suited to those who are anxiously attached, but may be ineffective with those who have an avoidant attachment type. For the latter, more appropriate treatment approaches might instead focus upon the therapeutic relationship, building trust and aiming to develop an internal representation of self that might tolerate difficult emotions without deactivating the attachment system (Fonagy & Allison, 2014). Additional research here would therefore be extremely useful in terms of confirming these findings, perhaps assessing those in treatment for specific IA and examining outcomes based on attachment type.

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Future research is required to further explore these dimensions of Internet Addiction, particularly in order to reflect the growing variety of online activities or behaviours. There is great scope for investigating specific dimensions such as Messaging, Shopping and Gaming to explore why they appear distinct from other online behaviours in terms of their attachment system profile. It may also be useful to examine Alexithymia in more depth, particularly in terms of mediation and whether some IA dimensions have stronger associations with positive or negative thoughts. Collecting data on actual use may be of benefit too. Which would reveal more nuances in relation to online behaviour and indeed, allow for contrast with self-report measures. Future research may well benefit from exploring ways of collecting actual data usage and finding out what specific applications or ways of using them are more problematic than others. Additional methodological approaches may also help, such as ecological diaries or experienced-based sampling method (Csikszentmihalyi & Larsen, 2014) in order to better track how the attachment system operates in relation to problematic Internet use over time. A more robust and unified diagnostic criteria may also help in terms of better connecting research efforts, along with more specific measurement scales that may lead to more appropriate clinical interventions. It is clear that Internet technology is here to stay and is now embedded in daily life for most of us, as technology changes, as will our need to investigate and explore the challenges such changes may present.

REFERENCES

Ainsworth, M. D. S., & Bell, S. M. (1970). Attachment, exploration, and separation: Illustrated by the behavior of one-year-olds in a strange situation. *Child development*, 49-67.

Ainsworth, M. D. S., Blehar, M., Waters, E., & Wall, S. (1978). Patterns of attachment: Observations in the Strange Situation and at home. *Hillsdale, NJ: Erlbaum.*

Ali, R., Jiang, N., Phalp, K., Muir, S., & McAlaney, J. (2015, March). The emerging requirement for digital addiction labels. In *International working conference on requirements engineering: Foundation for software quality* (pp. 198-213). Springer, Cham.

Althouse, A. D. (2016). Adjust for multiple comparisons? It's not that simple. *The Annals of thoracic surgery*, *101*(5), 1644-1645.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®).* American Psychiatric Pub.

Anderson, N. L., & Crowther, J. H. (2012). Using the experiential avoidance model of non-suicidal self-injury: Understanding who stops and who continues. *Archives of Suicide Research*, *16*(2), 124-134.

Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. *Psychology of Addictive Behaviors*, *30*(2), 252.

Arabatzoudis, T., Rehm, I. C., Nedeljkovic, M., & Moulding, R. (2017). Emotion regulation in individuals with and without trichotillomania. *Journal of Obsessive-Compulsive and Related Disorders*, *12*, 87-94.

Baker, T. B., Piper, M. E., McCarthy, D. E., Majeskie, M. R., & Fiore, M. C. (2004). Addiction motivation reformulated: an affective processing model of negative reinforcement. *Psychological review*, *111*(1), 33.

Barker, C., Pistrang, N., & Elliot, R. (1994). *Research methods in clinical and counselling psychology*. John Wiley & Sons.

Bartholomew, K. (1990). Avoidance of intimacy: An attachment perspective. *Journal of Social and Personal relationships*, *7*(2), 147-178.

Bateman, A., & Fonagy, P. (2004). *Psychotherapy for borderline personality disorder* (pp. 529-532). Oxford: Oxford University Press.

Bateman, A. W., & Fonagy, P. (2004). Mentalization-based treatment of BPD. *Journal of personality disorders, 18*(1), 36-51.

Begotka, A. M., Woods, D. W., & Wetterneck, C. T. (2004). The relationship between experiential avoidance and the severity of trichotillomania in a nonreferred sample. *Journal of Behavior Therapy and Experimental Psychiatry*, *35*(1), 17-24

Benjamin, J. (1988). The Bonds of Love: Psychoanalysis, Feminism, and the Problem of Domination. *New York: Pantheon*.

Berenbaum, H. (1996). Childhood abuse, alexithymia and personality disorder. *Journal of psychosomatic research*, *41*(6), 585-595.

Berke, J. D., & Hyman, S. E. (2000). Addiction, dopamine, and the molecular mechanisms of memory. *Neuron*, *25*(3), 515-532.

Blackwell, D., Leaman, C., Tramposch, R., Osborne, C., & Liss, M. (2017). Extraversion, neuroticism, attachment style and fear of missing out as predictors of social media use and addiction. *Personality and Individual Differences*, *116*, 69-72.

Bolat, N., Yavuz, M., Eliaçık, K., & Zorlu, A. (2018). The relationships between problematic internet use, alexithymia levels and attachment characteristics in a sample of adolescents in a high school, Turkey. *Psychology, health & medicine*, *23*(5), 604-611.

Bonnaire, C., Barrault, S., Aïte, A., Cassotti, M., Moutier, S., & Varescon, I. (2017). Relationship between pathological gambling, alexithymia, and gambling type. *The American journal on addictions*, *26*(2), 152-160.

Bowlby, J. (1969). *Attachment and Loss, Volume I Attachment.* Penguin Books.

Bowlby, J. (1973). *Attachment and loss: II. Separation. Anxiety and anger.* London: Hogarth Press.

Bowlby, J. (1980). *Attachment and loss: Loss, sadness and depression.* London: Hogarth Press.

Brandell, J. R., & Ringel, S. (2007). *Attachment and dynamic practice: An integrative guide for social workers and other clinicians.* Columbia University Press.

British Psychological Society (2017). Ethics Guidelines for Internet-mediated Research. INF206/04.2017. Leicester: Author. Retrieved from: https://www.bps.org.uk/news-and-policy/ethics-guidelines-internet-mediated-research-2017

Bucci, W. (1997). Symptoms and symbols: A multiple code theory of somatization. *Psychoanalytic Inquiry*, *17*(2), 151-172.

Carvalho, S., Martins, C. P., Almeida, H. S., & Silva, F. (2017). The evolution of cognitive behavioural therapy–The third generation and its effectiveness. *European Psychiatry*, *41*, S773-S774.

Chen, L., & Nath, R. (2016). Understanding the underlying factors of Internet addiction across cultures: a comparison study. *Electronic Commerce Research and Applications*, *17*, 38-48.

Chen, S. H., Weng, L. J., Su, Y. J., Wu, H. M., & Yang, P. F. (2003). Development of a Chinese Internet addiction scale and its psychometric study. *Chinese Journal of Psychology.*

Cheng, C., & Li, A. Y. L. (2014). Internet addiction prevalence and quality of (real) life: A meta-analysis of 31 nations across seven world regions. *Cyberpsychology, Behavior, and Social Networking*, *17*(12), 755-760.

Cho, S. M., Sung, M. J., Shin, K. M., Lim, K. Y., & Shin, Y. M. (2013). Does psychopathology in childhood predict internet addiction in male adolescents?. *Child Psychiatry & Human Development*, *44*(4), 549-555.

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Chou, W. P., Lee, K. H., Ko, C. H., Liu, T. L., Hsiao, R. C., Lin, H. F., & Yen, C. F. (2017). Relationship between psychological inflexibility and experiential avoidance and internet addiction: Mediating effects of mental health problems. *Psychiatry research*, *257*, 40-44.

Chou, W. P., Yen, C. F., & Liu, T. L. (2018). Predicting effects of psychological inflexibility/experiential avoidance and stress coping strategies for internet addiction, significant depression, and suicidality in college students: a prospective study. *International journal of environmental research and public health*, *15*(4), 788.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Cruise, K. E., & Becerra, R. (2018). Alexithymia and problematic alcohol use: a critical update. *Addictive behaviors*.

Csikszentmihalyi, M., & Larson, R. (2014). Validity and reliability of the experience-sampling method. In *Flow and the foundations of positive psychology* (pp. 35-54). Springer, Dordrecht.

Dalbudak, E., Evren, C., Aldemir, S., Coskun, K. S., Ugurlu, H., & Yildirim, F. G. (2013). Relationship of internet addiction severity with depression, anxiety, and alexithymia, temperament and character in university students. *Cyberpsychology, Behavior, and Social Networking*, *16*(4), 272-278.

Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in human behavior*, *17*(2), 187-195.

de Haan, H. A., van der Palen, J., Wijdeveld, T. G., Buitelaar, J. K., & De Jong, C. A. (2014). Alexithymia in patients with substance use disorders: State or trait?. *Psychiatry research*, *216*(1), 137-145.

de Haan, Hein, Evelien Joosten, Toon Wijdeveld, Peter Boswinkel, Job van der Palen, and Cor De Jong. "Alexithymia is not a stable personality trait in patients with substance use disorders." *Psychiatry research* 198, no. 1 (2012): 123-129.

De Rick, A., Vanheule, S., & Verhaeghe, P. (2009). Alcohol addiction and the attachment system: an empirical study of attachment style, alexithymia, and psychiatric disorders in alcoholic inpatients. *Substance Use & Misuse*, *44*(1), 99-114.

Downey, R. G., & King, C. V. (1998). Missing data in Likert ratings: A comparison of replacement methods. *The Journal of general psychology*, *125*(2), 175-191.

Drummond, A., & Sauer, J. D. (2018). Video game loot boxes are psychologically akin to gambling. *Nature Human Behaviour*, *2*(8), 530.

Eichenberg, C., Schott, M., Decker, O., & Sindelar, B. (2017). Attachment style and internet addiction: an online survey. *Journal of medical Internet research*, *19*(5).

El Rasheed, A. H. (2001). Alexithymia in Egyptian substance abusers. *Substance Abuse*, *22*(1), 11-21.

Estevez, A., Jauregui, P., Sanchez-Marcos, I., Lopez-Gonzalez, H., & Griffiths, M. D. (2017). Attachment and emotion regulation in substance addictions and behavioral addictions. *Journal of behavioral addictions*, *6*(4), 534-544.

Eyal, N. (2014). *Hooked: How to build habit-forming products*. Penguin UK.

Farris, S. G., Zvolensky, M. J., & Schmidt, N. B. (2015). Smoking-specific experiential avoidance cognition: Explanatory relevance to pre-and post-cessation nicotine withdrawal, craving, and negative affect. *Addictive behaviors*, *44*, 58-64.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. *Behavior research methods*, *41*(4), 1149-1160.

Feeney, J. A., & Noller, P. (1996). *Adult attachment* (Vol. 14). Sage Publications.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage Publications.

Flessner, C. A., Woods, D. W., Franklin, M. E., Cashin, S. E., Keuthen, N. J., & Board, T. L. C. S. A. (2008). The Milwaukee inventory for Subtypes of trichotillomania-adult version (MIST-A): development of an instrument for the

assessment of "focused" and "automatic" hair pulling. *Journal of Psychopathology and Behavioral Assessment*, *30*(1), 20-30.

Fletcher, K., Nutton, J., & Brend, D. (2015). Attachment, a matter of substance: The potential of attachment theory in the treatment of addictions. *Clinical Social Work Journal*, *43*(1), 109-117.

Flores, P. J. (2004). *Addiction as an attachment disorder*. Jason Aronson.

Fogg, B. J. (2009, April). A behavior model for persuasive design. In *Proceedings of the 4th international Conference on Persuasive Technology* (p. 40). ACM.

Fonagy, P. (2018). *Affect regulation, mentalization and the development of the self*. Routledge.

Fonagy, P., & Allison, E. (2014). The role of mentalizing and epistemic trust in the therapeutic relationship. *Psychotherapy, 51*(3), 372

Fonagy, P., & Target, M. (1997). Attachment and reflective function: Their role in self-organization. *Development and psychopathology*, *9*(4), 679-700.

Forsyth, J. P., Parker, J. D., & Finlay, C. G. (2003). Anxiety sensitivity, controllability, and experiential avoidance and their relation to drug of choice and addiction severity in a residential sample of substance-abusing veterans. *Addictive behaviors*, *28*(5), 851-870.

Frewen, P. A., Dozois, D. J., Neufeld, R. W., & Lanius, R. A. (2008). Meta- analysis of alexithymia in posttraumatic stress disorder. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies*, *21*(2), 243-246.

Gaetan, S., Bréjard, V., & Bonnet, A. (2016). Video games in adolescence and emotional functioning: Emotion regulation, emotion intensity, emotion expression, and alexithymia. *Computers in Human Behavior*, *61*, 344-349.

Galesic, M., & Bosnjak, M. (2009). Effects of questionnaire length on participation and indicators of response quality in a web survey. *Public opinion quarterly*, *73*(2), 349-360.

Gámez, W., Chmielewski, M., Kotov, R., Ruggero, C., Suzuki, N., & Watson, D. (2014). The brief experiential avoidance questionnaire: development and initial validation. *Psychological assessment*, *26*(1), 35.

Gao, T., Li, J., Zhang, H., Gao, J., Kong, Y., Hu, Y., & Mei, S. (2018). The influence of alexithymia on mobile phone addiction: The role of depression, anxiety and stress. *Journal of affective disorders*, *225*, 761-766.

Garcia-Oliva, C., & Piqueras, J. A. (2016). Experiential avoidance and technological addictions in adolescents. *Journal of behavioral addictions*, *5*(2), 293-303.

Ghalehban, M., & Besharat, M. A. (2011). Examination and comparison of alexithymia and self-regulation in patients with substance abuse disorder and normal individuals. *Procedia-Social and Behavioral Sciences*, *30*, 38-42.

Glass, G. V., Peckham, P. D., & Sanders, J. R. (1972). Consequences of failure to meet assumptions underlying the fixed effects analyses of variance and covariance. *Review of educational research*, *42*(3), 237-288.

Grant, J. E., Potenza, M. N., Weinstein, A., & Gorelick, D. A. (2010). Introduction to behavioral addictions. *The American journal of drug and alcohol abuse*, *36*(5), 233-241.

