Problematic Use of the Internet and Family Functioning:

A quantitative investigation

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DECLARATION

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ABSTRACT

The internet is intertwined with most aspects of our daily lives and contribute considerably to the progression of humankind. Nevertheless, the excessive and maladaptive use of the internet are linked to serious health concerns and has subsequently been termed problematic use of the internet. Problematic use of the internet (PUI) is widely considered a behavioural addiction and is frequently linked to various psychological, social, academic, and/or professional problems. Many people with PUI present with psychiatric comorbidities such as obsessive-compulsive disorder, obsessive-compulsive personality disorder, autism spectrum disorder, and attention deficit/hyperactivity disorder. Moreover, there are many reports suggesting that young people are at particular risk for PUI. Existing literature, mainly conducted in Asia, implicate family functioning in PUI. According to the premise of family systems theory (FST), PUI can only be appraised by examining the complex interactions of family members. The relationship between PUI and family functioning is shown to be reciprocal in nature: PUI may result in unhealthy family functioning, marked by conflict, low levels of cohesion, and poor communication. In turn, unhealthy family functioning may reinforce PUI when members excessively engage with the internet as a coping mechanism. Little research has been done on PUI in general, and none in youth in South Africa (SA). To our knowledge, this is the first study to investigate the relationship between PUI and family functioning in South African youth between the ages of 18 and 30. There were four research objectives to the present study. The first objective was to determine the demographic profile of our sample of 18-to-30-year-old South Africans with PUI (including PUI prevalence rates). The second objective was to investigate whether there is a relationship between PUI and family functioning. The third objective was to explore whether there is a relationship between time spent on various online activities (e.g., online gaming, online gambling, and online

pornography) and family functioning. The fourth objective was to determine whether there is an interaction effect between PUI and comorbid psychiatric disorders (e.g., obsessive-compulsive disorder, autism spectrum disorder, and attention deficit/hyperactivity disorder) on family functioning. Cross-sectional survey data was collected from 814 South Africans between the ages of 18 and 30 years. Among our sample of 814 respondents ($n_{females}$ = 531; n_{males} = 278; $n_{transgender/other}$ = 5), the prevalence rate of PUI was 15%, indicating that PUI may be a significant mental health issue among our sample. Potential risk factors to PUI in our sample included: being single, having completed high school (grade 12), having *some* college/university education, and being a university/college student. Results showed that as scores on the JEG internet addiction test (IAT) 10-item instrument increased, scores on the general functioning scale of the family assessment device (GF-FAD) increased linearly, indicating that increased severity of PUI was associated with increased severity of unhealthy family functioning (r = .33, p < .001). There was a significant difference in the GF-FAD scores for individuals with PUI (M = 2.57, SD = .51) and those without PUI (M = 2.13, SD = .61); t(812) = -7.52, p < 0.001, suggesting that individuals with PUI experienced unhealthier family functioning than individuals without PUI. The increased frequency of all but one of the PUI symptoms (i.e., symptom six: “Do you snap, yell, or act annoyed if someone bothers you while you are on-line?”) correlated significantly with severity of unhealthy family functioning. Section B of the internet severity and activities addiction questionnaire (ISAAQ), i.e., the internet activities scale (IAS), indicated that as time spent on social networking (r = .11, p = .003), online pornography (r = .20, p < .001), streaming media (r = .11, p = .003), and cyberbullying (r = .17, p < .001) increased, the severity of unhealthy family functioning increased. No interaction effects of PUI and comorbidities on family functioning were found (p > .05). In conclusion, the current findings suggest that PUI is common in South African

youth. This study also sheds light on the nature of the relationship between PUI and unhealthy family functioning among young South Africans. This relationship demands sustained attention and effort from role-players such as parents, schools, clinicians and policymakers alike, to mitigate it and therefore promote the optimal development of youth.

OPSOMMING

Die internet is verweef met die meeste aspekte van ons daaglikse lewens en dra aansienlik by tot die vooruitgang van die mensdom. Nietemin, die oormatige en wanaangepaste gebruik van die internet is gekoppel aan ernstige gesondheidsprobleme en word, derhalwe, problematiese gebruik van die internet (PGI) genoem. Problematiese gebruik van die internet (PGI) word algemeen beskou as 'n gedragsverslawing en word dikwels aan verskeie sielkundige, sosiale, akademiese en/of professionele probleme gekoppel. Baie mense met dié gedragsverslawing ly ook aan psigiatriese komorbiditeite, soos byvoorbeeld obsessief-kompulsiewe versteuring, obsessief-kompulsiewe persoonlikheidsversteuring, outisme, en aandagafleibaarheid-hiperaktiwiteitsindroom. Bowendien is daar baie navorsing wat daarop dui dat jong mense veral as ‘n hoë risikogroep beskou word om PGI te ontwikkel. Literatuur, hoofsaaklik van Asië, dui daarop dat familiefunksionering in PGI geïmpliseer kan word. Volgens die uitgangspunt van familiesisteemteorie (FST), kan PGI slegs verstaan word deur die komplekse interaksies van familielede te ondersoek. Die verhouding tussen PGI en familiefunksionering word as wederkerig van aard beskou: PGI kan lei tot ongesonde familiefunksionering, gekenmerk deur konflik, lae vlakke van samesyn en swak kommunikasie. Op sy beurt, kan ongesonde familiefunksionering PGI versterk wanneer familielede uitermatig gebruik maak van die internet as ‘n soort hanteringsmeganisme. Oor die algemeen is daar min navorsing rakende PGI. Na ons wete, is hierdie die eerste studie wat die verhouding tussen PGI en familiefunksionering in Suid-Afrikaanse jong mense ondersoek. Daar was vier navorsingsdoelwitte vir die huidige studie. Die eerste doelwit was om die demografiese profiel (insluitend PGI voorkomssyfers) van ons steekproef van 18-tot-30-jarige Suid-Afrikaners met PGI te bepaal. Die tweede doelwit was om te ondersoek of daar 'n verband is tussen PGI en familiefunksionering. Die derde doelwit was om te ondersoek of daar 'n

verband is tussen die hoeveelheid tyd wat aan verskeie aanlyn-aktiwiteite (byvoorbeeld, aanlyn speletjies, aanlyn dobbel, en aanlyn pornografie) bestee word en familiefunksionering. Die vierde doelwit was om te bepaal of daar 'n interaksie-effek tussen PGI en psigiatriese komorbiditeite (byvoorbeeld, obsessief-kompulsiewe versteuring, obsessief-kompulsiewe persoonlikheidsversteuring, outisme, en aandagafleibaarheid-hiperaktiwiteitsindroom) op familiefunksionering is. Deursnee-opnamedata is van 814 Suid-Afrikaners tussen die ouderdomme van 18 en 30 jaar ingesamel. Onder die 814 deelnemers ($n_{vroulik}$ = 531; n_{manlik} = 278; $n_{transgender/ander}$ = 5), is ‘n PGI-voorkomssyfer van 15% gevind, wat daarop dui dat PGI 'n beduidende geestesgesondheidskwessie onder ons steekproef mag wees. Potensiële PGI risikofaktore wat onder ons steekproef gevind is, sluit in: om enkellopend te wees, om hoërskool (graad 12) te voltooi, om 'n mate van kollege-/universiteitsopleiding te hê, en om 'n universiteit-/kollegestudent te wees. Resultate het getoon dat namate tellings op die JEG internet verslawingstoets (IVT) 10-item instrument toegeneem het, het tellings op die die algemene funksioneringsskaal van die familie asseseringstoestel (AFFA) lineêr toegeneem, wat daarop dui dat verhoogde erns van PGI geassosieer is met verhoogde erns van ongesonde familiefunksionering (r = .33, p <.001). Daar was 'n beduidende verskil in die AFFA-tellings vir individue met PGI (M = 2.57, SD = .51) en dié sonder PGI (M = 2.13, SD = .61); t (812) = -7.52, p <0.001, wat daarop dui dat individue met PGI meer ongesonde familiefunksionering ervaar het as individue sonder PGI. Die verhoogde frekwensie van al die PGI-simptome, behalwe een (d.i., simptoom ses: "Raak jy buite beheer, skree jy, of tree jy geïrriteerd op as iemand jou pla terwyl jy aanlyn is?") het beduidend gekorreleer met die erns van ongesonde familiefunksionering. Afdeling B van die internet erns en aktiwiteite verslawing vraelys (IEAVV), d.i., die internetaktiwiteite skaal (IAS), het aangedui dat soos wat tyd spandeer aan sosiale netwerking (r = .11, p = .003), aanlyn-

pornografie (r = .20, p <.001), stromingsmedia (r = .11, p = .003), en kuberafknouery (r = .17, p <.001) toegeneem het, het die erns van ongesonde familiefunksionering ook toegeneem. Geen interaksie-effekte van PGI en psigiatriese komorbiditeite op familiefunksionering is gevind nie (p > .05). Ten slotte, die huidige bevindinge dui daarop dat PGI algemeen is onder die Suid-Afrikaanse jeug. Hierdie studie het ook lig op die aard van die verhouding tussen PGI en ongesonde familiefunksionering onder jong Suid-Afrikaners gewerp. Hierdie verhouding vereis volgehoue en samewerkende aandag en moeite van alle rolspelers soos ouers, skole, klinici en beleidsmakers in ‘n poging om dit te negeer, en om sodoende die optimale ontwikkeling van jongmense te bevorder.

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CHAPTER ONE

Introduction

Information and Communication Technologies (ICTs), in particular the internet, are indispensable in our daily lives (Steyn et al., 2011). Although the internet contributes considerably to socio-economic growth through enabling fast and effective communication (Borcuch et al., 2012; Stavropoulos et al., 2016), the excessive use of the internet is associated with serious health concerns (Yates et al., 2012). Problematic use of the internet (PUI), as referenced by the European Cooperation in Science and Technology (COST EU; Fineberg et al., 2018), is characterized by uncontrollable and excessive urges to use the internet, resulting in distress and impaired daily functioning (Moreno et al., 2013; Spada, 2014). Problematic use of the internet (PUI) is widely considered a behavioural addiction that encompasses the excessive engagement with various online activities, such as online gaming and online gambling (Moreno et al., 2013; Spada, 2014). Although the developmental pathways of PUI are still unclear, most research indicates that PUI frequently co-occurs with numerous psychiatric disorders, such as obsessive-compulsive disorder, obsessive-compulsive personality disorder, autism spectrum disorder, and attention deficit/hyperactivity disorder (Bernardi & Pallanti, 2009; Yen et al., 2007).

Youth, specifically individuals in their early adulthood, may be at increased risk for the development of PUI (Kuss et al., 2014; Liu et al., 2015). Various problems, such as physical ailments (Blumenberg et al., 2021), sleep disorders (Choi et al., 2009), social withdrawal (Jia et al., 2018), and poor interpersonal relationships (Aboujaoude et al., 2006) are associated with excessive internet use among youth. Moreover, given that healthy family functioning (characterized by adaptability and effective communication and problem solving strategies among family members; Kuss & Lopez-Fernandez, 2016; Liau et al., 2015), plays a cardinal role in young

adults' psychological well-being and development (Kuss & Lopez-Fernandez, 2016; Liau et al., 2015), it follows that patterns of family functioning may especially be implicated in PUI (Mesch, 2006b; Snyder et al., 2015; Szcześniak & Tułecka, 2020). The relationship between PUI and family functioning (i.e., the relational and interactional patterns of the family; Boterhoven de Haan et al., 2015) is reciprocal in nature. PUI may result in unhealthy family functioning, marked by conflict (Wu et al., 2016), low levels of cohesion (Bonnaire & Phan, 2017), and poor communication (Park et al., 2009). In turn, unhealthy family functioning may reinforce PUI when members excessively engage with the internet to cope with an unhealthy family environment.

There is a remarkable lack of research in South Africa (SA) on the rates of PUI and the relationship between PUI and family functioning. Furthermore, it is also not clear whether PUI manifests in similar ways among SA families compared to families in other world regions such as Asia where research on PUI and family functioning is extensive.

The present study aims to investigate the relationship between PUI and family functioning among SA youth between the ages of 18 and 30 years. To our knowledge, this is the first study of its kind to examine PUI and family functioning among South Africans. Study findings may shed light on the rate of PUI and the association of PUI and family functioning in this context. The objectives of this study are fourfold. The first objective is to determine the demographic profile of our sample of 18- to 30-year-old South Africans with PUI (including PUI prevalence rates). The second objective is to investigate whether there is a relationship between PUI and family functioning. The third objective is to explore whether there is a relationship between time spent on certain online activities (such as online gaming, online gaming, and online pornography) and family functioning. Finally, the fourth objective is to explore whether there is a relationship between PUI, comorbid psychiatric disorders, and family functioning.

The thesis is organized as follows: In Chapter Two, family systems theory (FST) is described to theorize how families and internet use operates in relation to one another. Chapter Three provides a broad overview of existing literature on the internet, PUI, family functioning, and psychiatric comorbidities, highlighting relevant knowledge gaps. Chapter Four comprises the study methods and Chapter Five reports on the study results. Chapter Six provides a discussion on findings, encompassing also the study strengths and limitations, recommendations for future investigations, and the conclusions.

CHAPTER TWO

Theoretical Framework

Families are considered important social institutions that influence the development of its members by providing economic and psychological support (Samania, 2011; Statistics South Africa, 2020), as well as a sense of belonging (Samania, 2011). It is difficult to standardize the definition of the family since various disciplines provide different conceptualizations of the family (Department of Social Development Republic of South Africa, 2021). Individuals' ideas of a family also differ in terms of who they consider to be family (Department of Social Development Republic of South Africa, 2021). According to the Family Process and Content Model (FPC Model; Samania, 2011), the family can be described as a dynamic system that includes two or more individuals who are linked via relationships that separate the family system from other systems (such as friendships; Samania, 2011). The family operates as a unit of production in a certain context and is governed by accustomed norms and values (Samani, 2005, 2010). Based on the functioning of the family, the FPC model also delineates between two types of families, namely healthy and unhealthy families (Samania, 2010). A healthy family is characterized by well-established processing functions to adjust to new and challenging situations, flexibility, good communication and problem-solving skills, high levels of cohesion, affective involvement and assertiveness (Samania, 2010, 2011). On the other hand, unhealthy families are characterised by poor family processes, inflexibility, poor communication and problem-solving skills, low levels of cohesion, lack of affective involvement, unassertiveness, and distress (Samania, 2010, 2011).

The FPC Model relates to systems theory (Samania, 2011), and, as such, FST (embedded in systems theory; Broderick, 1993) is used as framework to direct the current research undertaking and to provide a comprehensive overview of how families function in general. Although there is a plethora of systems theories available for understanding family functioning, FST is widely cited

in literature, and is deemed especially appropriate in systematically examining complex phenomena (such as the family unit) in relation to situational influences (such as in the context of the internet; Guy-Evans, 2020; Pardeck, 1989; Spencer, 2007; Wood & Talmon, 1983). FST constitute concepts that can easily be adopted and implemented by trained clinicians to rectify unhealthy patterns of family functioning. In guiding the organization and interpretation of the data collected in this study, FST and its limitations are comprehensively discussed.

FST is the theoretical underpinning of family therapy (Minuchin, 2018), which is a distinct method of psychotherapy that formally emerged in the 1960s (Lopreato & von Bertalanffy, 1970). Scholars found that General Systems Theory concepts (such as systems and boundaries) could effectively be applied to families, sequentially implementing systems thinking to family therapy (Speer, 1970). Family therapy is aimed at rectifying unhealthy patterns of family functioning (such as relational and interactional family dynamics characterized by conflict and poor communication; Hooper & Cooper, 2005; Navarre, 1998) that emerge during family-focused therapeutic sessions (Hooper & Cooper, 2005; Navarre, 1998).

FST postulates that the family consists of various systems that are interdependent and interrelated (Bavelas & Segal, 1982; Charles, 2001; Melito, 1985; Rothbaum et al., 2002; Sontag, 1996; Sturge-Apple et al., 2010), and, as such, an individual family member's maladaptive behaviour may influence the functioning of the family and family dynamics may influence the individual's development, reciprocally (Detmer & Lamberti, 1991; Haefner, 2014; Steinglass, 1987). It is therefore asserted that researchers can only fully comprehend PUI when considering the family as a complex whole (Fish & Jain, 1988; Minuchin, 2018; Schermerhorn & Cummings, 2008). Certain concepts of FST are especially informative in the identification and treatment of unhealthy patterns of family functioning, namely: systems, boundaries, boundary enmeshment and detachment,

homeostasis, morphogenesis, and equifinality. Sequentially these concepts are discussed in relation to the internet and family functioning.

Systems

Systems are defined as bounded entities that consist of interrelated and interdependent elements (Minuchin, 2018; Vetere, 2018). These unified elements are characterized by patterned functioning and consolidated behaviour which form a complex whole (Tadros & Finney, 2018). The family is considered as one such system that actively interacts with environmental factors (Lee, 2018). Systems consist of various subsystems, which are essentially systems within other systems (Lee, 2018; Park et al., 2009; Woodard et al., 1982). For example, in considering the nuclear family as the main system (Hooper & Cooper, 2005), three interrelated subsystems are identified: i.e., parental, parent-child, and sibling relationships (Vetere, 2018). The various family systems are arranged hierarchically in terms of power relations and status (Wood & Talmon, 1983). For example, parents usually operate as the dominant and powerful subgroup within the larger family system, whereas siblings function as a less authoritative subgroup (Reiter, 2016). The internet is an example of an environmental factor that may influence family systems (Mesch, 2003, 2006a), by potentially disrupting family hierarchy, rules, roles, and interactional and relational patters of functioning (Reiter, 2016). For example, the internet may disrupt the hierarchy of family members when children's abilities to navigate the internet far exceed their parents' abilities, resulting in increased decision making power among children in this regard (Mesch, 2006a; Watt & White, 1999).

Boundaries

Systems and subsystems are enclosed by "boundaries" (Jacobvitz et al., 2004, p. 577), which serve to protect and regulate the eb and flow of information and communication between

systems and subsystems and the context in which these systems are located (Minuchin, 2018; Vetere, 2018). Family members structure these boundaries based on ideas, beliefs, mutual understanding, family hierarchies, rules, and roles (Dishion et al., 1983; Kerig & Swanson, 2010), and in response to environmental challenges (Kerig & Swanson, 2010). Families can be distinguished in terms of the permeability (i.e., the accessibility) of boundaries and boundary structure (Minuchin, 2018). Families therefore differ in how they function (Caughlin et al., 2000), and, as such, each family unit has a distinct boundary "shape" (Sturge-Apple et al., 2010, p. 1321; Toepfer, 2010, p. 59). A functional, "normal", "shape" (Toepfer, 2010, p. 59) aids in promoting healthy family functioning (Minuchin, 2017; Minuchin & Fishman, 1981; Pardeck, 1989).

The importance of establishing functional boundaries around the family and its subsystems are evident during the Coronavirus disease (COVID-19), since is coupled with many challenges that especially has an influence on how the family operates. In the context of COVID-19 and lockdown, for example, working from home may facilitate negative work-home spill-over, resulting in unhealthy family functioning (Chung et al., 2020; Como et al., 2021; Novianti & Sjabadhyni, 2021). Now, more than ever, the establishment and maintenance of clear and functional boundaries around individuals' personal and work lives are necessary to prevent unhealthy family functioning.

Enmeshed and Detached Boundaries

It is argued that family boundaries can be detected on a continuum, ranging from enmeshed boundaries at the one extreme end, to detached boundaries at the other end (Lindahl et al., 2012; Pardeck, 1989; Vetere, 2018). Throughout the family life cycle, the structure and permeability of boundaries will change in response to challenges and new situations (Minuchin, 2017; Minuchin & Fishman, 1981), such as in the case of the diagnosis of mental illness among a family member.

In order to effectively manage life challenges and facilitate healthy family functioning, families continually attempt to maintain a functional balance between enmeshed and detached boundaries.

Unhealthy family functioning arises when boundaries are "too open" (i.e., enmeshed; Minuchin, 2017, p. 96) or "too closed" (i.e., detached; Minuchin, 2017, p. 96). Boundaries that are unclear or non-existent and persistently allow too much and inappropriate information to pass through, are denoted as enmeshed (Lindahl et al., 2012; Pardeck, 1989). Such boundaries are usually poorly defined and characterized by fused relationships and extreme over-sharing of information (Lindahl et al., 2012; Pardeck, 1989). When children are continually exposed to intimate knowledge of parents' personal problems or entwined emotionally with parents, they may experience anxiety (Minuchin, 2017; Minuchin & Fishman, 1981). For example, when parents introduce work-related information of a sensitive nature (e.g., information on co-worker conflict and salary constraints) to the household (i.e., negative work-home spill-over), children may experience concern (Como et al., 2021; Novianti & Sjabadhyni, 2021).

Alternately, boundaries that function as "brick walls" (Lindahl, 2012, p. 839), preventing the flow of communication and information between systems, are described as detached (Lindahl, 2012; Perosa & Perosa, 1993; Vetere, 2018). Detached boundaries usually fail to keep family members adequately connected and are characterized by low cohesion, poor communication, and the under-sharing of important information (Lindahl et al., 2012; Perosa & Perosa, 1993). It is necessary for parents to readily share important information such as their love, admiration, and expectations with children, since such knowledge guides the development of children into responsible adults (Vetere, 2018). Given the pervasiveness and addictive nature of the internet (Schwab, 2017; Young, 1997), it may especially penetrate (i.e., disrupt) family system boundaries and facilitate the development of enmeshed or detached boundaries resulting in unhealthy

relationships and functioning. The family functioning of families who are already predisposed to detached and enmeshed relational boundaries, may especially be influenced negatively by the internet (Mesch, 2003, 2006a, 2006b).

Homeostasis

In the context of FST, the term homeostasis refers to a state of equilibrium (that sees a balance between enmeshed [too open] and detached [too closed] boundaries; Lindahl et al., 2012). Challenges and new situations that disrupt how the family operates, may result in unhealthy family functioning (Lindahl et al., 2012; Pardeck, 1989). Usually, the family will try to regain a sense of homeostasis that sees the healthy functioning of the family – e.g., when internet use is controlled and functional without compromising the quality of relationships – and is attained through the process of morphogenesis (Dishion et al., 1983; Melito, 1985).

Morphogenesis

Morphogenesis is the ability of families to actively grow and change in response to new stimuli or challenging situations (Smith & Karam, 2018; Wertheim, 1973, 1975). Morphogenesis is attained through positive feedback loops, which are interactional patterns and communication channels that emerge as a result of the need for change (Schmaling & Jacobson, 1990). In order to manage PUI, the family unit systematically moves away from the status quo, characterized by, for example, unhealthy family functioning, to a new state of homeostasis by altering family interactional and relational patterns (i.e., positive feedback loops; Martin, 1985; Speer, 1970).

Equifinality

Equifinality is the family's ability to reach the same goal (e.g., a new state of homeostasis that sees the healthy functioning of the family) through many paths and is based on the premise that different routes lead to the same destination (Bavelas & Segal, 1982; Crowley & Miller, 2020).

Numerous adaptive strategies (in this context referred to as equifinality) can be implemented to activate positive feedback loops to manage PUI and unhealthy family functioning. For example, parents can implement new rules (such as screentime) and increase time spent together as a family, thereby strengthening cohesion among members (in case of detached boundaries). In order to effectively manage PUI, it is argued that a combination of strategies be implemented by the family (Bavelas & Segal, 1982). Interactional patterns may be modified through instilling or improving supportive processes (such as cultivating mutual understanding among members; Church et al., 2018), the improvement of communication channels, and through help-seeking behaviour. Notable is that the process of managing PUI (or other difficulties), through the activation of positive feedback loops, may be characterized by severe turmoil and uncertainty (Speer, 1970; Wertheim, 1973). If the family does not have adaptive strategies in place but rather make use of maladaptive coping mechanisms (such as denial and behavioural disengagement; Pam, 1993; Smith & Karam, 2018a), they may fail to activate functional positive feedback loops and a new state of homeostasis may not be attained (Hammond & Nichols, 2008; Moore & Hague, 2019). Unhealthy functioning may escalate and endure in the form of conflict, poor communication and low levels of cohesion (Katz & Aspden; Mesch, 2003; Mesch, 2006b). In accord with FST's tenet of bi-directionality it is theorized that, in turn, unhealthy family function may reinforce PUI when individuals excessively use the internet to cope with an unhealthy family environment.

Limitations of FST

FST may be limited in terms of its application to the SA context since it is embedded in Western paradigms (Erdem & Safi, 2018; Tam et al., 2017) and developed around the conceptualization of the traditional nuclear family (which consists of two parents and their children [either biological or adopted and no other members]; Department of Social Development Republic

of South Africa, 2021). Nuclear families are prevalent in Western and European countries (Department of Social Development Republic of South Africa, 2021; Statistics South Africa, 2020), but, families in SA do not necessarily conform to that of the nuclear family (Department of Social Development Republic of South Africa Revised, 2021; Statistics South Africa, 2020). The heterogeneity of our population and apartheid legacies impact on how families are structured (Sooryamoorthy & Makhoba, 2016), and therefore defined. The country is characterized by a unique blend of different family structures. For example, South Africans constitute traditional, nuclear families (Rabe & Naidoo, 2015; Russell, 2003), single-parent (usually female-headed) families (Roman, 2011) and multigenerational households (Rabe & Naidoo, 2015; Roman, 2011). The revised white paper on families in SA (as published in 2021), indicated that nuclear families are the least common type of family in SA, while extended families (multigenerational family members that may or may not share the same household) are the norm (Department of Social Development Republic of South Africa, 2021). The interactional patterns and dynamics of different types of family structures may differ widely (Hall & Mokomane, 2018). The validity of FST in SA is therefore brought into question since the theory does not necessarily account for the living experiences of most family structures in South Africa.

Furthermore, families are unique in their functioning and may differ in their subjective experience of the world (Hall & Mokomane, 2018), and it is therefore difficult to standardize what exactly constitutes healthy and unhealthy family boundaries. One family may discern particular behaviour as “normal” and healthy while another family may discern the exact same behaviour as “abnormal” and unhealthy (Department of Social Development Republic of South Africa, 2021; Hall & Mokomane, 2018; Sooryamoorthy & Makhoba, 2016).

Nevertheless, there is a lack in research on family systems frameworks that is especially applicable to the diversity of SA families. The study's intentional focus on broad FST concepts may render it viable for application among the study cohort included here. To conclude this section on the theoretical framework guiding this investigation, it is noted that throughout the years, the vast development in ICTs, in particular the internet, necessitates adjustments to systems theory (Johnson, 2010). FST was introduced before the "Internet Revolution" (Gowda et al., 2020, p. 4407), but rapid integration and increased complexity of internet technologies demand the expansion of the framework to clarify the role of the internet in individuals' functioning within the family context.

CHAPTER THREE

Literature Review

In this chapter, I will firstly relay internet use statistics to provide an indication of global and local internet trends. Secondly, a summary of the advantages and disadvantages of the internet follows, highlighting how the internet both positively shapes society and concurrently may lead to negative consequences. Next, the definition and diagnostic criteria of problematic use of the internet (PUI) are discussed. Sequentially, the epidemiology of PUI is considered in terms of global and local demographics and prevalence rates. Of particular relevance is the reporting of data suggesting that young adulthood constitute a high-risk group for the development of PUI. Existing literature on the relationship between PUI and family functioning is reviewed, followed by a discussion on the interaction between PUI, comorbid psychiatric disorders, and family functioning. Furthermore, treatment interventions of PUI in youth, are reviewed, and, lastly, limitations of research on PUI are considered to determine how future research could be conducted to yield reliable and valid research on PUI. This chapter ultimately aims to highlight the gaps in our knowledge about PUI and family functioning.