Griffiths, M. (1995, February). Technological addictions. In *Clinical psychology forum* (pp. 14-14). Division of Clinical Psychology of the British Psychol Soc.

Griffiths, M. D. (1999). Internet addiction: Internet fuels other addictions. *Student British Medical Journal, 7*(1), 428-429.

Griffiths, M. D. (2018). Conceptual Issues Concerning Internet Addiction and Internet Gaming Disorder: Further Critique on Ryding and Kaye (2017). *International journal of mental health and addiction*, *16*(1), 233-239.

Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological Inquiry*, *26*(1), 1-26.

GSS. (2015). Harmonised Concepts and Questions for Social Data Sources, Secondary Standards: Social Capital. *Office for National Statistics*.

Hamidi, S., Rostami, R., Farhoodi, F., & Abdolmanafi, A. (2010). A study and comparison of Alexithymia among patients with substance use disorder and normal people. *Procedia-Social and Behavioral Sciences*, *5*, 1367-1370.

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* Guilford Publications.

Hayes, S. C., & Gifford, E. V. (1997). The trouble with language: Experiential avoidance, rules, and the nature of verbal events. *Psychological Science*, *8*(3), 170-173.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour research and therapy*, *44*(1), 1-25.

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of consulting and clinical psychology*, *64*(6), 1152.

Hendryx, M. S., Haviland, M. G., & Shaw, D. G. (1991). Dimensions of alexithymia and their relationships to anxiety and depression. *Journal of personality assessment*, *56*(2), 227-237.

Hertlein, K. M., & Twist, M. L. (2018). Attachment to Technology: The Missing Link. *Journal of Couple & Relationship Therapy*, *17*(1), 2-6.

Hinz, A., Klein, A. M., Brähler, E., Glaesmer, H., Luck, T., Riedel-Heller, S. G., ... & Hilbert, A. (2017). Psychometric evaluation of the Generalized Anxiety Disorder Screener GAD-7, based on a large German general population sample. *Journal of affective disorders*, *210*, 338-344.

Höfler, D. Z., & Kooyman, M. (1996). Attachment transition, addiction and therapeutic bonding—An integrative approach. *Journal of Substance Abuse Treatment*, *13*(6), 511-519.

Hormes, J. M., Kearns, B., & Timko, C. A. (2014). Craving F acebook? Behavioral addiction to online social networking and its association with emotion regulation deficits. *Addiction*, *109*(12), 2079-2088.

Commented [RP60]: Added missing reference as per feedback point 25.

Hong, S. B., Zalesky, A., Cocchi, L., Fornito, A., Choi, E. J., Kim, H. H., ... & Yi, S. H. (2013). Decreased functional brain connectivity in adolescents with internet addiction. *PloS one*, *8*(2), e57831.

Honkalampi, K., Hintikka, J., Laukkanen, E., & Viinamäki, J. L. H. (2001). Alexithymia and depression: a prospective study of patients with major depressive disorder. *Psychosomatics*, *42*(3), 229-234.

Howell, D. C. (2012). *Statistical methods for psychology*. Cengage Learning.

Hughes, J. L., Camden, A. A., & Yangchen, T. (2016). Rethinking and updating demographic questions: Guidance to improve descriptions of research samples. *Psi Chi Journal of Psychological Research*, *21*, 138-151.

Hyer, L., Woods, M. G., Summers, M. N., Boudewyns, P., & Harrison, W. R. (1990). Alexithymia among Vietnam veterans with posttraumatic stress disorder. *The Journal of clinical psychiatry*.

Iwaniec, D., & Sneddon, H. (2001). Attachment style in adults who failed to thrive as children: Outcomes of a 20 year follow-up study of factors influencing maintenance or change in attachment style. *British Journal of social work*, *31*(2), 179-195.

Jain, V., Tripathi, S., Ganesh, B. E., & Sheth, J. N. (2018, May). Internet Addiction and Its Impact on Consumer's Buying Behaviour: A Conceptual Framework: An Abstract. In *Academy of Marketing Science Annual Conference* (pp. 393-394). Springer, Cham.

Johansson, A., & Götestam, K. G. (2004). Problems with computer games without monetary reward: similarity to pathological gambling. *Psychological reports*, *95*(2), 641-650.

Joinson, A. N. (2007). Disinhibition and the Internet. In *Psychology and the Internet* (pp. 75-92). Academic Press.

Kandri, T. A., Bonotis, K. S., Floros, G. D., & Zafiropoulou, M. M. (2014). Alexithymia components in excessive internet users: A multi-factorial analysis. *Psychiatry research*, *220*(1-2), 348-355.

Kardefelt-Winther, D. (2014). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers in Human Behavior*, *31*, 351-354.

Khantzian, E. J. (1978). The ego, the self and opiate addiction: Theoretical and treatment considerations. *International Review of Psycho-Analysis*, *5*, 189-198.

Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: a reconsideration and recent applications. *Harvard review of psychiatry*, *4*(5), 231-244.

Khantzian, E. J. (2003). Understanding addictive vulnerability: An evolving psychodynamic perspective. *Neuropsychoanalysis*, *5*(1), 5-21.

Kim, H. Y. (2013). Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative dentistry & endodontics*, *38*(1), 52-54.

King, A. L. S., Valença, A. M., Silva, A. C., Sancassiani, F., Machado, S., & Nardi, A. E. (2014). "Nomophobia": impact of cell phone use interfering with symptoms and emotions of individuals with panic disorder compared with a control group. *Clinical practice and epidemiology in mental health: CP & EMH*, *10*, 28.

King, G., Pan, J., & Roberts, M. E. (2013). How censorship in China allows government criticism but silences collective expression. *American Political Science Review, 107*(2), 326-343.

King, W. R., Liu, C. Z., Haney, M. H., & He, J. (2007). Method effects in IS survey research: an assessment and recommendations. *Communications of the Association for Information Systems*, *20*(1), 30.

Ko, C. H., Liu, T. L., Wang, P. W., Chen, C. S., Yen, C. F., & Yen, J. Y. (2014). The exacerbation of depression, hostility, and social anxiety in the course of internet addiction among adolescents: a prospective study. *Comprehensive Psychiatry*, *55*(6), 1377-1384.

Konok, V., Gigler, D., Bereczky, B. M., & Miklósi, Á. (2016). Humans' attachment to their mobile phones and its relationship with interpersonal attachment style. *Computers in Human Behavior*, *61*, 537-547.

Kroenke, K. (2012). Enhancing the clinical utility of depression screening. *Canadian Medical Association Journal*, *184*(3), 281-282.

Kroenke, K., & Spitzer, R. L. (2002). The PHQ-9: a new depression diagnostic and severity measure. *Psychiatric annals*, *32*(9), 509-515.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ‐ 9: validity of a brief depression severity measure. *Journal of general internal medicine*, *16*(9), 606-613.

Krystal, J. H., Giller, E. L., & Cicchetti, D. V. (1986). Assessment of alexithymia in posttraumatic stress disorder and somatic illness: introduction of a reliable measure. *Psychosomatic medicine*.

Kuss, DJ., D Griffiths, M., Karila, L., & Billieux, J. (2014). Internet addiction: a systematic review of epidemiological research for the last decade. *Current pharmaceutical design*, *20*(25), 4026-4052.

Kuss, D. J., Griffiths, M. D., & Pontes, H. M. (2017). Chaos and confusion in DSM-5 diagnosis of Internet Gaming Disorder: Issues, concerns, and recommendations for clarity in the field. *Journal of Behavioral Addictions, 6*(2), 103-109.

Lane, R. D., & Schwartz, G. E. (1987). Levels of emotional awareness: a cognitive-developmental theory and its application to psychopathology. *The American journal of psychiatry*.

Lane, R. D., & Schwartz, G. E. (1992). Levels of emotional awareness: Implications for psychotherapeutic integration. *Journal of Psychotherapy Integration*, *2*(1), 1.

Lane, R. D., Lee, S., Reidel, R., Weldon, V., Kaszniak, A., & Schwartz, G. E. (1996). Impaired verbal and nonverbal emotion recognition in alexithymia. *Psychosomatic medicine*, *58*(3), 203-210.

Lee, J. Y., & Shin, Y. J. (2018). Experience in Close Relationships Scale–Short Version (ECR–S) Validation With Korean College Students. *Measurement and Evaluation in Counseling and Development*, 1-9.

Lei, H., Li, S., Chiu, M. M., & Lu, M. (2018). Social support and Internet addiction among mainland Chinese teenagers and young adults: A meta-analysis. *Computers in Human Behavior*, *85*, 200-209.

Leising, D., Grande, T., & Faber, R. (2009). The Toronto Alexithymia Scale (TAS-20): A measure of general psychological distress. *Journal of Research in Personality*, *43*(4), 707-710.

Levin, M. E., Lee, E. B., & Twohig, M. P. (2018). The role of experiential avoidance in problematic pornography viewing. *The Psychological Record*, 1-12.

Lillis, J., Hayes, S. C., & Levin, M. E. (2011). Binge eating and weight control: The role of experiential avoidance. *Behavior modification*, *35*(3), 252-264.

Lin, M. P., Ko, H. C., & Wu, J. Y. W. (2011). Prevalence and psychosocial risk factors associated with Internet addiction in a nationally representative sample of college students in Taiwan. *Cyberpsychology, Behavior, and Social Networking*, *14*(12), 741-746.

Little, R. J., & Rubin, D. B. (1989). The analysis of social science data with missing values. *Sociological Methods & Research*, *18*(2-3), 292-326.

Liu, M., & Luo, J. (2015). Relationship between peripheral blood dopamine level and internet addiction disorder in adolescents: a pilot study. *International journal of clinical and experimental medicine*, *8*(6), 9943.

Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical care*, 266-274.

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Lumley, M. A., & Roby, K. J. (1995). Alexithymia and pathological gambling. *Psychotherapy and Psychosomatics*, *63*(3-4), 201-206.

Maddux, J. F., & Desmon, D. P. (2000). Addiction or dependence?. *Addiction*, *95*(5), 661-665.

Mahapatra, A., & Sharma, P. (2018). Association of Internet addiction and alexithymia–A scoping review. *Addictive behaviors*.

Main, M., & Solomon, J. (1986). Discovery of an insecure-disorganized/disoriented attachment pattern. In T. B. Brazelton & M. W. Yogman (Eds.), *Affective development in infancy* (pp. 95-124). Westport, CT, US: Ablex Publishing

Manea, L., Gilbody, S., & McMillan, D. (2012). Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): a meta-analysis. *Cmaj*, *184*(3), E191-E196.

Maniaci, G., Picone, F., Dimarco, T., Lipari, A., Brancato, A., & Cannizzaro, C. (2015). Psychodiagnostic assessment of pathological gamblers: A focus on personality disorders, clinical syndromes and alexithymia. *International Journal of Mental Health and Addiction*, *13*(6), 728-739.

Marchesi, C., Brusamonti, E., & Maggini, C. (2000). Are alexithymia, depression, and anxiety distinct constructs in affective disorders?. *Journal of psychosomatic research*, *49*(1), 43-49.

Marchesi, C., Ossola, P., Tonna, M., & De Panfilis, C. (2014). The TAS-20 more likely measures negative affects rather than alexithymia itself in patients with major depression, panic disorder, eating disorders and substance use disorders. *Comprehensive Psychiatry*, *55*(4), 972-978.

Marino, C., Gini, G., Vieno, A., & Spada, M. M. (2018). A comprehensive meta-analysis on Problematic Facebook Use. *Computers in Human Behavior*, *83*, 262-277.

Martin, A., Rief, W., Klaiberg, A., & Braehler, E. (2006). Validity of the brief patient health questionnaire mood scale (PHQ-9) in the general population. *General hospital psychiatry*, *28*(1), 71-77.

McFarland, S. G. (1981). Effects of question order on survey responses. *Public Opinion Quarterly*, *45*(2), 208-215.

Meerkerk, G. J., Van Den Eijnden, R. J., Vermulst, A. A., & Garretsen, H. F. (2009). The compulsive internet use scale (CIUS): some psychometric properties. *Cyberpsychology & behavior*, *12*(1), 1-6.

Mei, S., Xu, G., Gao, T., Ren, H., & Li, J. (2018). The relationship between college students' alexithymia and mobile phone addiction: Testing mediation and moderation effects. *BMC psychiatry*, *18*(1), 329.

Mikulincer, M. (1998). Adult attachment style and affect regulation: Strategic variations in self-appraisals. *Journal of personality and social psychology*, *75*(2), 420.

Mikulincer, M., & Shaver, P. R. (2008). Adult attachment and affect regulation. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 503-531). New York, NY, US: The Guilford Press.

Mitrovic, D. V., & Brown, J. (2009). Poker mania and problem gambling: A study of distorted cognitions, motivation and alexithymia. *Journal of Gambling Studies*, *25*(4), 489-502.

Montag, C., Bey, K., Sha, P., Li, M., Chen, Y. F., Liu, W. Y., ... & Reuter, M. (2015). Is it meaningful to distinguish between generalized and specific Internet addiction? Evidence from a cross‐ cultural study from Germany, Sweden, Taiwan and China. *Asia‐ Pacific Psychiatry*, *7*(1), 20-26.

Moon, S. J., Hwang, J. S., Kim, J. Y., Shin, A. L., Bae, S. M., & Kim, J. W. (2018). Psychometric Properties of the Internet Addiction Test: A Systematic Review and Meta-Analysis. *Cyberpsychology, Behavior, and Social Networking*, *21*(8), 473-484.

Moretta, T., & Buodo, G. (2018). Modeling Problematic Facebook Use: Highlighting the role of mood regulation and preference for online social interaction. *Addictive behaviors*, *87*, 214-221.

Morrison, C. M., & Gore, H. (2010). The relationship between excessive Internet use and depression: a questionnaire-based study of 1,319 young people and adults. *Psychopathology*, *43*(2), 121-126.

Nemiah, J. C., & Sifneos, P. E. (1970). Psychosomatic illness: a problem in communication. *Psychotherapy and Psychosomatics*, *18*(1-6), 154-160.