Statistics on Global Online Trends

Internet Penetration Rates

Kemp (2019) reported that, globally, 4.39 billion individuals used the internet in January 2019, constituting a 9% increase since January 2018. As such, more than half of the world's population was connected to the internet in 2019, indicating a worldwide penetration rate of 57% (Kemp, 2019). Since January 2020, more than 4.5 billion individuals were actively using the internet (Clement, 2020), which is a 7% increase in users since January 2019. In 2020 the internet

penetration rate increased by 2% since 2019 (totalling 59%; Kemp, 2019). According to statistical trends, a steady increase in global internet penetration rates is predicted.

Average Daily Time Spent on the Internet

In 2019, the worldwide daily average time spent on the internet was 6 hours and 42 minutes (Kemp, 2019). In 2020 and 2021, marginal increases were reported. In 2020, an average of 6 hours and 43 minutes was recorded (Kemp, 2020), and in 2021 the worldwide average bordered on 7 hours (Kemp, 2021).

Social Networking

Across the globe, users of social media (e.g., Facebook, Instagram, Twitter) increased from 3.48 billion in January 2019 (Kemp, 2019) to over 4 billion in October 2020 (Clement, 2020). In 2020, the daily average time spent on social media platforms was 2 hours and 24 minutes (Deyan, 2021). In both 2019 and 2020, social media use was most prevalent among individuals between the ages of 25 and 34 years of age (Clement, 2020). In January 2021, VPNMentor (2021) reported that millennials had the most active social media accounts (on average 8.1 per person), while baby boomers (i.e., individuals born between 1946 and 1964) had the least active accounts in 2021 (on average 4.6 per person).

Streaming Media

In 2019, 58% of internet users reported streaming television content via the internet (e.g., Netflix, Showmax, and DStv Now) and 92% of internet users indicated that they watched online videos (e.g., YouTube videos) on a monthly basis (Kemp, 2019). The 2020 figures portrayed a slight decrease in the percentage of internet users who watched online videos (90%), but a modest increase in the percentage of individuals who streamed television content via the internet (67%;

Kemp, 2020). Kemp (2021) found that the most widely accessed internet content during COVID-19 in 2020 was online streaming media such as Netflix and Showmax.

Online Pornography

Adult websites, namely Pornhub, XVIDEOS, and XNXX were among the world's top 20 most frequently visited websites in 2019 (Kemp, 2019). It is especially Pornhub that enjoyed a high market share (Kemp, 2019). During the year of 2019, there were more than 42 billion visits to Pornhub (Kemp, 2019). The global traffic to Pornhub during the COVID-19 pandemic was much higher than before (Martínez et al., 2021). Zattoni et al. (2020) cited an especially large increase in Pornhub traffic during March 2020 after they offered *Free Pornhub Premium* in order to incentivize individuals to stay at home and abide by social distancing rules.

Cyberbullying

Cyberbullying is a global concern, especially among youngsters using social media. One-fifth of all bullying occurs through social media platforms such as Facebook and Instagram (Cook, 2021). The United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics reported that 33% of youth across the globe experienced cyberbullying in 2018 (Montoya, 2018). Research showed that parents are aware of cyberbullying attacks on their children. The market research company, Ipsos, reported that almost one in five parents worldwide indicated that their child has been a victim of cyberbullying in the past (Ipsos, 2018). Among 28 countries, parents in India, Brazil, and the United States (US) reported the highest percentages of cyberbullying among their children in 2018 (Cook, 2021). In particular, in the Ipsos survey, approximately 11% of parents indicated that they have witnessed their child being bullied online. Evidently, most research reports on cyberbullying are from the perspective of the victim. A lack in research from the point of view of perpetrators may be due to the deprecation of cyberbullying

in society, rendering it difficult to acquire adequate response rates. Nevertheless, findings from the perspective of the perpetrator are equally important, since research has indicated that victims of cyberbullying are most likely to also be the perpetrators of cyberbullying (Cook 2021; Ipsos, 2018; Montoya, 2018).

Online Gambling

Online gambling is currently the fastest growing form of gambling in the world (Gambling Commission, 2021) and mainly includes playing casino-wagers and sports over the internet (Auer & Griffiths, 2021; Hing et al., 2017). In 2019 and 2020, the size of the online gambling market was worth approximately 59 and 67 billion US dollars, respectively (Facts and Factors, 2021). The market is expected to reach 100 billion US dollars in 2026 (Facts and Factors, 2021). Online gambling seems to be particularly popular among males (Gambling Commission, 2021) at university (Petry & Gonzalez-Ibanez, 2013). It is reported that between 23% and 37% of university students have used the internet to place a bet in the past (Petry & Weinstock, 2007). In another study, 4% of undergraduate students gambled online on a weekly basis and roughly 3% of undergraduates indicated that they gambled online on a daily basis (Petry & Gonzalez-Ibanez, 2013).

Online Gaming

Online games are particularly popular among internet users. In 2019, as well as 2020, more than one billion individuals engaged with online gaming platforms each month (Kemp 2019, 2020). In 2021, 92% of females and 95.4% of males between 16 and 24 played online games (Kemp, 2021).

Online Shopping

The e-commerce sector demonstrated global growth from January 2018 to January 2019 via a 3.1% increase in the number of people purchasing consumer goods online (Kemp, 2018). Taken together, social networking, streaming media, online pornography, cyberbullying, online gambling, online gaming, and online shopping seem to be popular activities across the globe. Individuals spend a considerable amount of time on the internet and invest much energy into various online activities. Due to the far-reaching consequences of COVID-19 and the upward mobility trends of internet use, it is argued that the internet will become even more intertwined with our lives (Chung et al., 2020; Fernandes et al., 2020a). In order to establish whether online trends in SA are similar to those globally, statistics specific to South African internet use are reported below.

Statistics on South African Online Trends

Internet Penetration Rates

In 2008, there was a moderate internet penetration rate of 12% in SA (Thatcher et al, 2008). Throughout the years, our country experienced a significant increase in the number of active internet users. Just more than half of the South African population was internet users in 2019 (Johnson, 2021). In January 2020 and 2021, the SA internet penetration rate stood at 62% (Kemp, 2020) and 64% (Kemp, 2021), respectively.

Average Daily Time Spent on the Internet

Among 42 countries, SA showed the second highest average in time spent on the internet per day (9 hours and 22 minutes) in 2020, which is an increase of approximately one hour since 2019 (Kemp, 2020). In January 2021, SA dropped two places in terms of daily average time spent

on the internet since 2020 (Kemp 2021), but still placed fourth out of 42 countries, spending approximately 10 hours online per day (Kemp 2021).

Social Networking

South Africans are considered avid social media users. There was a steady and significant increase in social media use in the last few years, placing our country 9th out of 20 countries in terms of worldwide year-to-year social media growth. From 2018 onwards, the country maintained a steadfast lead on the worldwide average of 2 hours and 24 minutes (Kemp, 2020). In 2021, South Africans spent an average of 3 hours and 32 minutes using social media on a daily basis, ranking 6th out of 46 countries.

Streaming Media

Research on streaming media trends in SA is limited. Nevertheless, a research report showed that, in 2020, SA indicated a higher average percentage of individuals streaming online television content on a monthly basis (75%) than the worldwide average (67%; Kemp 2020). Compared to 42 other countries, SA showed the 6th highest percentage of individuals streaming television content via the internet per month (Kemp, 2020).

Online Pornography

Online pornography also seems to be a popular activity among South Africans. In 2017, South Africa was the 19th biggest consumer of Pornhub in the world (Kemp, 2019). Pornhub (2018a) indicated that SA came in second across the globe in terms of time spent per visit in 2017 (11 minutes and 2 seconds). In 2018, South Africa remained in the top 20 countries with the highest daily traffic to Pornhub, ranking in 20th place (Pornhub, 2018b). SA placed second in terms of time spent on Pornhub per visit (10 min and 57 seconds) in 2018 (Pornhub, 2018b). In 2019, South Africa remained in the top 30 of countries with the highest daily traffic to Pornhub (Pornhub,

2019). SA ranked in second place with regards to average time spent on Pornhub per visit (11 minutes and 21 seconds; Pornhub, 2019). Considering global online pornography trends during COVID-19, it is speculated that South Africa's online pornography traffic also increased considerably during the last year or two.

Cyberbullying

Cyberbullying is reported as a severe problem in South Africa. The Centre for Justice and Crime Prevention (CJCP; Smit, 2015) conducted a study on cyberbullying among 1726 SA youngsters in four urban cities, namely Cape Town, Port Elizabeth, Johannesburg, and Durban. Their findings suggested that a third of bullying in SA could be accounted for by cyberbullying (Smit, 2015). Their study also found that approximately 47% of adolescents reported being the victims of cyberbullying at least once during their lifetime. Farhangpour et al. (2019) reported high percentages of South African school children being exposed to cyberbullying, namely 52% of Grade 8's in Cape Town, 36.3% of high school students in Durban, and 16.5% of high school children in rural Eastern Cape. Sexual harassment was indicated as the most prevalent form of cyberbullying (Farhangpour, 2019). Sixty eight percent of participants indicated that they have been sexually harassed online at least once in the past. The global survey of Ipsos (2018) asked parents/primary caregivers in 28 countries to indicate whether any of their children (under the age of 18) have ever experienced cyberbullying. Twenty six percent of South African parents indicated "Yes". As such, our country placed 5th out of 28 countries in terms of parental self-report measures of children's exposure to cyberbullying.

Online Gambling

Statistics on online gambling in South Africa are scarce, which may be explained by the fact that online gambling casinos are illegal in the country (Snail, 2007). Online betting, e.g., online

horse racing and online sports betting, are exclusively recognized in the National Gambling Amendment Act of 2018 (Calicchio & Naidoo, 2017; Monnye, 2018). Online betting is the second-largest gambling category after casinos in SA (Nzimande et al., 2010; Williams et al., 2012). In 2016, betting gross gambling revenues (GGR) rose by 14.3% (Calicchio & Naidoo, 2017). As such, betting GGR raised its share of total GGR to 19%, which is a 2% increase since 2015 (Calicchio & Naidoo, 2017). Between 2010 and 2019, the online betting sector in SA grew by 20% (Rule & Sibanyoni, 2000). It is especially online sports gaming revenue that grew steadily between 2010 and 2019 from 185 million US dollars to 462 million US dollars (Nzama, 2018).

Online Gaming

Online gaming does not yet seem to be as popular in SA compared to other world regions, such as Asia (Kemp, 2019). In 2019, South Africans spent well below the worldwide average using gaming consoles on a daily basis (53 minutes in SA versus 70 minutes worldwide; Kemp, 2019). In contrast, Thai and Filipino individuals spent more than 90 minutes per day using gaming consoles (Kemp, 2019). It is, however, noted that a lack in research on online gaming trends in SA renders it particularly difficult to make accurate comparisons with other countries.

Online Shopping

E-commerce is yet to gain more prominence in our country. The percentage of internet users who bought something online in the month of January 2019, was estimated to be 55% in SA, while the worldwide percentage was reported to be 75% (Kemp, 2019). Furthermore, South Africans only spent 1.5% of GDP per capita online in 2019, considerably less than countries such as China (7.2%) and South Korea (5.2%). E-commerce in SA only shared 1% of total retail spend in 2019, reporting much lower percentages than Asian countries, for instance Thailand (12%), Hong Kong (9%), and Taiwan (8%; Kemp, 2019). Given the impact of COVID-19, it was predicted

that online shopping would increase considerably in SA from 2020 onward. Nevertheless, since 2019, ecommerce adoption rates only increased marginally in 2020 (56%; Kemp, 2020) and 2021 (57.7%; Kemp, 2021). As such, South Africa ranked second last out of 42 countries in terms of e-commerce adoption in both 2020 and 2021, considerably lower than the worldwide penetration rates (Kemp, 2020, 2021). It is argued that certain countries such as South Africa's e-commerce platforms and online shopping websites may be less user-friendly in tracking orders and returning goods, compared to platforms in Asian countries, rendering it less popular among South Africans (Jobodwana., 2009; Kemp 2020, 2021). Intercontinental online shopping platforms may also not cater to the language and cultural needs of a heterogenous country such as SA (Jobodwana., 2009).

To conclude, although the country's internet penetration rates only marginally exceeded the worldwide average in the last couple of years, it was clear that South Africans spend a considerable amount of time on the internet every day. In 2019, 2020, and 2021 our country consistently surpassed the worldwide average of daily time spent online. Similar to global trends, social networking, streaming media, online pornography, and cyberbullying seem to be particularly popular past-times among South Africans. The lack of research on online gambling and online gaming in SA makes it difficult to compare local and global statistics.

Advantages of the Internet

Through enabling rapid and easy access to valuable knowledge and information, the internet revolutionized how humans interact and think (Cacioppo et al., 2019; Dingwell, 2011). There are numerous advantages associated with its use, such as enhanced interconnectedness (Stavropoulos et al., 2016), effective communication (Borcuch et al., 2012), improved learning experiences (Johnson, 2010; Khan & Badii, 2012), and the provision of online mental health services (Arean et al., 2016; Chambers et al., 2018; Wang et al., 2018). The internet therefore has

the potential to improve life satisfaction and productivity on various domains of living (Stavropoulos et al., 2016). Especially during the COVID-19 pandemic, the internet has become essential for many people - at work as well as in their personal lives.

The Internet and Global Connectedness

In the 21st century, the large-scale integration of people and interdependence of countries necessitate rapid, productive communication, as well as, the sharing of valuable information (Borcuch et al., 2012; Stavropoulos et al., 2016). It should thus come as no surprise that online activities such as emailing, social media networking, and video calls have become essential in conducting business among individuals from different geographical backgrounds (Brousseau et al., 2012; Romm, 2002).