Nemiah, J., Freyberger, H., & Sifneos, P. E. (1976). Alexithymia: a view of the psychosomatic process. *Modern Tends in Psychosomatic Medicine 3*: 430–439.

Nicolò, G., Semerari, A., Lysaker, P. H., Dimaggio, G., Conti, L., D'Angerio, S., ... & Carcione, A. (2011). Alexithymia in personality disorders: Correlations with symptoms and interpersonal functioning. *Psychiatry research*, *190*(1), 37-42.

Nitzburg, G. C., & Farber, B. A. (2013). Putting up emotional (Facebook) walls? Attachment status and emerging adults' experiences of social networking sites. *Journal of Clinical Psychology*, *69*(11), 1183-1190.

Norberg, M. M., Wetterneck, C. T., Woods, D. W., & Conelea, C. A. (2007). Experiential avoidance as a mediator of relationships between cognitions and hair-pulling severity. *Behavior Modification*, *31*(4), 367-381.

Norris, J. I., Lambert, N. M., DeWall, C. N., & Fincham, F. D. (2012). Can't buy me love?: Anxious attachment and materialistic values. *Personality and Individual Differences*, *53*(5), 666-669.

Ofcom (2018), Communications Market Report 2018, London: *Ofcom.* Retrieved from: https://www.ofcom.org.uk/__data/assets/pdf_file/0022/117256/CMR-2018-narrative-report.pdf

ONS, 2019. Measuring national well-being in the UK, international comparisons, 2019, *Office for National Statistics* (2019): Retrieved from: https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/measuringnationalwellbeing/internationalcomparisons2019

Panayiotou, G., Leonidou, C., Constantinou, E., Hart, J., Rinehart, K. L., Sy, J. T., &

Björgvinsson, T. (2015). Do alexithymic individuals avoid their feelings? Experiential avoidance mediates the association between alexithymia, psychosomatic, and depressive symptoms in a community and a clinical sample. *Comprehensive psychiatry*, *56*, 206-216.

Parker, J. D., Taylor, G. J., & Bagby, M. (1993). Alexithymia and the recognition of facial expressions of emotion. *Psychotherapy and psychosomatics*, *59*(3-4), 197-202.

Parker, J. D., Wood, L. M., Bond, B. J., & Shaughnessy, P. (2005). Alexithymia in young adulthood: a risk factor for pathological gambling. *Psychotherapy and Psychosomatics*, *74*(1), 51-55.

Petry, N. M., & O'brien, C. P. (2013). Internet gaming disorder and the DSM-5. *Addiction*, *108*(7), 1186-1187.

Phillips, D. C., & Burbules, N. C. (2000). *Postpositivism and educational research*. Rowman & Littlefield.

Piehler, T. F., Véronneau, M. H., & Dishion, T. J. (2012). Substance use progression from adolescence to early adulthood: Effortful control in the context of friendship influence and early-onset use. *Journal of Abnormal Child Psychology*, *40*(7), 1045-1058.

Piwek, L., Ellis, D. A., Andrews, S., & Joinson, A. (2016). The rise of consumer health wearables: promises and barriers. *PLoS medicine, 13*(2), e1001953.

Plummer, F., Manea, L., Trepel, D., & McMillan, D. (2016). Screening for anxiety disorders with the GAD-7 and GAD-2: a systematic review and diagnostic metaanalysis. *General hospital psychiatry*, *39*, 24-31.

Potenza, M. N. (2014). Non-substance addictive behaviors in the context of DSM-5. *Addictive behaviors*, *39*(1).

Preece, D., Becerra, R., Allan, A., Robinson, K., & Dandy, J. (2017). Establishing the theoretical components of alexithymia via factor analysis: Introduction and validation of the attention-appraisal model of alexithymia. *Personality and Individual Differences*, *119*, 341-352.

Preece, D., Becerra, R., Robinson, K., Dandy, J., & Allan, A. (2018). The psychometric assessment of alexithymia: Development and validation of the Perth Alexithymia Questionnaire. *Personality and Individual Differences*, *132*, 32-44.

Rado, S. (1933). The psychoanalysis of pharmacothymia (drug addiction). *The Psychoanalytic Quarterly*, *2*(1), 1-23.

Reading, B. (2002). The application of Bowlby's attachment theory to the psychotherapy of the addictions. *The psychodynamics of addiction*, 13-30.

Reid, R. C., Carpenter, B. N., Spackman, M., & Willes, D. L. (2008). Alexithymia, emotional instability, and vulnerability to stress proneness in patients seeking help for hypersexual behavior. *Journal of Sex & Marital Therapy*, *34*(2), 133-149.

Rennie, D. L., & Frommer, J. (2015). Applications of qualitative and mixed-methods counseling and psychotherapy research. In *Psychotherapy Research* (pp. 429-454). Springer, Vienna.

Riley, B. (2014). Experiential avoidance mediates the association between thought suppression and mindfulness with problem gambling. *Journal of Gambling Studies*, *30*(1), 163-171.

Rochefort, C., Baldwin, A. S., & Chmielewski, M. (2018). Experiential avoidance: An examination of the construct validity of the aaq-ii and meaq. *Behavior therapy*, *49*(3), 435-449.

Rosenthal, R. J., & Faris, S. (2018). The etymology and early history of 'addiction'. *Addiction Research & Theory*, 1-13.

Ruesch, J. (1948). The infantile personality; the core problem of psychosomatic medicine. *Psychosomatic Medicine*.

Schimmenti, A., Passanisi, A., Gervasi, A. M., Manzella, S., & Famà, F. I. (2014). Insecure attachment attitudes in the onset of problematic Internet use among late adolescents. *Child Psychiatry & Human Development*, *45*(5), 588-595.

Schmidt, C., Muench, R., Schneider, F., Breitenbach, S., & Carolus, A. (2018, July). Generation "Always On" Turned Off. Effects of Smartphone Separation on Anxiety Mediated by the Fear of Missing Out. In *International Conference on Human-Computer Interaction* (pp. 436-443). Springer, Cham.

Scimeca, G., Bruno, A., Cava, L., Pandolfo, G., Muscatello, M. R. A., & Zoccali, R. (2014). The relationship between alexithymia, anxiety, depression, and internet addiction severity in a sample of Italian high school students. *The Scientific World Journal*, *2014*.

Şenormancı, Ö., Şenormancı, G., Güçlü, O., & Konkan, R. (2014). Attachment and family functioning in patients with internet addiction. *General hospital psychiatry*, *36*(2), 203-207.

Shaw, M., & Black, D. W. (2008). Internet addiction. *CNS drugs*, *22*(5), 353-365.

Shinohara, R. T., Frangakis, C. E., & Lyketsos, C. G. (2012). A broad symmetry criterion for nonparametric validity of parametrically based tests in randomized trials. *Biometrics*, *68*(1), 85-91.

Shorey, R. C., Gawrysiak, M. J., Elmquist, J., Brem, M., Anderson, S., & Stuart, G. L. (2017). Experiential avoidance, distress tolerance, and substance use cravings among adults in residential treatment for substance use disorders. *Journal of addictive diseases*, *36*(3), 151-157.

Sifneos, P. E. (1973). The prevalence of 'alexithymic' characteristics in psychosomatic patients. *Psychotherapy and psychosomatics*, *22*(2-6), 255-262.

Silver, N., & Slater, M. D. (2019). A safe space for self-expansion: Attachment and motivation to engage and interact with the story world. *Journal of Social and Personal Relationships*, 0265407519826345.

Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine*, *166*(10), 1092-1097.

Starcevic, V., & Billieux, J. (2017). Does the construct of Internet addiction reflect a single entity or a spectrum of disorders?. *Clinical Neuropsychiatry*, *14*(1), 5-10.

Stern, D. N. (1985). *The interpersonal world of the infant: A view from psychoanalysis and developmental psychology*. Karnac Books.

Stewart, S. H., Zvolensky, M. J., & Eifert, G. H. (2002). The relations of anxiety sensitivity, experiential avoidance, and alexithymic coping to young adults' motivations for drinking. *Behavior modification*, *26*(2), 274-296.

Suchman, N. E., DeCoste, C. L., McMahon, T. J., Dalton, R., Mayes, L. C., & Borelli, J. (2017). Mothering From the Inside Out: Results of a second randomized clinical trial testing a mentalization-based intervention for mothers in addiction treatment. *Development and Psychopathology, 29*(2), 617-636.

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5). Boston, MA: Pearson.

Tams, S., Legoux, R., & Leger, P. M. (2018). Smartphone withdrawal creates stress: A moderated mediation model of nomophobia, social threat, and phone withdrawal context. *Computers in Human Behavior, 81*, 1-9.

Taylor, G. J. (2000). Recent developments in alexithymia theory and research. *The Canadian Journal of Psychiatry*, *45*(2), 134-142.

Taylor, G. J., Bagby, R. M., & Parker, J. D. (1991). The alexithymia construct: a potential paradigm for psychosomatic medicine. *Psychosomatics*, *32*(2), 153-164.

Taylor, G. J., Bagby, R. M., & Parker, J. D. (1999). *Disorders of affect regulation: Alexithymia in medical and psychiatric illness*. Cambridge University Press.

Thorberg, F. A., Young, R. M., Sullivan, K. A., & Lyvers, M. (2009). Alexithymia and alcohol use disorders: a critical review. *Addictive behaviors*, *34*(3), 237-245.

Tiirikainen, K., Haravuori, H., Ranta, K., Kaltiala-Heino, R., & Marttunen, M. (2019). Psychometric properties of the 7-item Generalized Anxiety Disorder Scale (GAD-7) in a large representative sample of Finnish adolescents. *Psychiatry research*, *272*, 30-35.

Tilley, E., McLeod, J., & McLeod, J. (2015). An exploratory qualitative study of values issues associated with training and practice in pluralistic counselling. *Counselling and Psychotherapy Research*, *15*(3), 180-187.

Internet Addiction: Attached to Technology?

Toneatto, T., Lecce, J., & Bagby, M. (2009). Alexithymia and pathological gambling. *Journal of addictive diseases*, *28*(3), 193-198.

Tonioni, F., Mazza, M., Autullo, G., Cappelluti, R., Catalano, V., Marano, G., ... & Lai, C. (2014). Is Internet addiction a psychopathological condition distinct from pathological gambling?. *Addictive Behaviors*, *39*(6), 1052-1056.

Tourangeau, R., & Rasinski, K. A. (1988). Cognitive processes underlying context effects in attitude measurement. *Psychological bulletin*, *103*(3), 299.

Van Ameringen, M., Simpson, W., Patterson, B., Turna, J., & Khalesi, Z. (2018). INTERNET ADDICTION OR PSYCHOPATHOLOGY IN DISGUISE? RESULTS FROM A SURVEY OF COLLEGE-AGED INTERNET USERS. *European Neuropsychopharmacology*, *28*(6), 762.

Venta, A., Hart, J., & Sharp, C. (2013). The relation between experiential avoidance, alexithymia and emotion regulation in inpatient adolescents. *Clinical child psychology and psychiatry*, *18*(3), 398-410.

Waters, E., Merrick, S., Treboux, D., Crowell, J., & Albersheim, L. (2000). Attachment security in infancy and early adulthood: A twenty- year longitudinal study. *Child development*, *71*(3), 684-689.

Wei, M., Russell, D. W., Mallinckrodt, B., & Vogel, D. L. (2007). The Experiences in Close Relationship Scale (ECR)-short form: Reliability, validity, and factor structure. *Journal of personality assessment*, *88*(2), 187-204.

Weinstein, A., & Lejoyeux, M. (2015). New developments on the neurobiological and pharmaco- genetic mechanisms underlying internet and videogame addiction. *The American Journal on Addictions*, *24*(2), 117-125.

Wenzlaff, R. M., & Wegner, D. M. (2000). Thought suppression. *Annual review of psychology, 51*(1), 59-91.

Westwood, H., Kerr-Gaffney, J., Stahl, D., & Tchanturia, K. (2017). Alexithymia in eating disorders: Systematic review and meta-analyses of studies using the Toronto Alexithymia Scale. *Journal of psychosomatic research*, *99*, 66-81.

Wetterneck, C. T., Burgess, A. J., Short, M. B., Smith, A. H., & Cervantes, M. E. (2012). The role of sexual compulsivity, impulsivity, and experiential

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avoidance in internet pornography use. *The Psychological Record*, *62*(1), 3-18.

Williams, A. D. (2012). Distress tolerance and experiential avoidance in compulsive acquisition behaviours. *Australian Journal of Psychology*, *64*(4), 217-224.

Winnicott, D. W. (1969). The use of an object. *International Journal of Psycho-Analysis*, *50*, 711-716.

Yellowlees, P. M., & Marks, S. (2007). Problematic Internet use or Internet addiction?. *Computers in human behavior*, *23*(3), 1447-1453

Yen, J. Y., Ko, C. H., Yen, C. F., Wu, H. Y., & Yang, M. J. (2007). The comorbid psychiatric symptoms of Internet addiction: attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. *Journal of adolescent health*, *41*(1), 93-98

Young, K. S. (1996). Psychology of computer use: XL. Addictive use of the Internet: a case that breaks the stereotype. *Psychological reports*, *79*(3), 899-902.

Young, K. S. (1998). Internet addiction: The emergence of a new clinical disorder. *Cyberpsychology & behavior*, *1*(3), 237-244.

Young, K., Pistner, M., O'MARA, J. A. M. E. S., & Buchanan, J. (1999). Cyber disorders: The mental health concern for the new millennium. *CyberPsychology & Behavior*, *2*(5), 475-479.

Zarins, S., Johnson, M., Ustymchuk, N., Tutrow, K., & Konrath, S. H. (2016). *More comfortable online? Alexithymia and social media use*. Poster session presented at IUPUI Research Day 2016, Indianapolis, Indiana.

6 APPENDICES

6.1 Participant forms

6.1.1 Participant Information

Participant Information

Internet Addiction: Attached to digital technology?

We would like to invite you to take part in a research study. Before you decide, it is important to understand why the research is being done and what it will involve.