The Internet as a Social Communication Tool

The internet is an important source of socialization, especially among adolescents (Anderson & Jiang, 2018). Social interaction platforms (such as instant messaging, social networking, and chat rooms) provide users the opportunity to broaden their social circles (Geyer et al., 2017). As a result of certain intrinsic features of the internet, individuals frequently prefer using online networks (as opposed to face-to-face interactions) to seek out friendships and communicate with peers. McKenna et al. (2002) argued that the relative anonymity of the internet more readily allows individuals to self-disclose personal information, beliefs, interests and emotions during online interactions without fearing ridicule and judgement (Mishra et al., 2018). Such anonymity thus enables individuals to express themselves more freely and intimately (Mishra et al., 2018; Williams & Merten, 2008), which are important factors in relationship building.

The Internet as a Communication Conduit Between Family Members

The internet can function as connective tissue, strengthening family relationships, and, as such, increase family closeness (Chesley, 2005; Jostell & Hemlin, 2018; Mesch, 2006a). The internet can improve family relationships when it increases time spent together as a family through shared internet time (for example, playing online games together) and cooperative engagement in discovering features of the internet (Facer et al., 2003; Kiesler et al., 2000; Orleans & Laney, 2000). It is especially distant relatives who can benefit from social media platforms and video communications since such means of communication can facilitate family closeness and relatedness through increased frequency of virtual interactions (Bordia & Difonzo, 2004).

Improved Learning Experiences

On both an individual and educational level, the internet can aid in the acquisition of new skills and contribute to academic achievement (Johnson, 2010; Khan & Badii, 2012; Yadav et al., 2017). It is argued that internet use stimulates cognitive and psychosocial development (Johnson, 2006; Young, 2008). After controlling for demographic variables such as household socioeconomic status and parents' level of education, Fish et al. (2008) found that children who had access to home computers scored significantly higher on standardized cognitive tests in comparison to children without computers at home. They suggested that early onset of internet induction in the household had positive consequences for cognitive development during childhood. Visiting online websites and internet-platforms such as Google require the use of higher-order cognitive processes such as critical assessment, problem-solving, and manipulation of information (Fish et al., 2008). As such, the internet, when used to navigate online search-platforms, stimulates cognitive (Johnson, 2006) and meta-cognitive processes (Johnson, 2008; Johnson et al., 2007).

Educational institutions are increasingly relying on the internet for teaching purposes (Johnson et al., 2007), especially during COVID-19 (Chung et al., 2020; Fernandes et al., 2020a). Distance-learning at tertiary educational facilities, with the internet as principal feature, is a popular means of distributing educational material to students, since it is cost-effective and facilitates easy access (Baer, 1998; Lytras & de Pablos, 2011; Tsai, 2005; Yadav et al., 2017).

Provision of Online Mental Health Services

Pervasive mental health issues place a huge burden on public health services (Kessler et al., 2003), especially when research indicates that there are various barriers to the traditional, face-to-face treatment of mental health problems (Demyttenaere et al., 2004; Jones et al., 2014). Certain barriers include: restricted access due to time and transportation (especially among rural communities and in developing countries; Field et al., 2020; Norris et al., 2013; Strümpher et al., 2014), stigmatization (Schierenbeck et al., 2013), monetary restrictions (Alangari et al., 2020), the lack of human capital trained in the effective provision of mental health services (Kanehara et al., 2015), and lengthy waiting lists (Arean et al., 2016). As such, alternative treatment options are necessary (Arean et al., 2016; Demyttenaere et al., 2004). Mobile mental health technologies in the form of computer applications (apps), that usually require internet connections, are able to augment availability of mental health therapies (Musiat & Tarrier, 2014) and can provide individuals with the essential tools to manage mental health problems (Alqahtani & Orji, 2020). Mental health apps are able to deliver a vast number of functions, such as psychoeducation, symptom tracking and monitoring (Norris et al., 2013; Wang et al., 2018), journaling, cognitive-behavioural-therapy, acceptance-commitment-therapy, and peer-support (Price et al., 2014; Wu et al., 2015). Studies show that the use of mobile technology to deliver mental health care is feasible and effective (Muller & Yardley, 2011; Witt et al., 2017).

Disadvantages of the Internet

On the flipside, the internet, especially online entertainment platforms, is frequently associated with distractibility, privacy violations, lifestyle illnesses, financial difficulties, and *Technoference* (defined below). These disadvantages are discussed below.

Flow State and Resultant Distractibility

Since the internet is highly interactive and associated with instant gratification, it activates *flow* state (Chen, 2006), which is the mental state in which one is fully immersed in an activity that provides much excitement (Chen, 2006; Thatcher et al., 2008). Flow state may result in excessive time spent on online activities (Siekpe, 2005). These long hours on the internet may distract from social, academic, and occupational responsibilities (Loh & Kanai, 2016), resulting in poor peer relationships (Yusuf et al., 2020), unhealthy family functioning (discussed in depth in another section of the thesis), low productivity, and substandard grades (Chang & Law, 2008; Shapira et al., 2000; Young, 2012).

Harmful Exposure and Violation of Privacy

The internet is largely unregulated (Kvardova et al., 2021), which may expose individuals to harmful content such as pornographic imagery (Chambers et al., 2018), cyberbullying (Wright, 2017), cybercrime (Reep-van den Bergh & Junger, 2018), and *internet trolls* (i.e., a person who posts provocative messages online to elicit an emotional response from others; March, 2019). Internet hackers are also able to infiltrate personal computers, laptops, cellphones, and the like, through the use of internet viruses (Gold, 2013), gaining access to sensitive and confidential personal or workplace information (Beale & Berris, 2018).

Lifestyle Illnesses and Physical Affliction

Individuals with a high affinity toward the internet, may spend less time outdoors - e.g., engaging in physical activity (such as exercise) - and more time indoors while using the internet. Lifestyle illnesses such as obesity and diabetes (Matusitz & McCormick, 2012), associated with insufficient physical activity (Jenkins & Jenks, 2017; Vandelanotte et al., 2009), are frequently linked to the excessive use of the internet. Moreover, physical ailments such as back/neck pain (Blumenberg et al., 2021) and carpal tunnel syndrome (Katz & Simmons, 2002) are often the result of poor posture when engaging with the internet, particularly when online activity stretches over long periods of time.

Financial Difficulties

The anonymity and ease of access of the internet (Greenfield, 1999) may result in the unrestrained participation in online activities such as online shopping and online gambling (Singh & Paliwal, 2020), which may have cost implications. Excessive expenditure on such activities may result in financial difficulties (Shapira et al., 2000).

Technoference

Parents may inadvertently overlook or misconstrue developmental cues of children when they engage with the internet (may it be for work-related or social purposes). The phenomenon, termed Technoference (Combrinck-Graham, 1990), may hamper healthy attachment and sound relationship formation between parent and child.

In conclusion, the internet is associated with numerous advantages but also disadvantages. The disadvantages of the internet have resulted in increased concern about people's physical and mental health. It is especially the rates and impact of excessive, maladaptive internet use (i.e.,

problematic use of the internet [PUI]) that is disconcerting. In the next section, a comprehensive conceptualization of PUI follows.

Conceptualization of PUI

PUI Pioneered

In 1995, Ivan Goldberg introduced the ostensible disease, internet addiction disorder, as a tongue-in-cheek response to the "rigidity" and "complexity" of the Diagnostic and Statistical Manual of Mental Disorders (Block, 2008, p. 308). He sarcastically reported that he experienced a preoccupation with the internet, which resulted in functional disability (Block, 2008). However, the term quickly gained prominence in the research community and literature on the topic began to proliferate. The following year, the psychologist, Kimberly Young, orchestrated a large-scale investigation of the phenomenon (Young, 1996). She based her conceptualization of PUI on DSM-IV criteria for substance dependence, citing similarities between internet addiction (IA) and substance dependence in terms of observed physiological criteria such as tolerance and withdrawal (Young, 1996). However, Young and Rogers (1998) later argued that PUI more closely exemplifies an impulse control disorder (ICD), and consequently developed novel criteria in accordance with the DSM-IV criteria for pathological gambling (Cao & Su, 2007). Although controversy surrounds the conceptualization of PUI (Chakraborty et al., 2010; Pies, 2009), research indicates that it is generally guided by the following broad categories: presenting as a primary or secondary diagnosis, presenting as a generalized or specific disorder, and in terms of symptom presentation.

Definition of PUI as a Primary or a Secondary Diagnosis

Currently, there is no clear developmental pathway of problematic use of the internet (PUI) since researchers struggle to keep up with the rapid evolution in internet applications and the

increased integration of the internet into our daily lives (Pies, 2009). It is difficult to determine whether PUI develops of its own accord (presenting as a primary diagnosis) or whether it is preceded by an underlying comorbid psychiatric disorder, and, as such, should be considered a secondary diagnosis (Ha et al., 2006; Pies, 2009). PUI more frequently than not co-occurs with various psychiatric disorders and therefore elicit complex questions of causality and effect (Weinstein & Lejoyeux, 2010). The incidence rates of PUI in people with psychiatric disorders are higher than in the general population (Ko et al., 2012), suggesting PUI to be a mere symptom of other existing mental disorders such as depression, anxiety, or substance use disorders (Kuss et al., 2014; Pontes et al., 2015). Some argue that PUI develops as a type of maladaptive coping mechanism that aids in the avoidance of negative emotions or feelings related to an existing psychiatric disorder (Bottesi & Ghisi, 2014; Chakraborty et al., 2010). For example, people suffering from attention deficit/hyperactivity disorder may excessively use the internet to escape day-to-day monotony (Fineberg et al., 2018). Relatedly, Pies (2009) argued that it is premature to discern PUI as a distinct disease entity, since research on the course and prognosis of PUI is still in its infancy and concrete evidence is necessary for such a contention.

Definition of PUI as a Specific or Generalized Disorder

Another issue pertaining to the conceptualization of problematic use of the internet (PUI), is whether it should be classified as specific PUI or generalized PUI (Griffiths, 2014). Some scholars endorse the notion that PUI is specific in nature, suggesting that individuals are dependent on certain online applications and not addicted to the internet itself (Balhara et al., 2021). Specific PUI thus refers to the overuse and abuse of specific internet platforms for a particular purpose (e.g., online gambling, online gaming, or online shopping; Davis, 2001). Recently, a number of specific PUI subtypes were recognized, including: internet-related gaming disorder, internet-

related gambling disorder, cyberchondria, and cyberbullying (Fineberg et al., 2018). Some scholars, supporting the notion of specific PUI, postulate that the internet is simply a conduit through which individuals manifest existing disorders or maladaptive behaviours (Griffiths et al., 2016a, 2016b; Young, 1998). Specific internet applications are used to satisfy underlying psychiatric disorders and, as such, signs and symptoms of the primary disorder will manifest, regardless of the availability of the internet (Pontes et al., 2015; Trotzke et al., 2015). For example, an individual who gambles excessively in land-based casinos, may turn to online gambling (Davis, 2001). Similarly, a pornography addict may come to realize the large body of online pornography available and start engaging excessively with online pornographic websites (Davis, 2001). In other words, it is argued that individuals who excessively engage in online gambling and online gaming do not suffer from PUI, but should rather be considered gambling and gaming addicts (in the conventional sense), since they simply capitalize on the convenience of the internet (Pontes et al., 2015).

Conversely, generalized PUI, delineating a broader set of online behaviours, refers to the excessive use of the internet for non-specific purposes (Davis, 2001; Davis et al., 2002; Jia et al., 2018). Individuals with generalized PUI may, for example, spend unlimited amounts of time aimlessly searching online websites (Griffiths, 2000) or spend much of the day checking their email or other online communication platforms (Tsai & Lin, 2003). Davis (2001) emphasized the important role that procrastination plays in the manifestation of generalized PUI. He argued that individuals with generalized PUI engage with the internet to delay completion of certain responsibilities. Procrastination usually results in wasted time and anxiety, in turn, adversely influencing functioning. Davis (2001) considered the internet use of individuals who suffer from generalized PUI more problematic than the internet use of individuals with specific PUI since he

contended that generalized PUI would most likely not even manifest if the internet did not exist. Furthermore, the increase in evidence supporting PUI as a multifaceted problem that goes beyond, for example, online gaming/gambling, reinforces the idea that PUI should be considered as generalized. Recent findings suggested that distinct internet activities co-exist to similar degrees with increasing symptom severity (Brand et al., 2014). Tiego et al. (2019) found that various types of online activities (such as online gaming, online gambling, and online shopping) share similarities in terms of underlying cognitive dysfunction and that maladaptive engagement in these activities increases uniformly with each other. Such evidence counters the notion that PUI is exclusively related to only one specific disorder and implies commonalities across various PUI-related behaviours.

Conceptualization of PUI According to Symptom Presentation

Two principal schools of thought, based on symptom presentation, are widely recognized in the conceptualization of problematic use of the internet (PUI), namely: PUI as a behavioural addiction or as an impulse control disorder (ICD). Most literature endorse the term internet addiction (IA), favouring PUI as a candidate behavioural addiction.

PUI, Defined as a Behavioural Addiction. PUI shares significant phenomenological similarities with substance addictions, without the implication of a psychoactive substance, and have thus been argued to exemplify a candidate behavioural addiction (Chamberlain et al., 2016; Young, 1998). For example, internet addicts report feelings of irritability, anxiety, anger (Spada, 2014), physiological hyperarousal, nausea, fatigue (Chakraborty et al., 2010), and sweating (all withdrawal symptoms) when the internet is inaccessible or straight after a “binge” episode (Block, 2008, p. 309). Internet addicts also indicate signs of tolerance in instances where they communicate the need for increased access to the internet, faster internet connections, and spending more hours

on the internet to achieve the same euphoric state (Ko et al., 2009a). Nevertheless, there is still scepticism about whether internet addiction meets physiological criteria of withdrawal and tolerance, which are core characteristics of addictive disorders (Christie, 2008; Siegel, 2005). Pies (2009) argued that, as of yet, withdrawal and tolerance have not been identified in internet addicts using standardized physiological measures similar to those used in substance abuse patients. He argued that PUI should therefore not be considered as a type of addiction.

PUI, Defined as an ICD. Other research indicates that PUI more closely resembles the DSM-IV criteria for an ICD (Liu et al., 2019; Young & Rogers, 1998). Ioannidis et al. (2016) found that motor impulsivity to be an important predictor of PUI. Personality characteristics such as "escape from self" and "novelty-seeking", tightly linked to impulsive behaviour (Black et al., 2012, p. 582), are frequently implicated in the presentation of PUI (Choi et al., 2014; Lee et al., 2012). Shapira et al. (2000) used face-to-face, semi-structured interviews to investigate the psychiatric features of 20 individuals with PUI. All their subjects met DSM-IV criteria for an ICD Not Otherwise Specified (NOS). Another study conducted by Choi et al. (2014) indicated that participants with PUI scored higher on the Barratt Impulsiveness Scale-11 (BIS-11; used to assess impulsivity) than healthy controls (i.e., individuals without PUI). Results also showed that PUI correlated strongly with impulsiveness as a personality trait ($p = .001$). The PUI group performed poorer than the healthy control group on the Stop-Signal Test (SST) of the Cambridge Neuropsychological Test Automated Battery (CANTAB), suggesting poorer response-inhibition and impulsivity. Of note is that no differences were observed between the PUI group and healthy control group in terms of other neurocognitive tasks evaluated by the CANTAB (i.e., visual discrimination, attention, spatial planning, and working memory capacity). Lee et al. (2012) also used the BIS-11 to compare impulsivity among a PUI group, a pathological gambling group, and

a healthy control group. Both the PUI and pathological gambling groups obtained higher total scores on the BIS-11, and higher scores on the three subscales of the BIS-11 (i.e., cognitive impulsiveness, motor impulsiveness, and non-planning impulsiveness), than the healthy controls. Pearson's analysis showed a moderate correlation ($p < 0.01$) between the severity of PUI and the level of impulsivity, again suggesting poorer impulse control in people with PUI.

The disparate findings on the underlying symptomatology of PUI are reflected in the various terms used to refer to the condition, namely: problematic use of the internet (PUI; Grant et al., 2010; Snyder et al., 2015), internet addiction (IA; Chen et al., 2011; Fayazi & Hasani, 2017; Seok et al., 2015; Young & Rogers, 1998), internet addiction disorder (IAD; Ferraro et al., 2007), compulsive internet use (Chakraborty et al., 2010; Meerkerk et al., 2006), impulsive compulsive internet usage (Dell'Osso et al., 2008), internet dependency (Ghanbari et al., 2020), pathological internet use (Young, 1997), computer addiction (Wieland, 2005), and internetomania (Shaw & Black, 2008). Currently the two most widely cited terms in research are problematic use of the internet (PUI) and internet addiction (IA), often used interchangeably. The term PUI is preferred in this thesis as it is less emotionally laden than the term internet addiction (Pies, 2009). PUI is an umbrella term and explains a broad range of behaviours (Dalal & Basu, 2016; Fernandes et al., 2019b; Fineberg et al., 2018) accommodating the inclusion of potential subtypes and degrees of severity. The term PUI insinuates that internet use may be detected on a continuum ranging from healthy (normal) internet use, to mild and severely problematic internet use (Ang et al., 2012; LaRose et al., 2003) which is of particular relevance when considering that humans have a certain degree of "normal" dependency on the internet to fulfil daily tasks (Spada, 2014, p. 4). An encompassing definition such as PUI shows greater flexibility concerning conceptualization and

diagnostic classification in comparison to a definitive term such as internet addiction (Fernandes et al., 2019b; Zhou et al., 2018).

PUI Diagnostics

Notably, problematic use of the Internet (PUI) does not currently appear in any official diagnostic manual (Pies, 2009; Spada, 2014; Weinstein & Lejoyeux, 2010). Nevertheless, PUI is provisionally represented by two psychiatric disorders (i.e., gaming disorder and gambling disorder) in both the DSM-5 (American Psychiatric Association, 2013) and the International Classification of Diseases (ICD)-11 (World Health Organization, 2019). Gaming disorder and gambling disorder involve both online and offline activities (American Psychiatric Association, 2013; World Health Organization, 2019). In the DSM-5, internet gaming disorder (IGD) is included under section III (i.e., *conditions for further study*) and gambling disorder is included as one of the *substance-related and addictive disorders* (American Psychiatric Association, 2013). The ICD-11 includes both gaming disorder and online gambling disorder under: *disorders due to substance use and addictive behaviours* (World Health Organization, 2019).

Predictors of PUI

Type, frequency, and length of internet use is found to be significant predictors of problematic use of the internet (PUI). Individuals who frequently make use of the highly interactive features of the internet for entertainment purposes (Cao et al., 2011; Ching et al., 2017; Geyer et al., 2017; Kuss et al., 2014; Thatcher et al., 2008; Thatcher & Goolam, 2005), for lengthy time periods (Geyer et al., 2017; Kuss et al., 2014; Thatcher & Goolam, 2005; Tonioni et al., 2012), are at higher risk of PUI development than individuals who mostly use the internet for work-related purposes or engage with online entertainment less frequently. Most studies agree on the significant predictors of PUI, but research on PUI epidemiology, specifically prevalence rates, are

inconclusive. Researchers argue that the lack in the standardization of PUI measurements have led to ambiguous prevalence rates.

PUI Epidemiology

The sociodemographic variables associated with problematic use of the internet (PUI) seem to be consistent among most countries, but findings on prevalence rates vary. In general, lower rates are found in Europe and the Americas compared to Asia (Canan et al., 2012; Ko et al., 2009b; Lam et al., 2009; Yen et al. 2009). Some studies suggest that PUI prevalence among South Africans are similar to prevalence rates in Asian countries (e.g., China and Hong Kong; Geyer et al., 2017; Ioannidis et al., 2018; Nath et al., 2013), but research on PUI prevalence in SA is limited. Local PUI demographics are similar to global PUI demographics.

Demographics

Research shows a strong correlation between PUI and male gender (Geyer et al., 2017; Kuss et al., 2014; Kuss & Lopez-Fernandez, 2016; Thatcher et al., 2008; Thatcher & Goolam, 2005) and single relationship status (Asiri et al., 2013; Bakken et al., 2009; Demetrovics et al., 2008; Geyer et al., 2017). Young adulthood (age of onset is usually between early 20s and late 30s; Kuss & Lopez-Fernandez, 2016; Shaw & Black, 2008), higher socioeconomic status (Kuss et al., 2014; Kuss & Lopez-Fernandez, 2016; Thatcher & Goolam, 2005), and higher educational qualification (Aboujaoude et al., 2006; Thatcher & Goolam, 2005) are also frequently implicated in PUI.

Prevalence of PUI

Global PUI prevalence rates vary between 1% and 36.7% (Ko et al., 2012). Most research on PUI is conducted in Asia and findings indicate high PUI prevalence rates among Asian youth. To date, China is the only country in the world that officially recognizes PUI as a

diagnosable psychiatric disorder (Kuss & Lopez-Fernandez, 2016). Lam et al. (2009) investigated PUI among 1618 Chinese individuals between 13 and 18 years. Ten-point eight percent (10.8%) of the participants were identified as problematic internet users. Among Chinese adolescents, the prevalence of PUI typically varies between 2% and 18% (Ko et al., 2007; Wang et al., 2008). Ni et al. (2009) conducted an epidemiological study on PUI among 3557 Chinese first year university students. The internet addiction test (IAT; Young, 1996) revealed a prevalence of 6.44% among participants. Findings demonstrated a 10.8% PUI prevalence among 11-to-13-year-old Taiwanese children (Ko et al., 2009a). A high incidence rate of 18.8% was found among more than 9400 Taiwanese youngsters between 12 and 16 years (Ko et al., 2009b). Yen et al. (2009) reported a PUI incidence rate of 12.3% among Taiwanese university students. The internet addiction scale (IAS) was used to survey excessive internet use among South Korean adolescents (Park et al., 2009). Findings indicated that 10.7% of participants met criteria for PUI and 73.3% were identified as "possible internet addicts" (Park et al., 2009, para. 10). In Hong Kong, Shek and Yu (2012) implemented a two-wave longitudinal study to examine PUI among adolescents. High rates of PUI were recorded during both waves of the study (26.4% in wave one and 26.7% in wave two). Prevalence in the Philippines typically ranged between 5% and 21% in the study of Mak et al. (2014). In Turkey, Canan et al. (2012) observed a PUI incidence rate of 9.7% among young adults. A lower PUI prevalence rate was found among Turkish adolescents (5%), using the IAT (Ak et al., 2013).

Similar to Asia, high rates of PUI, ranging between 17.3% and 23.6%, were reported in Africa (Adiele & Olatokun, 2014). A study conducted among university students in Namibia and Uganda indicated that approximately 70% of Ugandans and 59% of Namibians indicated "frequent problems due to internet use" (Nath et al., 2013, p. 18). Roughly 5% of Ugandan students and 7%

of Namibian students suggested "significant problems due to internet use" (Nath et al., 2013, p. 18). In South Africa, internet use was investigated among 390 university students from the University of Fort Hare and Nelson Mandela University (Salubi et al., 2018). Just over 72% of participants reported that they used the internet on a daily basis and approximately 35% of participants indicated that they spent more than 10 hours online per day. According to the Columinate report on internet use among 2000 South Africans, 50% of participants indicated that the internet interfered in their daily lives and 39% logged onto the internet to relieve stress and anxiety (Malinga, 2016). Furthermore, 67% of respondents experienced the impulse to use the internet each day and 64% indicated signs of withdrawal when offline (Malinga, 2016). One study using the IAT (Young 1996) investigated PUI among adults from South Africa and Chicago (United States of America; USA) and reported a combined estimated point prevalence of ~8.5% (Ioannidis et al., 2018). Slightly lower mean IAT scores were found in the SA sample (M = 30.3) compared to the USA sample (M = 35.9). In earlier years, the problematic internet use questionnaire (PIUQ) was used by Thatcher and Goolam (2005) to determine PUI prevalence among South African internet users. A prevalence rate varying between 1.67% and 5.29% was reported. Furthermore, Geyer et al. (2017) conducted a study on internet use among 295 South African university students. In order to elucidate the extent of PUI among participants, they derived eight different items from two validated PUI screening tools, namely the internet-related addictive behaviour inventory (IRAB) and PIUQ. Upon administering these items, the researchers found a high prevalence of two PUI-related items, namely: "escape from problems" (approximately 71.5% of participants; Geyer et al., 2017, p. 73) and "loss of control" (46.8% of participants; Geyer et al., 2017, p. 73).

Regardless of the apparently disparate prevalence findings across the globe, the studies that exist concur that PUI rates among the youth - specifically young adults - are high (Geyer et al., 2017; Kuss et al., 2013; Shaw & Black, 2008; Young, 2009). Young adults seem to be at high risk of developing addictions including behavioural addictions such as PUI (Grant et al., 2010).

PUI in Youth

Youngsters are frequently called "digital natives" (Loh & Kanai, 2016, p. 2) who access the internet more regularly than any other age group (Anderson et al., 2017), which may increase their chances of excessive internet use and thus PUI (Johnson & Edwards, 2020; Romano et al., 2013). It is argued that young adults enter a life stage where they leave the family environment to pursue tertiary studies or careers (Hunt & Eisenberg, 2010; Kitzrow, 2003). As such, they are increasingly exposed to technological devices and the internet (either at university or at work) without parental supervision and guidance (Griffiths, 2014; Kuss et al., 2013). Even in instances where youngsters decide to live at home after the age of 18, a degree of detachment from family members can be observed, consequent to psychological and developmental factors associated with young adulthood (Geyer et al., 2017; Lanthier & Windham, 2004; Kuss et al., 2013). The absence of parental supervision (Kuss et al., 2013), readily available access to technology and free or low-cost Wi-Fi (especially on university campuses; Kawa & Shafi, 2015), unstructured time (Chaudhari et al., 2015), and increased responsibility (Geyer et al., 2017; Wu et al., 2015), may be risk factors to PUI. Young adults may start to rely heavily on the interactive features of the internet in order to relieve increased work-related stress (Chen et al., 2014) or cope with loneliness (Kawa & Shafi, 2015; Salehi et al. 2014; Young, 2004).

The Relationship Between PUI and Family Functioning

As mentioned, although young adults may depart from their parents' household after the age of 18, interactions with family members usually endure. A healthy family environment may protect against PUI (Kuss & Lopez-Fernandez, 2016; Liau et al., 2015) since family support and cohesion solidify the feeling of belonging and protect against PUI (Schneider et al., 2017; Şenormanci et al., 2014). Longitudinal studies are especially beneficial in elucidating the importance of a stable family environment in reducing the risk of PUI development. Family relatedness and compassion at baseline featured as significant protective factors against internet gaming disorder (IGD) at a two-year follow up study (Liau et al., 2015). The longitudinal, 5-year study of Rehbein and Baier (2013) suggested that parental attentiveness and guidance during childhood predicted lower rates of IGD in young adulthood.

Conversely, the relationship between PUI and unhealthy family functioning has also been elucidated. Adverse family interactional patterns may promote the development of PUI (Da Charlie et al., 2011). For example, family conflict (Bonnaire & Phan, 2017; Özaslan et al., 2021; Qi, 2021; Wang et al., 2011), poor parent-child relationships (Choo et al., 2015; Liau et al., 2015), insecure attachments, childhood abuse, (Schimmenti et al., 2012), divorce, and parental substance abuse (Choo & Shek, 2013; Yan et al., 2014), are continually linked to PUI.