What is the purpose of the study?
This research is an exploratory one, looking to delve into why some people are more likely to develop problematic Internet use. It looks at specific subtypes of Internet use, the role of psychological flexibility and what makes people more predisposed to addiction.

This study is being undertaken as part of my professional doctorate in Counselling Psychology at City University and the findings may help shape future understanding and treatment strategies.

What type of data is being collected?
The data collected is purely via a small number of online questionnaires, including a questions about how you use the Internet, relationships, emotions and a basic set of demographic questions relating to age, gender, sexual orientation, ethnicity, education and socio-economic status.

Data collected for this research is processed under the Article 9(2)(a) of the General Data Protection Regulation (GDPR).

Why have I been invited to take part?
If you are aged 18 or over and use the internet then your responses here are very useful for us.

Do I have to take part?
It is entirely up to you if you wish to participate and you may stop at any point if you feel at all uncomfortable answering any questions. If any questions seem too personal or intrusive, you are welcome to skip them.

What will happen if I take part?
It will take roughly 15 minutes to fill in the questionnaires. After you have finished answering the questions, there will be a debrief page which will provide you with further information if you need it. The answers will be anonymous and data collected from the questionnaire will be combined and analysed in order to discover any meaningful links

between the questions being asked.

What do I have to do?
Please simply answer the questions as honestly as possible, answering as reflects your current or recent situation rather than what you might wish to be the case.

What are the possible disadvantages and risks of taking part?
Should you fear that you may have an issue or problem, or that someone you know might, please see the debrief page links to organisations at the end of the questionnaire.

What are the possible benefits of taking part?
Taking part will help to shape our understanding of problematic internet behaviour. It may lead to new ways of understanding this kind of behaviour, along with new ways sufferers can be treated.

Will my taking part in the study be kept confidential? All information/data collected is confidential and only available to the supervisor and myself. Once the data has been made anonymous, with all personal or identifiable information removed, it may become available for other researchers to analyse.

Personal information will not be shared now, nor in the future for any commercial reason. Data will be securely encrypted, stored on secure servers via a third-party company (Qualtrics) and archived. It will be stored for 10 years. If the project is abandoned prior to completion, the data will be deleted.

What will happen to the results of the research study?
Results will be published as part of a finished doctoral thesis at City University. They may also be published in a scientific journal, however do note that anonymity will be maintained at all times for anyone participating within the study.

What will happen if I don't want to carry on with the study?
You are free to stop filling in the questionnaire, without explanation or penalty, at any time during the study. Once submitted, the data is anonymous and therefore cannot be later removed or identified as yours.

What if there is a problem?
If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone ██████████.

You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: Internet Addiction: Attached to technology?

You could also write to the Secretary at:
██████████
Secretary to Senate Research Ethics Committee
Research Office, E214

City University London
Northampton Square
London
EC1V 0HB

███████████████████

City University London holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

Who has reviewed the study?
This study has been approved by City University London School of Social Sciences Research Ethics Committee, **PSYETH (P/L) 17/18 189**.

Further information and contact details
If you have any enquiries, see below for contact details:

Researcher:
Richard Pomfret - ██████████████████

Research supervisor:
████████████████████████████████

Thank you for taking the time to read this information sheet.

6.1.2 Participant Consent

Participant Consent

Research Participant Consent Form
Researcher: Richard Pomfret
Ethics Approval Code: **PSYETH (P/L) 17/18 189**

Please carefully read and ensure the box is ticked if you consent and wish to take part in this study. If not, you will be taken directly to the end.

Tick to consent

Tick to consent

1) I agree to take part in the above City University London research project. I have had the project explained to me, and I have read the participant information sheet, which I may keep for my records.

I understand this will involve:

• Completing questionnaires asking me about my use of the internet, relationships and how I feel about things.

2) This information will be held and processed for the following purpose(s):

  • To answer the research question.
  • To help guide development of future psychological treatments.

It is held as per the lawful basis for processing under General Data Protection Regulation (GDPR) for personal data and special category data. The legal basis for processing your personal data will be that this research is a task in the public interest, that is City, University of London considers the lawful basis for processing personal data to fall under Article 6(1)(e) of GDPR (public task) as the processing of research participant data is necessary for learning and teaching purposes and all research with human participants by staff and students has to be scrutinised and approved by one of City's Research Ethics Committees.

I understand that the following special category data will be collected and retained as part of this research study: demographic data such as gender, ethnicity, occupation, education, age and socioeconomic status. City considers the processing of special category personal data will fall under: Article 9(2)(g) of the GDPR as the processing of special category data has to be for the public interest in order to receive research ethics approval and occurs on the basis of law that is, inter alia, proportionate to the aim pursued and protects the rights of data subjects and also under Article 9(2)(a) of the GDPR as the provision of these personal data is completely voluntary.

☐

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. The identifiable data will not be shared with any other organisation.

I understand that the thesis will be made available in the City Research Online repository.

3) I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalized or disadvantaged in any way.

4) I agree to City University London recording and processing this information about me. I understand that this information will be used only for the purpose(s) set out in this statement and my consent is conditional on the University complying with its duties and obligations under the General Data Protection Regulation (GDPR).

5) I agree to take part in the above study (please tick the box to consent).

If you wish to receive a copy of this consent form, please provide your email:

[   ]

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6.1.3 Participant Debrief

DEBRIEF

DEBRIEF INFORMATION

Thank you for taking part in this study. Now that it's finished we'd like to tell you a bit more about it.

This research explores whether problematic Internet use really can be classified as an addiction or not. You have helped us to try and determine this by answering questions that examine specific types of online behaviour in order to see if they share similarities with other addictions.

A secondary part of this research is to delve into why some people are more likely to develop such problematic behaviour while others are not. What cognitive and emotional processes may increase or decrease this? How can we reduce risk of addiction?

We expect to find that specific problematic Internet behaviours do echo findings relating to other addictions, particularly in terms of psychological flexibility and how we manage relationships.

This can mean that those of us who find ourselves becoming addicted are more likely to struggle with relationships and how we work with our emotions, particularly negative or painful ones. Without that support from others, we may become avoidant, seek escapism and continue to engage in behaviours even when they cease to be fun or rewarding.

If you would like to find out more, take a look here:

Problematic Internet use: https://en.wikipedia.org/wiki/Internet_addiction_disorder
Attachment: https://en.wikipedia.org/wiki/Attachment_theory
Experiential Avoidance (psychological flexibility): https://en.wikipedia.org/wiki/Experiential_avoidance
Alexithymia: https://en.wikipedia.org/wiki/Alexithymia

If you feel like you might be struggling with an addiction or mental health issue, do contact your GP or local doctor.

If you are based in the UK, you can also find support and advice below:

- NHS addiction support: https://www.nhs.uk/Livewell/Addiction/Pages/addictionhome.aspx
- Mind (Mental Health Charity): https://www.mind.org.uk/information-support/guides-to-support-and-services/crisis-services/telephone-support/
- Nightingale Hospital (Private support): https://www.nightingalehospital.co.uk/technology-addiction/

Find a counsellor here:

http://www.counselling-directory.org.uk/
https://www.bps.org.uk/lists/DIR
https://www.bacp.co.uk/

We hope you found the study interesting. If you have any other questions or noticed any problems or issues with the set of questionnaires, please do not hesitate to contact us at the following:

Researcher:
Richard Pomfret █████████████████

Research supervisor:
████████████████████████████

Ethics approval code: **PSYETH (P/L) 17/18 189**

6.2   Questionnaires

6.2.1   Dimensions of Problematic Internet Use (DPIU)

Note that there are a few formatting issues with the Qualtrics export as shown here – there were no issues when accessing these online for users.

DPIU

Dimensions of Problematic Internet Use (DPIU) Questionnaire.

Below is a list of some of the things that people use the internet for.

For each individual activity listed below, please answer each question Yes or No. You can skip a category if it is not relevant to you. Answer as many as you can and as honestly as possible. It can be useful not to dwell too long on any question, rather go with what you think and feel is right.

Entertainment and Video Streaming – examples: Netflix, YouTube, Amazon Prime, Hulu, HBOGo, Now TV or other video streaming services

	YES	NO
- Have you ever felt bad or guilty about how much time you spend streaming?	O	O
- Have people ever annoyed you by criticizing how much time you spend streaming?	O	O
- Have you ever felt you should cut down on the amount of time you spend streaming videos?	O	O

If you answered Yes to 2 or more the above questions, please answer the following

	0 - Not at all	1	2	3	4	5 - A lot
- How hard would it be for you to cut down on the amount of time you spend streaming?	O	O	O	O	O	O
- Do you find that the amount of time you spend streaming impacts your ability to work, go to school or function normally day to day?	O	O	O	O	O	O
- If you were unable to stream videos, how irritable/cranky/annoyed/restless would you become?	O	O	O	O	O	O
- How frequently do you neglect important things (like work, school, friend or family) in order to spend time streaming?	O	O	O	O	O	O
- How often do you find yourself thinking about videos you watched, or videos you may want to stream later on?	O	O	O	O	O	O

Social Media – examples: Facebook, Twitter, Tumblr, Pintrest, Instagram, Reddit

	YES	NO
- Have people annoyed you by criticizing how much time you spend on social media?	O	O
- Have you ever felt bad or guilty about how much time you spend on social media?	O	O
- Have you ever felt like you should cut down on how much time you spend looking at social media?	O	O

If you answered Yes to 2 or more the above questions, please answer the following

	Not at all		Somewhat			A lot
	0 - Not at all	1	2	3	4	5 - A lot
- How often do you find yourself thinking about posts you made or posts you might want to make later?	O	O	O	O	O	O
- How frequently do you neglect important things (like work, school, friend or family) in order to spend time on social media?	O	O	O	O	O	O
- If you were unable to use social media, how irritable/cranky/annoyed/restless would you become?	O	O	O	O	O	O

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	Not at all		Somewhat			A lot
	0 - Not at all	1	2	3	4	5 - A lot
- Do you find that the amount of time you spend on social media impacts your ability to work, go to school or function normally day to day?	O	O	O	O	O	O
- How hard would it be for you to cut down on the amount of time you spend using social media?	O	O	O	O	O	O

Gaming – examples: Fortnite, Clash of Clans, Candy Crush, Minecraft, World of Warcraft, Destiny, Dota 2, Warframe, Xbox Live, Playstation Network.

	YES	NO
- Have you ever felt bad or guilty about how much time you spend playing games online?	O	O
- Have people annoyed you by criticising how much time you spend playing games online?	O	O
- Have you ever felt like you should cut down on how much time you spend playing games online?	O	O

If you answered **Yes** to 2 or more the above questions, please answer the following

	0 - Not at all	1	2	3	4	5 - A lot
- How hard would it be for you to cut down on the amount of time you spend gaming?	O	O	O	O	O	O
- If you were unable to game online, how irritable/cranky/annoyed/restless would you become?	O	O	O	O	O	O
- How often do you find yourself thinking about times you were gaming, or the gaming you want to do later?	O	O	O	O	O	O
- Do you find that the amount of time you spend gaming impacts your ability to work, go to school or function normally day to day?	O	O	O	O	O	O
- How frequently do you neglect important things (like work, school, friend or family) in order to spend time gaming?	O	O	O	O	O	O

Messaging (excluding work-related messaging) – examples: Texting (SMS), WhatsApp, Facebook Messenger, Skype, Email, iMessage, BBM, Forums, Chat rooms

	YES	NO
- Have you ever felt bad or guilty about how much time you messaging?	O	O
- Have you ever felt like you should cut down on how much time you spend messaging?	O	O
- Have people annoyed you by criticising how much time you spend messaging?	O	O

If you answered **Yes** to 2 or more the above questions, please answer the following

	0 - Not at all	1	2	3	4	5 - A lot
- How often do you find yourself thinking about messages you sent, or messages may want to send later on?	O	O	O	O	O	O
- How hard would it be for you to cut down on the amount of time you spend messaging?	O	O	O	O	O	O
- How frequently do you neglect important things (like work, school, friend or family) in order to spend time messaging?	O	O	O	O	O	O
- If you were unable to message people, how irritable/cranky/annoyed/restless would you become?	O	O	O	O	O	O
- Do you find that the amount of time you spend messaging impacts your ability to work, go to school or function normally day to day?	O	O	O	O	O	O

Dating Apps – examples: Tinder, Bumble, happn, Plenty of Fish, Match.com, eHarmony.

	YES	NO
- Have people annoyed you by criticising how much time you spend on dating apps?	O	O
- Have you ever felt like you should cut down on how much time you spend on dating apps?	O	O
- Have you ever felt bad or guilty about how much time you spend on dating apps?	O	O

If you answered **Yes** to 2 or more the above questions, please answer the following

	0 - Not at all	1	2	3	4	5 - A lot
- How often do you find yourself thinking about times you used or will use dating apps?	O	O	O	O	O	O
- How hard would it be for you to cut down on the amount of time you spend on dating apps?	O	O	O	O	O	O
- If you were unable to use dating apps, how irritable/cranky/annoyed/restless would you become?	O	O	O	O	O	O
- How frequently do you neglect important things (like work, school, friend or family) in order to spend time on dating apps?	O	O	O	O	O	O
- Do you find that the amount of time you spend using dating apps impacts your ability to work, go to school or function normally day to day?	O	O	O	O	O	O

Gambling – examples: sports betting, online casino, poker, horse racing

	YES	NO
- Have people annoyed you by criticising how much time you spend gambling online?	O	O
- Have you ever felt bad or guilty about how much time you spend gambling online?	O	O
- Have you ever felt like you should cut down on how much time you spend gambling online?	O	O

If you answered **Yes** to 2 or more the above questions, please answer the following

	0 - Not at all	1	2	3	4	5 - A lot
- If you were unable to gamble online, how irritable/cranky/annoyed/restless would you become?	O	O	O	O	O	O
- How often do you find yourself thinking about gambling online?	O	O	O	O	O	O
- Do you find that the amount of time you spend gambling online impacts your ability to work, go to school or function normally day to day?	O	O	O	O	O	O
- How frequently do you neglect important things (like work, school, friend or family) in order to gamble online?	O	O	O	O	O	O

	0 - Not at all	1	2	3	4	5 - A lot
- How hard would it be for you to cut down on the amount of time you spend gambling online?	O	O	O	O	O	O

Sexual Content – examples: porn videos, sexting, webcam shows, erotic chat

	YES	NO
- Have people annoyed you by criticising how much time you spend looking at sexual content online?	O	O
- Have you ever felt like you should cut down on how much time you spend looking at sexual content online?	O	O
- Have you ever felt bad or guilty about how much time you spend looking at sexual content online?	O	O

If you answered **Yes** to 2 or more the above questions, please answer the following

	0 - Not at all	1	2	3	4	5 - A lot
- Do you find that the amount of time you spend looking at sexual content online impacts your ability to work, go to school or function normally day to day?	O	O	O	O	O	O
- How frequently do you neglect important things (like work, school, friend or family) in order to spend time looking at sexual content online?	O	O	O	O	O	O
- How often do you find yourself thinking about online sexual content?	O	O	O	O	O	O
- If you were unable look at sexual content online, how irritable/cranky/annoyed/restless would you become?	O	O	O	O	O	O
- How hard would it be for you to cut down on the amount of time you spend looking at sexual content online?	O	O	O	O	O	O

Online shopping – examples: Ebay, Amazon, Etsy, Asos, John Lewis, Craigslist

	YES	NO
- Have people annoyed you by criticising how much time you spend shopping online?	O	O

	YES	NO
- Have you ever felt like you should cut down on how much time you spend shopping online?	O	O
- Have you ever felt bad or guilty about how much time you spend shopping online?	O	O

If you answered **Yes** to 2 or more the above questions, please answer the following

	0 - Not at all	1	2	3	4	5 - A lot
- How frequently do you neglect important things (like work, school, friend or family) in order to spend time shopping online?	O	O	O	O	O	O
- How often do you find yourself thinking about things you bought online, or things you may want to buy online later?	O	O	O	O	O	O
- How hard would it be for you to cut down on the amount of time you spend shopping online?	O	O	O	O	O	O
- Do you find that the amount of time you spend shopping online impacts your ability to work, go to school or function normally day to day?	O	O	O	O	O	O
- If you were unable to shop online, how irritable/cranky/annoyed/restless would you become?	O	O	O	O	O	O

Information Seeking – examples: Wikipedia, Googling for information, Buzzfeed, reading the news

	YES	NO
- Have people annoyed you by criticising how much time you spend looking for information online?	O	O
- Have you ever felt bad or guilty about how much time you spend looking for information online?	O	O
- Have you ever felt like you should cut down on how much time you spend looking for information online?	O	O

If you answered **Yes** to 2 or more the above questions, please answer the following

Internet Addiction: Attached to Technology?

	0 - Not at all	1	2	3	4	5 - A lot
- Do you find that the amount of time you spend looking for information online impacts your ability to work, go to school or function normally day to day?	O	O	O	O	O	O
- If you were unable to look for information online, how irritable/cranky/annoyed/ restless would you become?	O	O	O	O	O	O
- How frequently do you neglect important things (like work, school, friend or family) in order to look for information online?	O	O	O	O	O	O
- How often do you find yourself thinking about things you looked up online, or things you might want to look up online later on?	O	O	O	O	O	O
- How hard would it be for you to cut down on the amount of time you spend looking for information online?	O	O	O	O	O	O

6.2.2 Experiences of Close Relationships Short Form (ECR-S)

Experiences in Close Relationship Scale-Short Form (ECR-S)

The following statements concern how you feel in romantic relationships. We are interested in how you generally experience relationships, not just in what is happening in a current relationship.

Respond to each statement by indicating how much you **agree** or **disagree** with it. Select your answer using the following rating scale:

	1 - Strongly disagree	2 - Disagree	3 - Slightly disagree	4 - Neutral	5 - Slightly agree	6 - Agree	7 - Strongly agree
- It helps to turn to my romantic partner in times of need.	O	O	O	O	O	O	O
- I usually discuss my problems and concerns with my partner.	O	O	O	O	O	O	O
- I turn to my partner for many things, including comfort and reassurance.	O	O	O	O	O	O	O
- I find that my partner(s) don't want to get as close as I would like.	O	O	O	O	O	O	O
- I need a lot of reassurance that I am loved by my partner.	O	O	O	O	O	O	O
- I do not often worry about being abandoned.	O	O	O	O	O	O	O
- I want to get close to my partner, but I keep pulling back.	O	O	O	O	O	O	O
- My desire to be very close sometimes scares people away.	O	O	O	O	O	O	O

	1 - Strongly disagree	2 - Disagree	3 - Slightly disagree	4 - Neutral	5 - Slightly agree	6 - Agree	7 - Strongly agree
- I am nervous when partners get too close to me.	O	O	O	O	O	O	O
- I get frustrated if romantic partners are not available when I need them.	O	O	O	O	O	O	O
- I worry that romantic partners won't care about me as much as I care about them.	O	O	O	O	O	O	O
- I try to avoid getting too close to my partner.	O	O	O	O	O	O	O

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6.2.3   Perth Alexithymia Questionnaire (PAQ)

Perth Alexithymia Questionnaire (PAQ)

This questionnaire asks about how you perceive and experience your emotions. Please score the following statements according to **how much you agree or disagree that the statement is true of you**. Select one answer for each statement.

Some questions mention bad or unpleasant emotions, this means emotions like sadness, anger, or fear. Some questions mention good or pleasant emotions, this means emotions like happiness, amusement, or excitement.

	1 - Strongly disagree	2 - Disagree	3 - Slightly disagree	4 - Neutral	5 - Slightly agree	6 - Agree	7 - Strongly agree
- When I'm feeling bad, I can't talk about those feelings in much depth or detail.	O	O	O	O	O	O	O
- When I'm feeling bad (feeling an unpleasant emotion), I can't find the right words to describe those feelings.	O	O	O	O	O	O	O

	1 - Strongly disagree	2 - Disagree	3 - Slightly disagree	4 - Neutral	5 - Slightly agree	6 - Agree	7 - Strongly agree
- When I'm feeling good, I can't talk about those feelings in much depth or detail.	O	O	O	O	O	O	O
- It's strange for me to think about my emotions.	O	O	O	O	O	O	O
- When I'm feeling bad, I get confused about what emotion it is.	O	O	O	O	O	O	O
- When I'm feeling bad, I can't make sense of those feelings.	O	O	O	O	O	O	O
- When I'm feeling good, I'm puzzled by those feelings.	O	O	O	O	O	O	O
- When I'm feeling good, I can't tell whether I'm happy, excited, or amused.	O	O	O	O	O	O	O
- When I'm feeling bad, if I try to describe how I'm feeling I don't know what to say.	O	O	O	O	O	O	O
- I don't pay attention to my emotions.	O	O	O	O	O	O	O
- When I'm feeling good, I get confused about what emotion it is.	O	O	O	O	O	O	O
- When I'm feeling good, I can't make sense of those feelings.	O	O	O	O	O	O	O
- I don't try to be 'in touch' with my emotions.	O	O	O	O	O	O	O
- Usually, I try to avoid thinking about what I'm feeling.	O	O	O	O	O	O	O

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	1 - Strongly disagree	2 - Disagree	3 - Slightly disagree	4 - Neutral	5 - Slightly agree	6 - Agree	7 - Strongly agree
- When I'm feeling bad, I can't tell whether I'm sad, angry, or scared.	O	O	O	O	O	O	O
- When I'm feeling good (feeling a pleasant emotion), I can't find the right words to describe those feelings.	O	O	O	O	O	O	O
- When something good happens, it's hard for me to put into words how I'm feeling.	O	O	O	O	O	O	O
- I tend to ignore how I feel.	O	O	O	O	O	O	O
- I prefer to just let my feelings happen in the background, rather than focus on them.	O	O	O	O	O	O	O
- When something bad happens, it's hard for me to put into words how I'm feeling.	O	O	O	O	O	O	O
- I prefer to focus on things I can actually see or touch, rather than my emotions.	O	O	O	O	O	O	O
- When I'm feeling bad, I'm puzzled by those feelings.	O	O	O	O	O	O	O
- When I'm feeling good, if I try to describe how I'm feeling I don't know what to say.	O	O	O	O	O	O	O
- It's not important for me to know what I'm feeling.	O	O	O	O	O	O	O

6.2.4   Brief Experiential Avoidance Questionnaire (BEAQ)

Brief Experiential Avoidance Questionnaire

Please indicate the extent to which you agree or disagree with each of the following statements

	1 - Strongly disagree	2 - moderately disagree	3 - slightly disagree	4 - slightly agree	5 - moderately agree	6 - strongly agree
- I try to put off unpleasant tasks for as long as possible	○	○	○	○	○	○
- When unpleasant memories come to me, I try to put them out of my mind	○	○	○	○	○	○
- I won't do something until I absolutely have to	○	○	○	○	○	○
- I go out of my way to avoid uncomfortable situations	○	○	○	○	○	○

	1 - Strongly disagree	2 - moderately disagree	3 - slightly disagree	4 - slightly agree	5 - moderately agree	6 - strongly agree
- I'm quick to leave any situation that makes me feel uneasy	○	○	○	○	○	○
- It's hard for me to know what I am feeling	○	○	○	○	○	○
- I work hard to keep out upsetting feelings	○	○	○	○	○	○
- I feel disconnected from my emotions	○	○	○	○	○	○
- Fear or anxiety won't stop me from doing something important	○	○	○	○	○	○
- I would give up a lot to not feel bad	○	○	○	○	○	○
- One of my big goals is to be free of painful emotions	○	○	○	○	○	○
- I rarely do something if there is a chance it will upset me	○	○	○	○	○	○
- The key to a good life is never feeling any pain	○	○	○	○	○	○
- If I have any doubts about doing something, I just won't do it	○	○	○	○	○	○
- Pain always leads to suffering	○	○	○	○	○	○

6.2.5   PHQ-9 and GAD-7

Depression (PHQ-9) and Generalised Anxiety Disorder (GAD-7) Questionnaires

Over the last 2 weeks, on how many days **have you been bothered by any of the following problems?**

	0 - Not at all	1 - Several days	2 - More than half the days	3 - Nearly every day
- Feeling down, depressed or hopeless	O	O	O	O
- Poor appetite or overeating	O	O	O	O
- Thoughts that you would be better off dead or of hurting yourself in some way	O	O	O	O
- Feeling bad about yourself – or that you are a failure or have let yourself or your family down	O	O	O	O
- Moving or speaking so slowly that other people could have noticed, or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	O	O	O	O
- Trouble concentrating on things, such as reading the newspaper or watching television	O	O	O	O

	0 - Not at all	1 - Several days	2 - More than half the days	3 - Nearly every day
- Trouble falling or staying asleep, or sleeping too much	O	O	O	O
- Feeling tired or having little energy	O	O	O	O
- Little interest or pleasure in doing things	O	O	O	O

Over the last 2 weeks, on how many days **have you been bothered by any of the following problems?**

	0 - Not at all	1 - Several days	2 - More than half the days	3 - Nearly every day
- Becoming easily annoyed or irritable	O	O	O	O
- Not being able to stop or control worrying	O	O	O	O
- Feeling afraid as if something awful might happen	O	O	O	O
- Worrying too much about different things	O	O	O	O
- Being so restless it is hard to sit still	O	O	O	O
- Trouble relaxing	O	O	O	O
- Feeling nervous, anxious or on edge	O	O	O	O

6.2.6 Demographic Questions

Demographic Questions

How do you currently describe your gender identity?

○ Please specify: [   ]

○ I prefer not to answer

What is your age in years?

○ Please specify: [   ]

○ I prefer not to answer

Which categories describe you? Select all that apply to you:

☐ Asian/Asian British - For example, Indian, Pakistani, Bangladeshi, Chinese or other Asian background

☐ Black/African/Caribbean/Black British - For example, African, Caribbean or any other Black/African/Caribbean background

☐ Mixed/Multiple ethnic groups - For example, White and Black Caribbean, White and Black African, White and Asian or any other Mixed/Multiple ethnic background

☐ White - For example, English/Welsh/Scottish/Northern Irish/British, Gypsy or Irish Traveller, or any other White background

☐ Some other race, ethnicity, or origin. Please specify: [   ]

☐ I prefer not to answer

Which education categories describe you? Select all that apply to you:

☐ Some high school/secondary school (e.g. GCSE's)

☐ High school diploma or equivalent (e.g. A-levels)

☐ Vocational training

☐ University bachelor degree (e.g. BA, BSc)

☐ University master's degree (e.g. MA, MSc)

☐ Applied or professional doctorate degree (e.g. MD, DBA, DEd, DDS, DPsych, DClinPsy)

☐ Doctorate degree (e.g. EdD, PhD)

☐ Other

☐ I prefer not to answer

Where do you live? Select all that is appropriate to you:

☐ England & Wales

☐ Scotland

☐ Ireland

☐ Central Europe

☐ Eastern Europe

☐ Western Europe

☐ Asia

☐ Africa

☐ North America

☐ South America

☐ Antarctica

☐ Oceania

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☐ Northern Europe   ☐ I prefer not to answer
☐ Southern & Southeastern Europe

On average how many hours do you work a week, including time at an office, in the field, or working at home?

○ 35 or more hours
○ Less than 35 hours
○ I prefer not to answer

Do you consider yourself to be:

☐ Heterosexual or straight   ☐ Queer
☐ Gay or lesbian   ☐ Demisexual
☐ Bisexual   ☐ Questioning
☐ Fluid   ☐ Asexual
☐ Pansexual   ☐ I prefer not to answer

Are you currently in a romantic relationship with a partner or partners?

☐ No   ☐ If yes, are you married or in a civil partnership and living apart?

☐ Yes, one partner   ☐ If yes, are you NOT married or in a civil partnership and living together?

☐ Yes, I have multiple partners   ☐ If yes, are you NOT married or in a civil partnership and living apart?

☐ If yes, are you married or in a civil partnership and living together?   ☐ I prefer not to answer

How do you describe your religion, spiritual practice, or existential worldview?