A cross-sectional study conducted among high schoolers in Hong Kong investigated the relationship between PUI and various familial variables (Wu et al., 2016). In particular, the effect of family functioning on PUI was explored. Both high and moderate levels of unhealthy family functioning did not significantly predict PUI, whereas severe unhealthy family functioning strongly predicted PUI (Wu et al., 2016). Another study showed that family-related variables such as low affective involvement and an authoritarian parenting style correlated significantly with PUI

among high school students in Iran (Sahraee et al., 2011). Logistic regression analysis showed that high parent-adolescent conflict, high inter-parental conflict, and unhealthy family dynamics significantly predicted PUI (Yen et al., 2007). These researchers argued that families with high levels of conflict may rebuff parental monitoring of internet use, resulting in the development of unhealthy internet use patterns (Wu et al., 2016). Evidently, most research on the impact of the family environment on PUI are conducted among Asians. It is frequently cited that the Chinese culture is characterized by high performance expectations and standards (Yang et al., 2016; Zhu et al., 2021) and that the acute focus on academic achievement may result in a family environment that is aloof and indifferent (Yang et al., 2016; Zhu et al., 2021), cultivating a breeding ground for PUI.

Research has also examined PUI as a predictor variable and family functioning as an outcome variable. A study among Chinese adolescents, used the general functioning of the family assessment device (GF-FAD) and the adolescent pathological internet use scale (APIUS) to investigate family functioning and PUI, respectively. Results showed a moderate, negative correlation between PUI and family functioning, suggesting that increased severity of PUI is associated with unhealthier family functioning (Li et al., 2021). This is consistent with findings from a longitudinal study that showed that healthy family functioning deteriorated significantly as participants developed PUI (Ko et al., 2015).

One of the most widely considered issues pertaining to internet use is its ability to rob families of their shared time together (Kraut et al., 1998; Nie et al., 2008; Snyder et al., 2015). This is problematic in the sense that quantity of time spent together as a family unit strengthens relationships (Mesch, 2003), increases family cohesion (Kraut et al., 1998), and functions as a barrier against unhealthy family functioning (Subrahmanyam et al., 2001). The time-displacement

hypothesis considers the concept of time to be finite and regards the internet as a zero-sum phenomenon (Lee & Kuo, 2002; Nie et al., 2008; Subrahmanyam et al., 2001). As such, it is postulated that internet use is a time-consuming activity which demands attention and distracts from family time (Lee & Kuo, 2002; Nie et al., 2008; Williams & Merten, 2011). Research showed a negative correlation between frequency of internet use and family time spent together (Nie et al., 2008; Williams & Merten, 2011). Excessive amounts of time spent on certain online activities may contribute to a dilapidated sense of cohesion and family conflict (Katz & Aspden, 1997; Mesch, 2003). When a family member is preoccupied with the internet, family subsystem boundaries may become more detached, potentially resulting in lack of effective communication and decreased cohesion (Mesch, 2006b).

Mesch (2006a) found that as internet use for specifically *entertainment* purposes increased, family time decreased. Similarly, as *frequency* of internet use increased, family time decreased. It is argued that increased use of the internet for entertainment and increased frequency of use, result in less time spent together (Mesch, 2006a). Subsequently, family members may become less connected on an emotional and psychological level and conflict may ensue when family members are not responsive to one another's needs (Mesch, 2006a). Bonnaire and Phan (2017) compared family functioning of adolescents with internet gaming disorder (IGD) and healthy controls (i.e., individuals without IGD). Results indicated that participants with IGD showed weaker family cohesion, more family conflict, and more defective family relations. Similarly, the longitudinal study of Da Charlie et al. (2011) showed that, after three years, online problem-gamers indicated significantly more deficient relationships with parents than non-gamers. Moreover, youngsters were more likely to exhibit signs of problematic internet related behaviours if parents also excessively engaged with the internet, signifying the possible negative influence of vicarious

learning (Liau et al., 2015). It is argued that well-intentioned PUI rules and regulations, aimed at ameliorating children's excessive internet use, are made redundant when parents display maladaptive internet use (Liau et al., 2015).

Evidently, most research indicates an adverse relationship between PUI and family functioning. It is, however, largely unclear whether comorbidities moderate or mediate the relationship between PUI and family functioning. Given that PUI and comorbid psychiatric disorders more frequently than not co-occur, such knowledge is of particular relevance. After an extensive search of various online databases such as Google Scholar, PubMed, EBSCOhost Research Databases, SAGE Journals Online, ScienceDirect, Scopus, and Wiley Online Library, only a few studies related to the interaction effect of PUI and indicators of mental health on family functioning were found.

PUI, Comorbidities, and Family Functioning

Research conducted by Marzilli et al. (2020) showed that the relationship between family functioning and problematic use of the internet (PUI) in young adults were mediated by comorbid depressive symptoms. The direct effect of PUI on family functioning was also significant ($p = .04$), but the path coefficient increased significantly when depressive symptoms were added as mediator to the relationship, indicating a better model fit. Anxiety symptoms were not found to mediate this relationship (Marzilli et al., 2020). A separate study looked at the interplay between family functioning (the family system), hope (the personality system), social withdrawal (the behavioural system) and PUI. Results showed that hope was a mediator between family functioning and PUI ($p < .01$; Li et al., 2021). Family functioning had a significant effect on hope ($p < .01$), whereas hope had a significant effect on PUI ($p < .01$). Social withdrawal moderated the relationship between family functioning and hope ($p < .01$), but no moderating effect of social withdrawal was found

between family functioning and PUI (Li et al., 2021). These results support evidence that a healthy family environment instils hope and reduces the risk of PUI development among adolescents (Li et al., 2021). Since level of social withdrawal (low or high) did not moderate the relationship between family functioning and PUI, the researchers argued that adolescents who had a healthy relationship with parents actively tried to divert from maladaptive behaviours (such as PUI) regardless of whether they had a high or low tendency to withdraw from society (Li et al., 2021). Shi et al. (2017) tested three model pathways to investigate mediators between family functioning and PUI. The first model showed that both self-esteem and loneliness mediated the association between family functioning and PUI, the second model indicated that self-esteem on its own mediated the relationship between family functioning and PUI, and in the third model, loneliness on its own mediated the relationship between family functioning and PUI. The second model indicated the highest path coefficient, indicating that self-esteem may play a particularly important role in the association between family functioning and PUI. Considering these findings, various confounding variables (e.g., depression and hope, loneliness, and self-esteem) seem to play a role in the complex relationship between family functioning and PUI.

PUI: Family-based Treatment Interventions

Family-centred prevention and intervention strategies are effective in managing problematic use of the internet (PUI) within the context of the family (Schneider et al., 2017; Sexton & Alexander, 2002). Family-based intervention strategies involve both parents/caregivers and children (Kaslow et al., 2012; Kuss & Lopez-Fernandez, 2016) and therefore emphasize a collaborative approach to conflict resolution among family members (Sexton & Alexander, 2002; Yang et al., 2016). Family therapy clinicians aim to rectify unhealthy family dynamics to promote effective communication and support (Schneider et al., 2017; Sexton & Alexander, 2002). During

PUI-focused therapeutic sessions, parents are taught which strategies can practically be implemented to prevent the onset and maintenance of PUI (Schneider et al., 2017; Wu et al., 2016). Parents are encouraged and trained to: exhibit desired internet-related behaviour (such as moderate internet use; Kim & Noh, 2019), implement screen-time (Liu et al., 2015), actively monitor their children's online activities (Xu et al., 2021), advocate mindful internet use (Zajac et al., 2017), and mediate boundaries related to internet use (Xu et al., 2021). Children, in turn, are taught how their internet use impacts on the family environment and how they can curb internet use to contribute to healthy family functioning (Xu et al., 2021; Zajac et al., 2017).

Family-based interventions seem to be more fruitful in reducing signs and symptoms of PUI, compared to other treatments such as individual-based cognitive behavioural therapy and dialectical behaviour therapy (Liu et al., 2015; Park et al., 2014). Schneider et al. (2017) suggested that individual-based interventions may cultivate feelings of solitude, despair, shame, and worthlessness, while family-based therapy has the potential to encourage the notion of shared responsibility and solidarity (Vetere, 2018).

A 3-week family-based intervention, which targeted adolescents' internet gaming disorder (IGD), improved perceived family cohesion and markedly reduced symptoms of IGD (Sugaya et al., 2019). Also, greater affection and understanding among family members correlated with a gradual decline in problematic online gaming in adolescents. Liu et al. (2015) conducted a quasi-experimental study to elucidate the impact of multi-family group therapy (MFGT) on PUI in adolescence. Results showed that MFGT was effective in reducing PUI among adolescents and that family connectedness, as well as improved communication, were pivotal in maintaining healthy recovery.

Snyder et al. (2015) argued that it is especially important to intervene at the level of the family since behavioural addictions (such as PUI) may prevail in families. Since young adults frequently model the internet-related behaviours of parents or other family members (Liau et al., 2015), family-based interventions that effectively intervene at the level of parents or siblings who exhibit maladaptive internet use, may decrease the chances of children replicating problematic internet related behaviours (Liau et al., 2015).

As such, family-based intervention strategies may contribute to a reduction in rates of PUI and improve family functioning. Since PUI is a relatively new research phenomenon, and is yet to be conceptualized in terms of standardized diagnostic criteria, findings on its relation to family functioning and treatment strategies should be interpreted with caution. Various limitations that specifically pertain to research on PUI are discussed below.

Limitations of Research on PUI

In general, the most prominent research limitations pertain to a selective focus on certain aspects of problematic use of the internet (PUI) and research methodology. Such limitations hamper generalizability of results.

Selective Focus of PUI Research

A significant limitation to some of the studies are their exclusive focus on IGD, omitting the investigation of PUI as a multifaceted issue (Bonnaire & Phan, 2017; Choo et al., 2015; Da Charlie et al., 2011; Liau et al., 2015; Sugaya et al., 2019). Results from these studies are not necessarily generalizable to all forms of PUI (Ioannidis et al., 2018). It is argued that internet applications may impact on family functioning in different ways (Liu et al., 2015). In particular, the interactive nature of certain maladaptive online activities may be more detrimental to family functioning than other internet applications. Furthermore, the vast majority of research on PUI is

specifically focused on either high school children (Yen et al., 2007; Wu et al., 2016) or adolescents (Bonnaire & Phan, 2017; Li et al., 2015; Liu et al., 2015; Sugaya et al., 2019; Yen et al., 2007), thus, neglecting emerging adulthood as a high-risk group.

Most research on PUI is also skewed toward Asian countries (Choo et al., 2015; Li et al., 2021; Liau et al., 2015; Sahraee et al., 2011; Sugaya et al., 2019; Wu et al., 2016; Yen et al., 2007). An abundance of PUI research is conducted in China and Hong Kong. High prevalence rates of PUI have been found in these countries, but findings cannot be generalized to other world regions. It is therefore necessary to expand PUI research across the globe.

Methodological Issues to PUI Research

Various self-report measures are used to investigate PUI and show little consensus on the underlying mechanisms of PUI (Spada, 2014). Measurements vary in cut-off scores (Kuss & Lopez-Fernandez, 2016) and the formal operationalization of PUI (Ioannidis et al., 2018). As such, these measurements yield prevalence rates that differ widely. For example, the meta-analysis of Pan et al. (2020) indicated that shorter version psychometric tests (such as the 12-item IAT and 8-item Young's diagnostic questionnaire [YDQ]), resulted in significantly lower prevalence rates of PUI compared to longer version psychometric tests such as the 20-item IAT and the 26-item compulsive internet use scale (CIUS). Both the 12-item IAT and 8-item YDQ consist of items to assess the core aspects of PUI, while the longer PUI measures comprise more peripheral symptoms such as "time management" and "social problems", which may generate inflated incidence estimates (Pan et al., 2020).

Also, certain psychometric properties of these measures are to be validated more rigorously, especially in terms of cut-off scores. It is reported that the 20-item IAT has issues with item redundancy (Pawlikowski et al., 2013) and lacks robustness concerning factor structure

(Khazaal et al., 2015) as well as trail behind advances in internet applications (Laconi et al., 2014). Another limitation to methodology of PUI research, is the over-reliance on the cross-sectional research design (Bonnaire & Phan, 2017; Li et al., 2021; Schimmenti et al., 2012; Wu et al., 2016; Yang et al., 2016; Yen et al., 2007), rendering it difficult to establish causal pathways. Liu et al. (2015) suggested the implementation of a longitudinal multifaceted family-based intervention strategy to investigate different PUI causal pathways.

To conclude this introductory literature review, it is clear that little research on PUI is available within the South African context, owing to PUI being a relatively novel phenomenon. Various knowledge gaps on PUI are identified, especially pertaining to its prevalence in young people, and its relationship with family functioning among South Africans. The next chapter provides an outlay of the methods used in the present study to address these gaps.

CHAPTER FOUR

Methods

The aim of the present study is to investigate problematic use of the internet (PUI) among South Africans between the ages of 18 and 30 years, with a specific focus on the potential relationship between PUI and family functioning among this age-cohort. The rationale behind this study is the lack of research on the topic. According to the premise of family systems theory (FST; Broderick, 1993; Hooper & Cooper, 2005; Minuchin, 2018), mental illness, such as PUI, can only be appraised by examining the complex interactions of family members. Such research is important since the world is increasingly relying on the internet to complete daily tasks. Increased frequency of internet use may result in increased susceptibility to PUI and therefore more readily impact negatively on the healthy functioning of the family. This is problematic since the family plays a pivotal role in the healthy development of its members (Broderick, 1993; Guy-Evans, 2020). Moreover, research gaps surrounding the interaction effect of PUI and psychiatric comorbidities on family functioning renders it difficult to plan and implement efficacious treatment interventions. To our knowledge, this is the first study of its kind to examine PUI and family functioning among South Africans.

Objectives

The present study was a cross-sectional study embedded in a larger, international, 4-site project titled “Problematic Internet Use and Addictive Behaviours: A Comprehensive Enquiry”[1] (#N19/07/079), led by professor Christine Lochner at the MRC Unit on Risk and Resilience in Mental Disorders in the Department of Psychiatry, Stellenbosch University.