○ Please specify: [_____]
○ I prefer not to answer:

Which social class group do you identify with?

☐ Poor
☐ Working class
☐ Middle class
☐ Affluent
☐ I prefer not to answer

What type of device are you using to access this questionnaire?

○ Mobile   ○ Laptop or desktop
○ Tablet   ○ Other internet device (please specify):

How did you find out about this research study?

○ Social media (e.g. Facebook, Twitter,   ○ Website (e.g. research portal or recruitment
  Instagram)   site)
○ Messaging (e.g. Email, WhatsApp, Skype,   ○ Other - please specify:
  Hangouts, iMessage, Facebook Messenger,
  Signal, Text)

Do you have any personal experience of mental health problems or mental distress?

○ Yes (please describe):

○ No

○ I would prefer not to answer

6.3 Ethics Approval

Psychology Research Ethics Committee
School of Arts and Social Sciences
City University London
London EC1R 0JD

10th July 2018

Dear ███████████████

Reference: PSYETH (P/L) 17/18 189

Project title: *Internet Addiction: Exploring Attachment, Alexithymia & Psychological Flexibility*

I am writing to confirm that the research proposal detailed above has been granted approval by the City University London Psychology Department Research Ethics Committee.

Period of approval
Approval is valid for a period of three years from the date of this letter. If data collection runs beyond this period you will need to apply for an extension using the Amendments Form.

Project amendments
You will also need to submit an Amendments Form if you want to make any of the following changes to your research:
      (a) Recruit a new category of participants
      (b) Change, or add to, the research method employed
      (c) Collect additional types of data
      (d) Change the researchers involved in the project

Adverse events
You will need to submit an Adverse Events Form, copied to the Secretary of the Senate Research Ethics Committee ██████████████████ in the event of any of the following:
      (a) Adverse events
      (b) Breaches of confidentiality
      (c) Safeguarding issues relating to children and vulnerable adults
      (d) Incidents that affect the personal safety of a participant or researcher
Issues (a) and (b) should be reported as soon as possible and no later than 5 days after the event. Issues (c) and (d) should be reported immediately. Where appropriate the researcher should also report adverse events to other relevant institutions such as the police or social services.

Should you have any further queries then please do not hesitate to get in touch.

Kind regards

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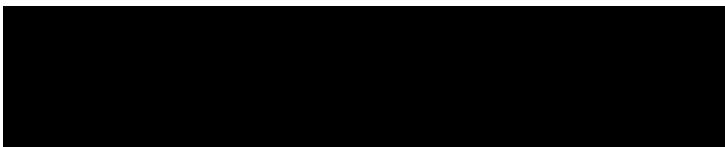
6.4 Levene's Test for Homogeneity

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
ECRS REP TOTAL SUM	Based on Mean	.007	1	439	.933
	Based on Median	.007	1	439	.935
	Based on Median and with adjusted df	.007	1	438.953	.935
	Based on trimmed mean	.005	1	439	.941

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Experiential Avoidance Sum (with replaced values)	Based on Mean	.161	1	439	.689
	Based on Median	.167	1	439	.683
	Based on Median and with adjusted df	.167	1	438.735	.683
	Based on trimmed mean	.151	1	439	.698

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Squre root transformed to normal dist PAQ for correlations	Based on Mean	.331	1	439	.566
	Based on Median	.377	1	439	.540
	Based on Median and with adjusted df	.377	1	438.989	.540
	Based on trimmed mean	.342	1	439	.559

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Squre root transformed GAD7 normal dist for correlations	Based on Mean	.015	1	439	.902
	Based on Median	.008	1	439	.931
	Based on Median and with adjusted df	.008	1	436.968	.931
	Based on trimmed mean	.013	1	439	.909

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Squre root transformed PHQ9 normal dist for correlations	Based on Mean	.380	1	439	.538
	Based on Median	.427	1	439	.514
	Based on Median and with adjusted df	.427	1	436.978	.514
	Based on trimmed mean	.399	1	439	.528

6.5 Appendix Testing for Multicollinearity

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Tolerance	VIF	Minimum Tolerance
						Collinearity Statistics		
1	Alexithymia Sum (with replaced missing values)	−.105[b]	−1.953	.051	−.093	.744	1.344	.741
	Experiential Avoidance Sum (with replaced values)	−.264[b]	−5.080	.000	−.236	.757	1.321	.757
	PHQ−9 Sum (with replaced missing values)	−.271[b]	−5.180	.000	−.241	.745	1.342	.740
	GAD−7 Sum (with replaced missing values)	−.248[b]	−4.885	.000	−.228	.799	1.251	.768
2	Experiential Avoidance Sum (with replaced values)	−.275[c]	−4.683	.000	−.219	.592	1.688	.582
	PHQ−9 Sum (with replaced missing values)	−.263[c]	−4.800	.000	−.224	.681	1.468	.680
	GAD−7 Sum (with replaced missing values)	−.237[c]	−4.541	.000	−.213	.755	1.325	.703
3	PHQ−9 Sum (with replaced missing values)	−.224[d]	−4.086	.000	−.192	.659	1.518	.562
	GAD−7 Sum (with replaced missing values)	−.201[d]	−3.870	.000	−.182	.733	1.364	.571
4	GAD−7 Sum (with replaced missing values)	−.105[e]	−1.457	.146	−.070	.382	2.618	.343

Correlations

		DPIU IA_Criteria+NEW	Attachment Avoidance Sum (with replaced missing values)	Attachment Anxiety Composite Sum (with replaced missing val)	Alexithymia Sum (with replaced missing values)	Experiential Avoidance Sum (with replaced values)	PHQ−9 Sum (with replaced missing values)	GAD−7 Sum (with replaced missing values)
Pearson Correlation	DPIU IA_Criteria+NEW	1.000	−.136	−.223	−.176	−.311	−.319	−.302
	Attachment Avoidance Sum (with replaced missing values)	−.136	1.000	.334	.473	.370	.325	.274
	Attachment Anxiety Composite Sum (with replaced missing val)	−.223	.334	1.000	.328	.431	.473	.425
	Alexithymia Sum (with replaced missing values)	−.176	.473	.328	1.000	.584	.441	.375
	Experiential Avoidance Sum (with replaced values)	−.311	.370	.431	.584	1.000	.463	.416
	PHQ−9 Sum (with replaced missing values)	−.319	.325	.473	.441	.463	1.000	.782
	GAD−7 Sum (with replaced missing values)	−.302	.274	.425	.375	.416	.782	1.000

6.6 DPIU Factor/Principle Component Analysis:

Factor Analysis DPIU Q1 Entertainment and Video Streaming Constructs.

Prompt: answering Yes on 2 or more of the questions (a-c) then asks the respondent to answer d-h. Scale: Not at all (0), Somewhat (2-3), A lot (5).

Item	Factor Loading 1
Factor 1: Withdrawal & Negative Consequences (α = .776)	
d. If you were unable to stream videos, how irritable/cranky/annoyed/restless would you become?	.72
e. Do you find that the amount of time you spend streaming impacts your ability to work, go to school or function normally day to day?	.75
f. How often do you find yourself thinking about videos you watched, or videos you may want to stream later on?	.71
g. How frequently do you neglect important things (like work, school, friend or family) in order to spend time streaming?	.72
h. How hard would it be for you to cut down on the amount of time you spend streaming?	.80

Scree Plot for Q1 Entertainment

Scree Plot – DPIU Subscale 1 – Entertainment
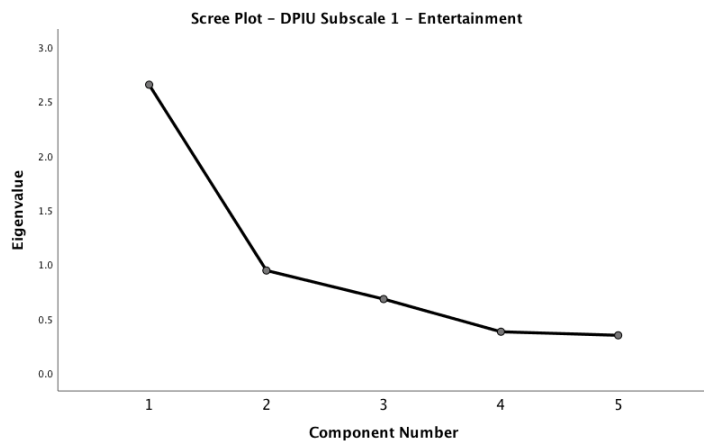
Internet Addiction: Attached to Technology?

*Factor Analysis DPIU Q2 **Social Media** Constructs.*

Prompt: answering Yes on 2 or more of the questions (a-c) then asks the respondent to answer d-h. Scale: Not at all (0), Somewhat (2-3), A lot (5).

Item	Factor Loading 1
Factor 1: Withdrawal & Negative Consequences ($\alpha = .765$)	
d. If you were unable to use social media, how irritable/cranky/annoyed/restless would you become?	.75
e. Do you find that the amount of time you spend on social media impacts your ability to work, go to school or function normally day to day?	.75
f. How often do you find yourself thinking about posts you made or posts you might want to make later?	.65
g. How frequently do you neglect important things (like work, school, friend or family) in order to spend time on social media?	.76
h. How hard would it be for you to cut down on the amount of time you spend using social media?	.76

Scree Plot for Q2 Social Media:

*Factor Analysis DPIU Q3 **Gaming** Constructs.*

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Internet Addiction: Attached to Technology?

Prompt: answering Yes on 2 or more of the questions (a-c) then asks the respondent to answer d-h. Scale: Not at all (0), Somewhat (2-3), A lot (5).

Item	Factor Loading 1
Factor 1: Withdrawal & Negative Consequences (α = .842)	
d. If you were unable to game online, how irritable/cranky/annoyed/restless would you become?	.84
e. Do you find that the amount of time you spend gaming impacts your ability to work, go to school or function normally day to day?	.80
f. How often do you find yourself thinking about times you were gaming, or the gaming you want to do later?	.78
g. How frequently do you neglect important things (like work, school, friend or family) in order to spend time gaming?	.74
h. How hard would it be for you to cut down on the amount of time you spend gaming?	.87

Scree Plot for Q3 Gaming:

Scree Plot – DPIU Q3 Gaming

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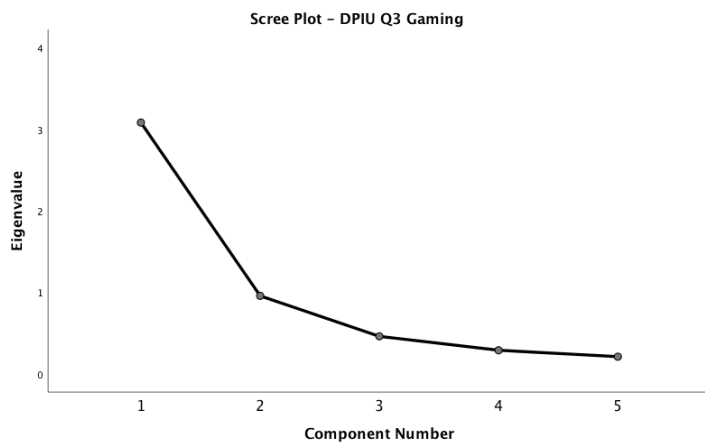
*Factor Analysis DPIU Q4 **Messaging** Constructs.*

Prompt: answering Yes on 2 or more of the questions (a-c) then asks the respondent to answer d-h. Scale: Not at all (0), Somewhat (2-3), A lot (5).

Item	**Factor Loading 1**
Factor 1: Withdrawal & Negative Consequences (α = .811)	
d. If you were unable to message people, how irritable/cranky/annoyed/restless would you become?	.76
e. Do you find that the amount of time you spend messaging impacts your ability to work, go to school or function normally day to day?	.70
f. How often do you find yourself thinking about messages you sent, or messages may want to send later on?	.80
g. How frequently do you neglect important things (like work, school, friend or family) in order to spend time messaging?	.79
h. How hard would it be for you to cut down on the amount of time you spend messaging?	.79

Scree Plot for Q4 Messaging:

*Factor Analysis DPIU Q5 **Dating Apps** Constructs.*

Prompt: answering Yes on 2 or more of the questions (a-c) then asks the respondent to answer d-h. Scale: Not at all (0), Somewhat (2-3), A lot (5).

Item	Factor Loading 1	2
Factor 1: Withdrawal & Negative Consequences (α = .728)		
d. If you were unable to use dating apps, how irritable/cranky/annoyed/restless would you become?	.65	-.21
e. Do you find that the amount of time you spend using dating apps impacts your ability to work, go to school or function normally day to day?	.71	-.54
f. How often do you find yourself thinking about times you used or will use dating apps?	.66	.59
g. How frequently do you neglect important things (like work, school, friend or family) in order to spend time on dating apps?	.83	-.26
h. How hard would it be for you to cut down on the amount of time you spend on dating apps?	.60	.59

Scree Plot for Q5 Dating Apps:

*Factor Analysis DPIU Q6 **Gambling** Constructs.*

Prompt: answering Yes on 2 or more of the questions (a-c) then asks the respondent to answer d-h. Scale: Not at all (0), Somewhat (2-3), A lot (5).

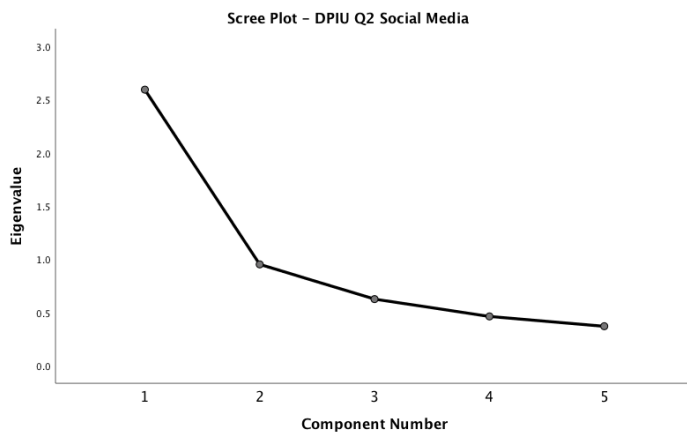| Item	Factor Loading 1
Factor 1: Withdrawal & Negative Consequences (α = .881)	
d. - If you were unable to gamble online, how irritable/cranky/annoyed/restless would you become?	.89
e. Do you find that the amount of time you spend gambling online impacts your ability to work, go to school or function normally day to day?	.55
f. How often do you find yourself thinking about gambling online?	.86
g. How frequently do you neglect important things (like work, school, friend or family) in order to gamble online?	.89
h. How hard would it be for you to cut down on the amount of time you spend gambling online?	.90

Scree Plot for Q6 Gambling:
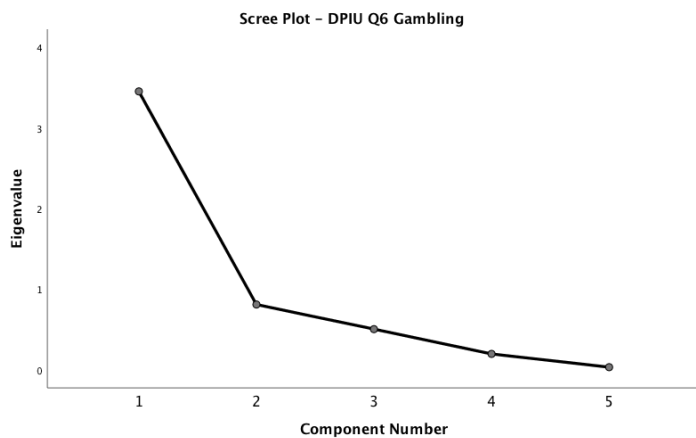
Internet Addiction: Attached to Technology?

*Factor Analysis DPIU Q7 **Sex/Porn** Constructs.*

Prompt: answering Yes on 2 or more of the questions (a-c) then asks the respondent to answer d-h. Scale: Not at all (0), Somewhat (2-3), A lot (5).

Item	Factor Loading 1
Factor 1: Withdrawal & Negative Consequences (α = .827)	
d. If you were unable look at sexual content online, how irritable/cranky/annoyed/restless would you become?	.72
e. Do you find that the amount of time you spend looking at sexual content online impacts your ability to work, go to school or function normally day to day?	.82
f. How often do you find yourself thinking about online sexual content?	.78
g. How frequently do you neglect important things (like work, school, friend or family) in order to spend time looking at sexual content online?	.86
h. How hard would it be for you to cut down on the amount of time you spend looking at sexual content online?	.79

Scree Plot for Q7 Sexual Content:

Scree Plot – DPIU Q7 Sexual Content
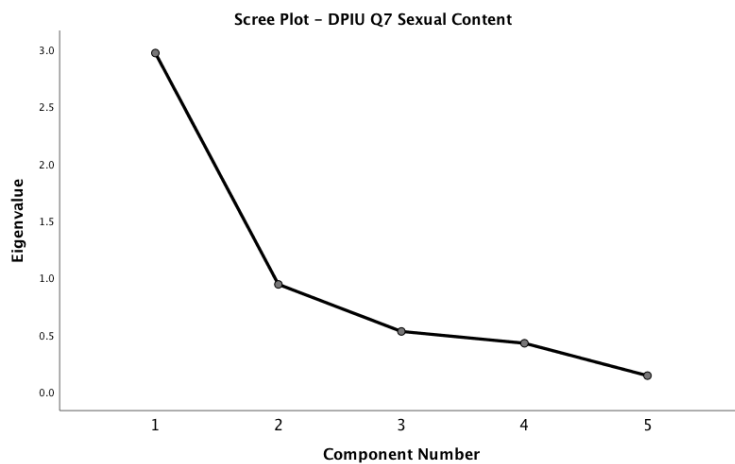
*Factor Analysis DPIU Q8 **Online Shopping** Constructs.*

Prompt: answering Yes on 2 or more of the questions (a-c) then asks the respondent to answer d-h. Scale: Not at all (0), Somewhat (2-3), A lot (5).

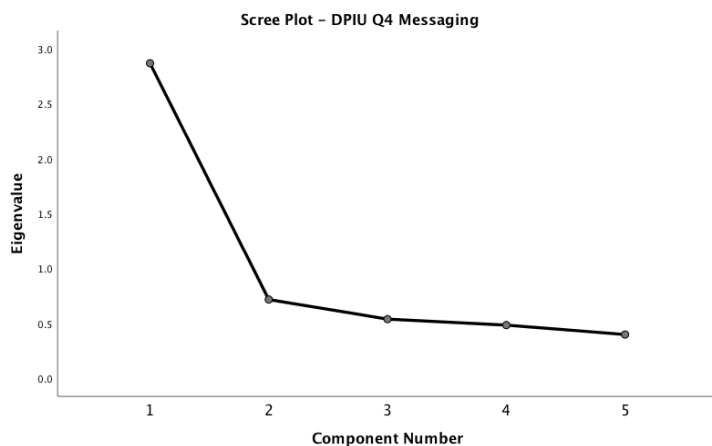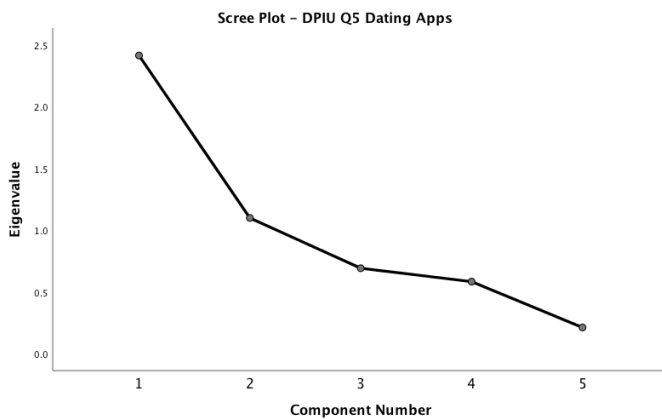| Item	Factor Loading 1	2
Factor 1: Withdrawal & Negative Consequences (α = .780)		
d. If you were unable to shop online, how irritable/cranky/annoyed/restless would you become?	.80	.25
e. Do you find that the amount of time you spend shopping online impacts your ability to work, go to school or function normally day to day?	.28	.88
f. How often do you find yourself thinking about things you bought online, or things you may want to buy online later?	.74	.16
g. How frequently do you neglect important things (like work, school, friend or family) in order to spend time shopping online?	.17	.92
h. How hard would it be for you to cut down on the amount of time you spend shopping online?	.90	.20

Scree Plot for Q8 Shopping:
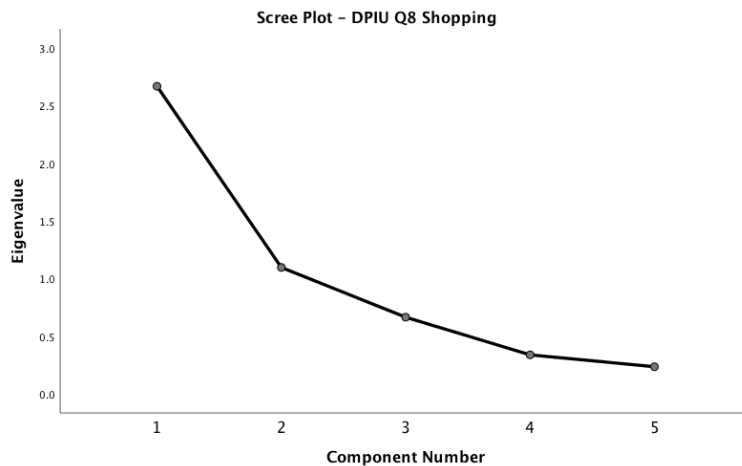
Internet Addiction: Attached to Technology?

*Factor Analysis DPIU Q9 **Info Seeking** Constructs.*

Prompt: answering Yes on 2 or more of the questions (a-c) then asks the respondent to answer d-h. Scale: Not at all (0), Somewhat (2-3), A lot (5).

Item	Factor Loading 1	2
Factor 1: Withdrawal & Negative Consequences (α = .710)		
d. If you were unable to look for information online, how irritable/cranky/annoyed/ restless would you become?	.87	.06
e. Do you find that the amount of time you spend looking for information online impacts your ability to work, go to school or function normally day to day?	.24	.88
f. How often do you find yourself thinking about things you looked up online, or things you might want to look up online later on?	.63	.29
g. How frequently do you neglect important things (like work, school, friend or family) in order to look for information online?	.11	.92
h. How hard would it be for you to cut down on the amount of time you spend looking for information online?	.85	.16

Scree Plot for Q9 Info Seeking:
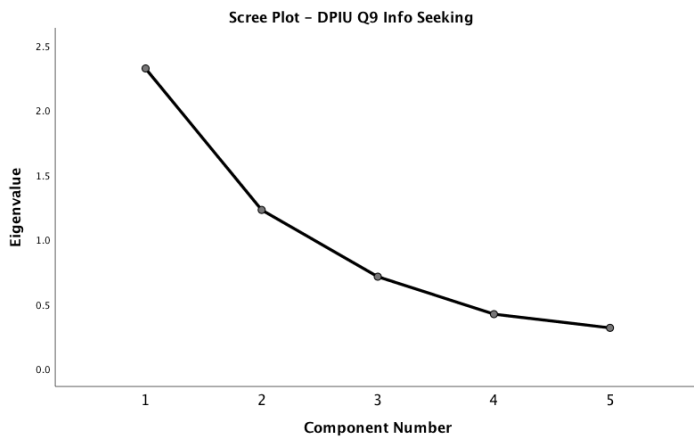
6.7 Demographic statistics

Gender & IA/Non-IA chi-squared test

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.348[a]	1	.246	.257	.145	
Continuity Correction[b]	1.119	1	.290			
Likelihood Ratio	1.354	1	.245	.257	.145	
Fisher's Exact Test				.257	.145	
Linear-by-Linear Association	1.345[c]	1	.246	.257	.145	.042
N of Valid Cases	434					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 61.61.

b. Computed only for a 2x2 table

c. The standardized statistic is 1.160.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	.056	.246	.257
	Cramer's V	.056	.246	.257
	Contingency Coefficient	.056	.246	.257
N of Valid Cases		434		

GENDER_Groups * DPIU IA_Criteria+NEW Crosstabulation

			DPIU IA_Criteria+NEW		Total
			IA Group	No IA Group	
GENDER_Groups	female	Count	135a	159a	294
		Expected Count	129.4	164.6	294.0
		% within GENDER_Groups	45.9%	54.1%	100.0%
		% within DPIU IA_Criteria+NEW	70.7%	65.4%	67.7%
		% of Total	31.1%	36.6%	67.7%
		Standardized Residual	.5	-.4	
	male	Count	56a	84a	140
		Expected Count	61.6	78.4	140.0
		% within GENDER_Groups	40.0%	60.0%	100.0%
		% within DPIU IA_Criteria+NEW	29.3%	34.6%	32.3%
		% of Total	12.9%	19.4%	32.3%
		Standardized Residual	-.7	.6	
Total		Count	191	243	434
		Expected Count	191.0	243.0	434.0
		% within GENDER_Groups	44.0%	56.0%	100.0%
		% within DPIU IA_Criteria+NEW	100.0%	100.0%	100.0%
		% of Total	44.0%	56.0%	100.0%

Each subscript letter denotes a subset of DPIU IA_Criteria+NEW categories whose column proportions do not differ significantly from each other at the .05 level.

Gender & DPIU Q1 Entertainment Subscale Chi-squared test

GENDER_Groups * DPIU Q1 IA Entertainment Criteria = 1 Crosstabulation

			DPIU Q1 IA Entertainment Criteria = 1		Total
			No Entertainment IA	Entertainment IA	
GENDER_Groups	female	Count	251a	43a	294
		Expected Count	253.4	40.6	294.0
		% within GENDER_Groups	85.4%	14.6%	100.0%
		% within DPIU Q1 IA Entertainment Criteria = 1	67.1%	71.7%	67.7%
		% of Total	57.8%	9.9%	67.7%
		Standardized Residual	-.1	.4	
	male	Count	123a	17a	140
		Expected Count	120.6	19.4	140.0
		% within GENDER_Groups	87.9%	12.1%	100.0%
		% within DPIU Q1 IA Entertainment Criteria = 1	32.9%	28.3%	32.3%
		% of Total	28.3%	3.9%	32.3%
		Standardized Residual	.2	-.5	
Total		Count	374	60	434
		Expected Count	374.0	60.0	434.0
		% within GENDER_Groups	86.2%	13.8%	100.0%
		% within DPIU Q1 IA Entertainment Criteria = 1	100.0%	100.0%	100.0%
		% of Total	86.2%	13.8%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	.491a	1	.484	.553	.294	
Continuity Correctionb	.304	1	.581			
Likelihood Ratio	.500	1	.479	.553	.294	
Fisher's Exact Test				.553	.294	
Linear-by-Linear Association	.490c	1	.484	.553	.294	.095
N of Valid Cases	434					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 19.35.

b. Computed only for a 2x2 table

c. The standardized statistic is -.700.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	-.034	.484	.553
	Cramer's V	.034	.484	.553
	Contingency Coefficient	.034	.484	.553
N of Valid Cases		434		

Gender & DPIU Q2 Social Media Subscale Chi-squared test

GENDER_Groups * DPIU Q2 Social Media IA Criteria = 1 Crosstabulation

			No Social Media IA	Social Media IA	Total
			DPIU Q2 Social Media IA Criteria = 1		
GENDER_Groups	female	Count	225a	69b	294
		Expected Count	235.7	58.3	294.0
		% within GENDER_Groups	76.5%	23.5%	100.0%
		% within DPIU Q2 Social Media IA Criteria = 1	64.7%	80.2%	67.7%
		% of Total	51.8%	15.9%	67.7%
		Standardized Residual	-.7	1.4	
	male	Count	123a	17b	140
		Expected Count	112.3	27.7	140.0
		% within GENDER_Groups	87.9%	12.1%	100.0%
		% within DPIU Q2 Social Media IA Criteria = 1	35.3%	19.8%	32.3%
		% of Total	28.3%	3.9%	32.3%
		Standardized Residual	1.0	-2.0	
Total		Count	348	86	434
		Expected Count	348.0	86.0	434.0
		% within GENDER_Groups	80.2%	19.8%	100.0%
		% within DPIU Q2 Social Media IA Criteria = 1	100.0%	100.0%	100.0%
		% of Total	80.2%	19.8%	100.0%