[1] The larger, international, 4-site project is subsequently referred to as the “parent” study.

There were four research objectives to the present study. The first objective was to determine the demographic profile of our sample of 18-to-30-year-old South Africans with PUI (including PUI prevalence rates). The second objective was to investigate whether there is a relationship between PUI and family functioning. The third objective was to explore whether there is a relationship between time spent on various online activities (see Table 1 for online activities) and family functioning. The fourth objective was to determine whether there is an interaction effect between PUI and comorbid psychiatric disorders (see Table 2 for psychiatric disorders) on family functioning.

Table 1

The Various Types of Online Activities Investigated in the Present Study and their Descriptions

Online Activities	**Description**
Cyberbullying	Include exchange of online insults, nasty texts/emails, unpleasant media, pranks.
General surfing	Any unstructured online activities.
Health and medicine	Any online activity relating to reading and researching medical facts, diagnoses, treatments and risks.
Internet gaming	Online gaming and gaming with multiple other players and role-playing format.
Online gambling	Any online activity in which there is a chance for monetary gain or other stakes.
Online shopping	Any activity on online shopping platforms and auction websites.
Pornography	Include cybersex, cyber-texting, viewing pornography and other online sexual activities.
Skill games and time wasters	Games and applications on computers, tablets, and mobile phones for which activity is without specific benefit.
Social networking	Browsing social media and messaging/communicating over online social platforms.
Streaming media	Include music or video streaming activities on any platform.

Table 2

The Various Types of Comorbid Psychiatric Disorders Investigated in the Present Study and their Descriptions

Comorbid Psychiatric Disorders	**Description**
Alcohol use disorder	The hazardous and harmful consumption of alcohol that result in impaired functioning (Kranzler, 2018).
Attention deficit/hyperactivity disorder	The condition characterized by inattention, hyperactivity (e.g., inability to sit still) and impulsivity (Bernardi & Pallanti, 2009).
Autism spectrum disorder	Symptoms can be detected on a continuum and include deficits in social-emotional reciprocity, impairment in conveying and interpreting non-verbal communication, and difficulties in forming and maintaining social relationships (Lord et al., 2018).
Eating disorders	Include anorexia nervosa, characterised by restrictive eating, and bulimia nervosa, characterized by binging and purging behaviours, that cause impairment in functioning (Striegel-Moore & Bulik, 2007).
Obsessive-compulsive disorder	Reoccurring and uncontrollable thoughts that result in repetitive behaviours, resulting in impaired functioning (Stein, 2002).
Obsessive compulsive personality disorder	A personality disorder characterized by the severe need for perfection and order, and rigid thinking patterns, that result in impaired functioning (Diedrich & Voderholzer, 2015).
Substance use disorder	The ingestion of any psychoactive drugs (e.g., opioids and hallucinogens) that result in impaired functioning (Han et al., 2009).

Hypotheses

In view of existing literature on PUI, family functioning, various types of online activities, and comorbid psychiatric disorders, there were five hypotheses. The first three hypotheses pertained to the relationship between PUI and family functioning:

(1) There will be a significant correlation between PUI and family functioning. As PUI severity increases, the severity of unhealthy family functioning will increase.

(2) PUI symptoms (see Table 3) will correlate significantly with family functioning. As the frequency of each symptom increases, the severity of unhealthy family functioning will increase.

(3) There will be a significant difference in level of family functioning between individuals with PUI and individuals without PUI. The family functioning of individuals with PUI will be significantly unhealthier than the family functioning of individuals without PUI.

The fourth hypothesis pertained to the relationship between time spent on various online activities and family functioning:

(4) Significant correlations will be found between the amount of time spent on any of the online activities and family functioning. As time spent on any of the online activities increase, the severity of unhealthy family functioning will increase.

The fifth hypothesis focused on the interaction effect of PUI and comorbid psychiatric disorders on family functioning:

(5) There will be a significant interaction effect between the level of PUI and the level of comorbid disorders on severity of unhealthy family functioning. Individuals with PUI and with comorbidity will experience significantly unhealthier family functioning compared to individuals with PUI, without comorbidity.

Table 3

PUI Symptoms (Represented as Items on the JEG Internet Addiction Test 10 Item Instrument).

	Description
Symptom/Item 1	"Do you prefer excitement of the Internet to intimacy with your partner?"
Symptom/Item 2	"Do others in your life complain to you about the amount of time you spend online?"
Symptom/Item 3	"Do you become defensive or secretive when anyone asks you what you do online?"
Symptom/Item 4	"Do you block out disturbing thoughts about your life with soothing thoughts of the Internet?"
Symptom/Item 5	"Do you fear that life without the Internet would be boring, empty, and joyless?"
Symptom/Item 6	"Do you snap, yell, or act annoyed if someone bothers you while you are on-line?"
Symptom/Item 7	"Do you lose sleep due to late-night logins?"
Symptom/Item 8	"Do you feel preoccupied with the Internet when offline, or fantasize about being on-line?"
Symptom/Item 9	"Do you try to hide how long you've been on-line?"
Symptom/Item 10	"Do you feel depressed, moody, or nervous when you are offline, which goes away once you are back on-line?"

Study Procedures

Ethics

After consent from the Health Research Ethics Committee (HREC) at the Faculty of Medicine and Health Sciences of Stellenbosch University was obtained (#S20/04/093), data collection took place from July to November 2020. The consent form, which was applicable to both the parent study and this thesis (see Appendix A), provided participants with a brief overview of the study. Ethical considerations such as informed consent, confidentiality, and the right to withdraw were considered, and information regarding the opportunity to win one of five Takealot vouchers was provided (each worth R 2000).

Recruitment

Blended sampling methods were employed (a combination between convenience sampling and snowball sampling; Field, 2013) to recruit SA participants between the ages of 18 and 30 years. A power analysis (Cohen, 2013) was conducted by professor Martin Kidd (a reputed statistician at the Stellenbosch University Centre for Statistical Consultation) to determine a sample size of 700 participants.

Recruitment advertisements, that were applicable to both the parent study and this thesis (see Appendices B1 and B2), were sent per email and posted on social media platforms (i.e., Facebook, Instagram, WhatsApp Messenger, LinkedIn, and Instagram). Respondents were provided with a unique survey link which guided them to an online self-administered survey (see Appendix C). Note that, since this thesis formed part of a larger study on PUI (the parent study), only some parts of the online survey were relevant to the objectives of the present study. Accordingly, these sections are provided in separate documentation for clarification purposes (see Appendix D).

The average time of completion for the survey was between 50 and 60 minutes. Participants were able to access the survey link on technological devices such as smartphones, tablets, laptops, and personal computers through numerous Web browsers, namely: Windows Explorer, Google Chrome, Mozilla Firefox, and Safari. As soon as participants accessed the survey link, they were required to complete the consent form. Subsequently, they were permitted to finish the rest of the survey. Following the completion of the entire online survey, participants were informed about the services of the Mental Health Information Centre (MHIC) of Southern Africa (the contact details of the MHIC were logged on the survey). The MHIC is a non-governmental organization, affiliated

with the Department of Psychiatry at Stellenbosch University, that provides psychoeducation and access to mental health services.

Participants' responses were exported to the IBM Statistical Package for Social Sciences (SPSS) version 27 for further analysis. As an incentive to participate, respondents stood the chance to win one of five Takealot vouchers (each worth R 2000), during a lucky draw. After the termination of the online survey, participants were informed of the lucky draw results.

Respondents

The final sample included 814 South African respondents ($n_{females}$ = 531; n_{males} = 278; $n_{transgender/other}$ = 5) and participants were between 18 and 30 years of age (*M* = 21.39 years, *SD* = 2.84 years). As such, responses were skewed toward females and individuals younger than 25. Although a considerable number of participants initially submitted responses (*N* = 3648), the majority were excluded from the final data set (*n* = 2834). Five hundred and sixty (*n* = 560) participants' data were excluded since they were not between the ages of 18 and 30 years. A further 434 of respondents' data were not included because they were not South African citizens. In order to ensure optimal results and the validity of research conclusions, it was decided to exclude participants who failed to complete *all* the relevant scales of the survey (*n* = 1840).

Data Collection Tools

The relevant sections of the online survey (see Appendix D) consisted of a demographic questionnaire, two instruments on internet use, measurements on various psychiatric disorders, and an instrument on family functioning:

Demographic Questionnaire

The demographic questionnaire inquired about age and grouping variables such as gender, relationship status, sexual orientation, completed level of education, and occupational status. The

purpose of the demographic questionnaire was to establish a more comprehensive demographic profile of our sample with PUI and to deduce possible demographic risk factors in our sample.

Internet Use Instruments

The JEG Internet Addiction Test (IAT) 10-item Instrument. The JEG-IAT 10-item screening instrument is an adapted version of the internet addiction test (IAT; Young, 1998). The JEG-IAT 10-item instrument has been validated as a unidimensional measure within the South African context (Tiego et al., 2019). In order to screen for PUI, participants were presented ten items on PUI-related symptoms: "Do you prefer the excitement of the internet to intimacy with your partner?" (Item one); "Do others in your life complain to you about the amount of time you spend online?" (Item two); "Do you become defensive or secretive when anyone asks you what you do online?" (Item three); "Do you block out disturbing thoughts about your life with soothing thoughts of the internet?" (Item four); "Do you fear that life without the internet would be boring, empty, and joyless?" (Item five); "Do you snap, yell, or act annoyed if someone bothers you while you are on-line?" (Item six); "Do you lose sleep due to late-night logins?" (Item seven); "Do you feel preoccupied with the internet when offline, or fantasize about being on-line?" (Item eight); "Do you try to hide how long you've been on-line?" (Item nine); and "Do you feel depressed, moody, or nervous when you are offline, which goes away once you are back on-line?" (Item ten). A 5-point Likert type scale that ranged from 1=*rarely* to 5=*always*, was used to determine the frequency of these symptoms. Responses were summed, and, as scores on the JEG-IAT increased, PUI severity increased. A cut-off score of 24 was used. Individuals who scored 24 and below ($\leq$ 24) indicated individuals without PUI while individuals who scored above 24 ($>$ 24) indicated individuals with PUI.

Although the cut-off scores of the JEG-IAT 10-item instrument were arbitrary, it was based on preliminary empirical research conducted by Dr Jeggan Tiego (a post-doctoral research fellow at the Turner Institute for Brain and Mental Health at Monash University [Australia] and principal researcher in the parent study). Since distress and impairment in functioning are important criteria for the classification of clinical disorders, Dr Tiego decided to use a quality of life (QoL) scale to determine preliminary cut-off scores to differentiate between a PUI-group (marked by clinically significant lower overall self-perceived life-satisfaction) and a non-PUI group (marked by clinically significant higher overall self-perceived life-satisfaction). In particular, Dr Tiego implemented the Brunnsviken brief quality of life scale (BBQLS; Lindner et al., 2016). The parent-study's JEG-IAT 10-item sample data (N = 3648) was divided into two groups – those with an IAT total score <=24, and those with an IAT total score >24 (the 75% percentile was used to determine cut-off scores). These two groups were compared on the BBQLS, and results showed that there was a significant difference (medium effect size: d = .51), with the former (non-PUI group: <= 24) having much better QoL scores than the latter (PUI group: > 24). Note that quartile cut-offs were used, instead of means or standard deviation, since the sample data of the parent study (N= 3648) was not normally distributed.

The Internet Severity and Activities Addiction Questionnaire (ISAAQ). Section B of the ISAAQ, the internet activities scale (IAS), is a 10-item instrument that was used to assess the amount of time spent on content-specific online activities during the six months preceding the completion of the survey. These online activities were: general surfing, internet gaming, skills games and time wasters, online shopping, online gambling, social networking, health and medicine, pornography, streaming media, and cyberbullying. The time spent on the online activities were rated on a 6-point scale which ranged from 0=*not at all* to 5=*all the time*. For

example, if a participant indicated "5" on the question on general surfing, it indicated that the person spent "all their time" on general surfing over the last six months. The IAS measurement is currently undergoing rigorous validation research within the SA context.

Psychiatric Disorder Assessments

The SCOFF. The SCOFF is a validated self-report questionnaire used to screen for eating disorders (Hill et al., 2010). Respondents were asked to answer *Yes* or *No* to five questions; namely: "Do you make yourself sick because you feel uncomfortably full?"; "Do you worry you have lost control over how much you eat?"; "Have you recently lost more than approximately fifteen pounds in a 3-month period?"; "Do you believe yourself to be fat when others say you are too thin?"; and "Would you say that food dominates your life?". Answers were coded as follows: 0= *No* and 1=*Yes*. A score of 2 or above showed individuals with an eating disorder.

The MINI International Neuropsychiatric Interview (MINI). The MINI is a short, structured, diagnostic interview employed to investigate various psychiatric disorders in a clinical setting (Lecrubier et al., 1997). For the purpose of this thesis, the MINI was tailored to be implemented as a self-administered questionnaire (Sheehan et al., 1998) and used to investigate obsessive-compulsive disorder (OCD) and substance use disorder (SUD), respectively. Participants were required to answer four questions on OCD symptoms; e.g., "In the past month, have you been bothered by recurrent thoughts, impulses, or images that were unwanted, distasteful, inappropriate, intrusive, or distressing?" and "In the past month, did you feel driven to do something repeatedly in response to an obsession or in response to a rigid rule, like washing or cleaning excessively, counting or checking things over and over, or repeating or arranging things or other superstitious rituals?". Only one question on the MINI enquired about substance abuse, namely: "In the past 12 months, did you take any drugs (non-alcohol) more than once, to get high,

to feel elated, to get 'a buzz' or to change your mood?". A dichotomous, pre-coded response scale was used to rate answers on the MINI; i.e.: 0=*No* and 1=*Yes*. Individuals who scored two or more on the OCD screener, showed symptoms of OCD (i.e., individuals with obsessive-compulsive disorder). Individuals who scored one for the question pertaining to drug use, showed symptoms of SUD (i.e., individuals with substance use disorder).