Each subscript letter denotes a subset of DPIU Q2 Social Media IA Criteria = 1 categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7.657[a]	1	.006	.007	.003	
Continuity Correction[b]	6.961	1	.008			
Likelihood Ratio	8.196	1	.004	.005	.003	
Fisher's Exact Test				.007	.003	
Linear-by-Linear Association	7.640[c]	1	.006	.007	.003	.002
N of Valid Cases	434					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 27.74.

b. Computed only for a 2x2 table

c. The standardized statistic is -2.764.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	-.133	.006	.007
	Cramer's V	.133	.006	.007
	Contingency Coefficient	.132	.006	.007
N of Valid Cases		434		

Gender & DPIU Q3 Gaming Subscale Chi-squared test

GENDER_Groups * DPIU Q3 Gaming IA Criteria Crosstabulation

			No Gaming IA	Gaming IA	Total
			DPIU Q3 Gaming IA Criteria		
GENDER_Groups	female	Count	275a	19b	294
		Expected Count	268.3	25.7	294.0
		% within GENDER_Groups	93.5%	6.5%	100.0%
		% within DPIU Q3 Gaming IA Criteria	69.4%	50.0%	67.7%
		% of Total	63.4%	4.4%	67.7%
		Standardized Residual	.4	−1.3	
	male	Count	121a	19b	140
		Expected Count	127.7	12.3	140.0
		% within GENDER_Groups	86.4%	13.6%	100.0%
		% within DPIU Q3 Gaming IA Criteria	30.6%	50.0%	32.3%
		% of Total	27.9%	4.4%	32.3%
		Standardized Residual	−.6	1.9	
Total		Count	396	38	434
		Expected Count	396.0	38.0	434.0
		% within GENDER_Groups	91.2%	8.8%	100.0%
		% within DPIU Q3 Gaming IA Criteria	100.0%	100.0%	100.0%
		% of Total	91.2%	8.8%	100.0%

Each subscript letter denotes a subset of DPIU Q3 Gaming IA Criteria categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	5.999a	1	.014	.018	.013	
Continuity Correctionb	5.142	1	.023			
Likelihood Ratio	5.644	1	.018	.028	.013	
Fisher's Exact Test				.018	.013	
Linear-by-Linear Association	5.985c	1	.014	.018	.013	.008
N of Valid Cases	434					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.26.

b. Computed only for a 2x2 table

c. The standardized statistic is 2.446.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	.118	.014	.018
	Cramer's V	.118	.014	.018
	Contingency Coefficient	.117	.014	.018
N of Valid Cases		434		

Gender & DPIU Q4 Messaging Subscale Chi-squared test

GENDER_Groups * DPIU Q4 Messaging IA Criteria Crosstabulation

| | | | DPIU Q4 Messaging IA Criteria | | |
			No Messaging IA	Messaging IA	Total
GENDER_Groups	female	Count	247a	47b	294
		Expected Count	259.5	34.5	294.0
		% within GENDER_Groups	84.0%	16.0%	100.0%
		% within DPIU Q4 Messaging IA Criteria	64.5%	92.2%	67.7%
		% of Total	56.9%	10.8%	67.7%
		Standardized Residual	-.8	2.1	
	male	Count	136a	4b	140
		Expected Count	123.5	16.5	140.0
		% within GENDER_Groups	97.1%	2.9%	100.0%
		% within DPIU Q4 Messaging IA Criteria	35.5%	7.8%	32.3%
		% of Total	31.3%	0.9%	32.3%
		Standardized Residual	1.1	-3.1	
Total		Count	383	51	434
		Expected Count	383.0	51.0	434.0
		% within GENDER_Groups	88.2%	11.8%	100.0%
		% within DPIU Q4 Messaging IA Criteria	100.0%	100.0%	100.0%
		% of Total	88.2%	11.8%	100.0%

Each subscript letter denotes a subset of DPIU Q4 Messaging IA Criteria categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	15.764[a]	1	.000	.000	.000	
Continuity Correction[b]	14.524	1	.000			
Likelihood Ratio	19.441	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	15.728[c]	1	.000	.000	.000	.000
N of Valid Cases	434					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 16.45.

b. Computed only for a 2x2 table

c. The standardized statistic is -3.966.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	-.191	.000	.000
	Cramer's V	.191	.000	.000
	Contingency Coefficient	.187	.000	.000
N of Valid Cases		434		

Gender & DPIU Q5 Dating Subscale Chi-squared test

GENDER_Groups * DPIU Q5 Dating IA Criteria Crosstabulation

			No Dating App IA	Dating App IA	Total
			DPIU Q5 Dating IA Criteria		
GENDER_Groups	female	Count	292a	2a	294
		Expected Count	292.6	1.4	294.0
		% within GENDER_Groups	99.3%	0.7%	100.0%
		% within DPIU Q5 Dating IA Criteria	67.6%	100.0%	67.7%
		% of Total	67.3%	0.5%	67.7%
		Standardized Residual	.0	.6	
	male	Count	140a	0a	140
		Expected Count	139.4	.6	140.0
		% within GENDER_Groups	100.0%	0.0%	100.0%
		% within DPIU Q5 Dating IA Criteria	32.4%	0.0%	32.3%
		% of Total	32.3%	0.0%	32.3%
		Standardized Residual	.1	-.8	
Total		Count	432	2	434
		Expected Count	432.0	2.0	434.0
		% within GENDER_Groups	99.5%	0.5%	100.0%
		% within DPIU Q5 Dating IA Criteria	100.0%	100.0%	100.0%
		% of Total	99.5%	0.5%	100.0%

Each subscript letter denotes a subset of DPIU Q5 Dating IA Criteria categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	.957a	1	.328	.562	.458	
Continuity Correction[b]	.048	1	.826			
Likelihood Ratio	1.562	1	.211	.562	.458	
Fisher's Exact Test				1.000	.458	
Linear-by-Linear Association	.955c	1	.329	.562	.458	.458
N of Valid Cases	434					

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .65.

b. Computed only for a 2x2 table

c. The standardized statistic is -.977.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	-.047	.328	.562
	Cramer's V	.047	.328	.562
	Contingency Coefficient	.047	.328	.562
N of Valid Cases		434		

Gender & DPIU Q6 Gambling Subscale Chi-squared test

GENDER_Groups * DPIU Q6 Gambling IA Criteria Crosstabulation

			DPIU Q6 Gambling IA Criteria		
			.00	1.00	Total
GENDER_Groups	female	Count	293a	1a	294
		Expected Count	291.3	2.7	294.0
		% within GENDER_Groups	99.7%	0.3%	100.0%
		% within DPIU Q6 Gambling IA Criteria	68.1%	25.0%	67.7%
		% of Total	67.5%	0.2%	67.7%
		Standardized Residual	.1	−1.0	
	male	Count	137a	3a	140
		Expected Count	138.7	1.3	140.0
		% within GENDER_Groups	97.9%	2.1%	100.0%
		% within DPIU Q6 Gambling IA Criteria	31.9%	75.0%	32.3%
		% of Total	31.6%	0.7%	32.3%
		Standardized Residual	−.1	1.5	
Total		Count	430	4	434
		Expected Count	430.0	4.0	434.0
		% within GENDER_Groups	99.1%	0.9%	100.0%
		% within DPIU Q6 Gambling IA Criteria	100.0%	100.0%	100.0%
		% of Total	99.1%	0.9%	100.0%

Each subscript letter denotes a subset of DPIU Q6 Gambling IA Criteria categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.375a	1	.066	.101	.101	
Continuity Correctionb	1.690	1	.194			
Likelihood Ratio	3.100	1	.078	.310	.101	
Fisher's Exact Test				.101	.101	
Linear-by-Linear Association	3.367c	1	.066	.101	.101	.090
N of Valid Cases	434					

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.29.

b. Computed only for a 2x2 table

c. The standardized statistic is 1.835.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	.088	.066	.101
	Cramer's V	.088	.066	.101
	Contingency Coefficient	.088	.066	.101
N of Valid Cases		434		

Gender & DPIU Q7 Sexual Content Subscale Chi-squared test

GENDER_Groups * DPIU Q7 Porn/Sex IA Criteria Crosstabulation

| | | | DPIU Q7 Porn/Sex IA Criteria | | |
			No Porn IA	Porn IA	Total
GENDER_Groups	female	Count	292a	2b	294
		Expected Count	283.2	10.8	294.0
		% within GENDER_Groups	99.3%	0.7%	100.0%
		% within DPIU Q7 Porn/Sex IA Criteria	69.9%	12.5%	67.7%
		% of Total	67.3%	0.5%	67.7%
		Standardized Residual	.5	-2.7	
	male	Count	126a	14b	140
		Expected Count	134.8	5.2	140.0
		% within GENDER_Groups	90.0%	10.0%	100.0%
		% within DPIU Q7 Porn/Sex IA Criteria	30.1%	87.5%	32.3%
		% of Total	29.0%	3.2%	32.3%
		Standardized Residual	-.8	3.9	
Total		Count	418	16	434
		Expected Count	418.0	16.0	434.0
		% within GENDER_Groups	96.3%	3.7%	100.0%
		% within DPIU Q7 Porn/Sex IA Criteria	100.0%	100.0%	100.0%
		% of Total	96.3%	3.7%	100.0%

Each subscript letter denotes a subset of DPIU Q7 Porn/Sex IA Criteria categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	23.199a	1	.000	.000	.000	
Continuity Correction[b]	20.649	1	.000			
Likelihood Ratio	22.046	1	.000	.000	.000	
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	23.146c	1	.000	.000	.000	.000
N of Valid Cases	434					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.16.

b. Computed only for a 2x2 table

c. The standardized statistic is 4.811.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	.231	.000	.000
	Cramer's V	.231	.000	.000
	Contingency Coefficient	.225	.000	.000
N of Valid Cases		434		

Gender & DPIU Q8 Shopping Subscale Chi-squared test

GENDER_Groups * DPIU Q8 Shopping IA Criteria Crosstabulation

			DPIU Q8 Shopping IA Criteria		Total
			No Shoppping IA	Shopping IA	
GENDER_Groups	female	Count	266a	28b	294
		Expected Count	273.0	21.0	294.0
		% within GENDER_Groups	90.5%	9.5%	100.0%
		% within DPIU Q8 Shopping IA Criteria	66.0%	90.3%	67.7%
		% of Total	61.3%	6.5%	67.7%
		Standardized Residual	-.4	1.5	
	male	Count	137a	3b	140
		Expected Count	130.0	10.0	140.0
		% within GENDER_Groups	97.9%	2.1%	100.0%
		% within DPIU Q8 Shopping IA Criteria	34.0%	9.7%	32.3%
		% of Total	31.6%	0.7%	32.3%
		Standardized Residual	.6	-2.2	
Total		Count	403	31	434
		Expected Count	403.0	31.0	434.0
		% within GENDER_Groups	92.9%	7.1%	100.0%
		% within DPIU Q8 Shopping IA Criteria	100.0%	100.0%	100.0%
		% of Total	92.9%	7.1%	100.0%

Each subscript letter denotes a subset of DPIU Q8 Shopping IA Criteria categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7.790a	1	.005	.009	.003	
Continuity Correction[b]	6.717	1	.010			
Likelihood Ratio	9.438	1	.002	.003	.003	
Fisher's Exact Test				.005	.003	
Linear-by-Linear Association	7.772c	1	.005	.009	.003	.002
N of Valid Cases	434					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.00.

b. Computed only for a 2x2 table

c. The standardized statistic is -2.788.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	-.134	.005	.009
	Cramer's V	.134	.005	.009
	Contingency Coefficient	.133	.005	.009
N of Valid Cases		434		

Gender & DPIU Q9 Info Seeking Subscale Chi-squared test

GENDER_Groups * DPIU Q9 Info Seeking IA Criteria Crosstabulation

			No Info seeking IA	Info Seeking IA	Total
			DPIU Q9 Info Seeking IA Criteria		
GENDER_Groups	female	Count	274a	20a	294
		Expected Count	271.0	23.0	294.0
		% within GENDER_Groups	93.2%	6.8%	100.0%
		% within DPIU Q9 Info Seeking IA Criteria	68.5%	58.8%	67.7%
		% of Total	63.1%	4.6%	67.7%
		Standardized Residual	.2	-.6	
	male	Count	126a	14a	140
		Expected Count	129.0	11.0	140.0
		% within GENDER_Groups	90.0%	10.0%	100.0%
		% within DPIU Q9 Info Seeking IA Criteria	31.5%	41.2%	32.3%
		% of Total	29.0%	3.2%	32.3%
		Standardized Residual	-.3	.9	
Total		Count	400	34	434
		Expected Count	400.0	34.0	434.0
		% within GENDER_Groups	92.2%	7.8%	100.0%
		% within DPIU Q9 Info Seeking IA Criteria	100.0%	100.0%	100.0%
		% of Total	92.2%	7.8%	100.0%

Each subscript letter denotes a subset of DPIU Q9 Info Seeking IA Criteria categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.343a	1	.247	.256	.166	
Continuity Correctionb	.936	1	.333			
Likelihood Ratio	1.294	1	.255	.340	.166	
Fisher's Exact Test				.256	.166	
Linear-by-Linear Association	1.340c	1	.247	.256	.166	.076
N of Valid Cases	434					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.97.

b. Computed only for a 2x2 table

c. The standardized statistic is 1.157.

Symmetric Measures

		Value	Approximate Significance	Exact Significance
Nominal by Nominal	Phi	.056	.247	.256
	Cramer's V	.056	.247	.256
	Contingency Coefficient	.056	.247	.256
N of Valid Cases		434		

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