The Obsessive-compulsive Personality Disorder (OCPD) Screener. The OCPD Screener (as adapted from DSM-5 criteria; Chamberlain et al., 2017) consisted of eight questions on obsessive-compulsive personality disorder (OCPD). Participants were asked questions such as: "Do you have trouble finishing jobs because you spend so much time trying to get things exactly right?"; "Do you have trouble throwing things out because they might come in handy someday?"; and "Are you often so sure you are right that it doesn't matter what other people say?". Responses were evaluated as follows: 0=*absent or clinically insignificant*; 1=*present but of uncertain clinical significance*; and 2=*present and clinically significant.* The endorsement of four or more items rated as "2" were necessary to confirm the presence of OCPD (i.e., individuals with obsessive-compulsive personality disorder).

The Autism Spectrum Quotient (AQ-10). The AQ-10 (Allison et al., 2012) is a ten-item instrument that was used to screen for autism spectrum disorder (ASD). Some of the items included: "I often notice small sounds when others do not"; "When I'm reading a story, I find it difficult to work out the characters' intentions" and "I find it difficult to work out people's intentions". Each item had four possible responses; namely: *definitely agree*, *slightly agree*, *slightly disagree*, and *definitely disagree*. Respondents were prompted to provide one response per item. *Definitely agree* and *slightly agree* were collapsed into *agree* (coded as 0), while *slightly disagree* and *definitely disagree* were collapsed into *disagree* (coded as 1). Items 2, 3, 4, 5, 6, and

9 were reverse scored to represent the typical symptoms of ASD. Each ASD-symptom was then scored one point; a score of 6 or more indicated the presence of ASD (i.e., individuals with autism spectrum disorder).

The World Health Organization Adult ADHD Self-report Scale (ASRS). The short version ASRS, as adopted from Kessler et al. (2005), consisted of six questions pertaining to adult attention deficit/hyperactivity disorder (ADHD). Respondents were asked to answer questions such as: "How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?" and "When you have a task that requires a lot of thought, how often do you avoid or delay getting started?". Response options were scaled in terms of symptom frequency (0=*never* to 4=*very often*) experienced in the 6 months preceding the completion of the survey. The summed responses across the six items yielded a score ranging between 0 and 24. Individuals who scored a total of 14 or more screened positive for ADHD (i.e., individuals with attention deficit/hyperactivity disorder [ADHD]).

The Fast Alcohol Screening Test (FAST). The FAST (Hodgson et al., 2002) is a brief four-item questionnaire which was used to screen for the presence of alcohol use disorder (AUD) as experienced in the 12 months preceding the completion of the survey. Questions one to three were scaled as follows: 0 (*Never)*, 1 *(Less than monthly)*, 2 *(Monthly)*, 3 *(Weekly)*, to 4 *(Daily or almost daily).* Respondents who answered *weekly* and *daily or almost daily* at question one, were identified as harmful and hazardous drinkers, and were not obliged to complete the rest of the questions on alcohol use. If the response to question one was *never*, *less than monthly* or *monthly*, questions two ("How often during the last year have you failed to do what was normally expected from you because of your drinking?"); three ("How often during the last year have you been unable to remember what happened the night before because you had been drinking?"); and four ("Has a

relative or friend, doctor or other health worker been concerned about your drinking or suggested that you cut down?") were considered. Question four was rated as follows: 0=*no*; 2= *yes, but not in the last year*; 4=*yes, during the last year*. Scores were summed and ranged from 0 to 16. A score of 3 or more indicated the presence of hazardous drinking (i.e., individuals with alcohol use disorder [AUD]).

Family Functioning Instrument

The General Functioning Scale of the Family Assessment Device. The general functioning scale of the family assessment device (GF-FAD) is a 12-item subscale of the McMaster family assessment device (McMaster Model; Epstein et al., 1978; Epstein et al., 1983) and has been validated as a single index for measuring self-reported general family functioning (Boterhoven de Haan et al., 2015) in terms unhealthy and healthy functioning. The introduction of the instrument to participants in this study was preceded by the sentence: "When completing the following items on your family relationships, think of your current closest family members (i.e., nuclear or extended) with whom you have the most frequent interactions". This particular introductory sentence was presented in order to deter participants from reporting on interactional patterns with distant relatives with whom they have less frequent interpersonal contact. This sentence also allowed for individuals to report on close relationships with individuals who are not necessarily nuclear family, for example, extended family members (such as grandparents). Items were rated on a four-point scale which ranged from 1=*strongly agree* to 4=*strongly disagree*. Six of the items were positively worded (such as: "In times of crisis we can turn to each other for support"; "Individuals are accepted for what they are"; and "We can express feelings to each other"); while the remaining questions were negatively worded (such as: "There are lots of bad feelings in our family"; "Making decisions is a problem for our family"; and "We don't get along

well together"). The negative worded items were reverse scored. All responses were summed and then divided by 12 (the total amount of GF-FAD items), to provide a mean score ranging between 1 and 4. A score at and above two (≥ 2) indicated unhealthy family functioning, while a score below two (< 2) indicated healthy family functioning. In other words, as scores on the GF-FAD increased, family functioning became unhealthier.

Data Analysis

SPSS version 27 was used to analyse the data quantitatively. Data Cleaning was conducted to identify missing and inaccurate data. Variables were coded or re-coded into different variables and totals calculated. Assumptions such as variable level, homogeneity of variance, linearity, multicollinearity, outliers, and skewness/kurtosis were analysed using both parametric and non-parametric tests.

In order to address objective one, descriptive statistics such as means, standard deviations, ranges, frequencies, and percentages were used to analyse the various demographic variables. Multiple independent Kruskal-Wallis H tests were conducted to determine whether there were significant differences between the respective demographic variables and severity of PUI.

In relation to objective two, inferential statistics such as Pearson's correlation coefficient (r) was used to determine whether there was a correlation between severity of PUI and severity of unhealthy family functioning. The coefficient of determination (R^2) was used to determine the proportion of variation in the dependent variable (i.e., family functioning) that could be predicted from the independent variable (i.e., PUI). Spearman's rho was used to determine whether frequency of PUI-related symptoms correlated with severity of unhealthy family functioning. Effect sizes ($\eta 2$) were determined to establish the strength of relationships between frequency of each PUI symptom and severity of unhealthy family functioning. An independent samples t-test

was conducted to compare the family functioning of individuals with PUI and without PUI. Cohen's d was then used to indicate the standardised difference between the two means of the two levels of family functioning (healthy and unhealthy).

In order to examine objective three, Pearson's (r) was implemented to determine whether significant correlations existed between time spent on the online activities and severity of unhealthy family functioning. The coefficient of determination (R^2) was used to determine the proportion of variation in the dependent variable (i.e., family functioning) that could be predicted from the independent variables (i.e., the online activities). During the investigation of the fourth objective, Levene's tests were used to check the assumption of equal variances. Next, multiple two-way between-subject analysis of variance (ANOVAs) were implemented to determine whether the interaction effect of PUI and comorbid psychiatric disorders (i.e., eating disorders [ED], obsessive-compulsive disorder [OCD], substance use disorder [SUD], personality disorders [PD], autism spectrum disorder [ASD], attention-deficit/hyperactivity disorder [ADHD], and alcohol use disorder [AUD]), had a significant influence on family functioning. With regards to each comorbid psychiatric disorder, participants were divided into four distinct groups according to level of PUI (with/without) and level of comorbid disorder (with/without).

CHAPTER FIVE

Results

A cut-off score of 24 on the JEG-IAT 10-item instrument, showed that 126 respondents screened positive for PUI (i.e., participants with PUI) and 688 respondents screened negative for PUI (i.e., participants without PUI). As such, a PUI prevalence of 15% was found (i.e., one in six participants in the study was affected by PUI at time of survey completion).

Demographics

PUI scores on the JEG-IAT 10-item instrument ranged between a minimum of 18 and a maximum of 48 (M = 18.18; SD = 6.48). High PUI prevalence rates were found among both males (6.3%) and females (9.2%), single (12.4%)-, heterosexual (10.8%)-, and student (14.9%)-participants. Notable prevalence rates were also found among individuals with *some* college/university experience and high school graduates (see Table 4a and 4b for complete list of prevalence percentages).

Table 4a

PUI Prevalence Percentages Among the Following Demographic Grouping Variables: Gender, Relationship Status, and Sexual Orientation

Demographic Variables									
Male	Female	Single	Married/ domestic partner	Engaged/ comitted dating relationship	Hetero-sexual	Gay/ lesbian	Bisexual	Asexual	Unsure
6,3%	9,2%	12,4%	0,1%	2,9%	10,8%	0,9%	1,2%	1,1%	1,5%

Note:
Variables with no data from participants and 0% prevalence rates were excluded from the table.

Table 4b

PUI Prevalence Percentages Among the Following Demographic Grouping Variables: Completed Level of Education and Occupational Status

Demographic Variables						
High school graduate (completed grade 12)	Some college/ university	College/ university graduate	Professional	Student	Artist/ musician/ writer	Other
6,3%	6,1%	3,1%	0,1%	14,9%	0,1%	0,4%

Note:
Variables with no data from participants and 0% prevalence rates were excluded from the table.

The Kruskal-Wallis H test showed that there was a statistically significant difference in PUI severity scores between the different relationship status variables, $H(3) = 17.83$, $p < .01$, with a mean rank PUI severity score of 17 for single individuals, 15 for individuals who were engaged/in a committed dating relationship, and 13 for married/domestic partner participants. Furthermore, there was a statistically significant difference in PUI severity scores between the different levels of education, $H(2) = 11.61$, $p < .01$, with a mean rank PUI severity score of 17 for individuals with *some* college/university, 17 for high school graduates and 15 for college/university graduates. There was also a statistically significant difference between the severity of PUI and occupational status, $H(6) = 26.83$, $p < .01$, with a mean rank of 17 for student occupation and 14 for professional occupation.

As such, single individuals scored higher on PUI severity than individuals who were engaged/in a committed dating relationship or participants who indicated that they were married/had a domestic partner. Individuals with either *some* college/university or who completed high school showed higher PUI severity scores than college/university graduates. PUI severity was also higher among students than individuals in a professional occupation.

Clinical Findings

Hypothesis One and Two: The Relationship Between PUI and Family Functioning

Hypothesis one was supported. Pearson's r indicated a significant, moderate correlation between PUI and family functioning (r = .33, p < .001). As scores on the JEG-IAT 10-item instrument increased, scores on the GF-FAD increased linearly. This positive relationship suggested that as PUI severity increased, family functioning became unhealthier. According to the coefficient of determination (R^2), 10.9% of variance in family functioning could be explained by PUI, indicating that PUI predicted unhealthy family functioning and that the correlation is a reliable model for future forecasts.

Hypothesis two was partially supported. The items on the JEG-IAT 10-item instrument represented the various PUI symptoms (for example, item one = symptom 1; item 2 = symptom 2…item 10 = symptom 10). Spearman's rho analysis showed that symptoms one, two, three, four, five, seven, eight, nine, and ten correlated significantly, but weakly, with family functioning (see Table 5 for Spearman's rho correlations). As the reported frequencies on these symptoms increased, family functioning became unhealthier.

Table 5

Spearman's Rho Correlations Between Frequency of PUI-related Symptoms (Represented as Items on the JEG-IAT 10-item Instrument) and Severity of Unheathly Family Functioning

		Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Unhealthy family functioning
Item 1	"Do you prefer excitement of the Internet to intimacy with your partner?"	-										
Item 2	"Do others in your life complain to you about the amount of time you spend online?	.16**	-									
Item 3	"Do you become defensive or secretive when anyone asks you what you do online?"	.16**	.26**	-								
Item 4	"Do you block out disturbing thoughts about your life with soothing thoughts of the Internet?"	.25**	.27**	.30**	-							
Item 5	"Do you fear that life without the Internet would be boring, empty, and joyless?"	.31**	.26**	.18**	.35**	-						
Item 6	"Do you snap, yell, or act annoyed if someone bothers you while you are on-line?"	.17**	.24**	.17**	.20**	.16**	-					
Item 7	"Do you lose sleep due to late-night logins?"	.23**	.30**	.25**	.30**	.27**	.25**	-				
Item 8	"Do you feel preoccupied with the Internet when offline, or fantasize about being on-line?"	.27**	.27**	.28**	.38**	.37**	.27**	.40**	-			
Item 9	"Do you try to hide how long you've been on-line?"	.10**	.26**	.34**	.26**	.13**	.19**	.29**	.33**	-		
Item 10	"Do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back on-line?"	.28**	.28**	.29**	.36**	.37**	.30**	.38**	.41**	.33**	-	
	Unhealthy family functioning	.19**	.10**	.24**	.25**	.25**	.04	.25**	.22**	.18**	.25**	-

** $p < .01$

Increased frequency in symptoms three ("Do you become defensive or secretive when anyone asks you what you do online?"), four ("Do you block out disturbing thoughts about your life with soothing thoughts of the internet?"), five ("Do you fear that life without the internet would be boring, empty, and joyless?"), seven ("Do you lose sleep due to late-night logins?"), and ten ("Do you feel depressed, moody, or nervous when you are offline, which goes away once you are back on-line?") explained more variance in unhealthy family functioning than increased frequency in any of the other PUI symptoms (see Table 6 for coefficients of determination [R^2]), suggesting that the increased frequency of these symptoms may especially be implicated in unhealthy family functioning.

Hypothesis Three: Comparing the Family Functioning of Individuals with PUI and Without PUI

Hypothesis three was supported. The results of the independent samples t-test indicated that there was a significant difference in the GF-FAD scores for individuals with PUI (M = 2.57, SD = .51) and those without PUI (M = 2.13, SD = .61); $t(812) = -7.52$, $p < 0.001$. These results suggested that individuals with PUI experienced unhealthier family functioning than individuals without PUI (a medium to large effect size was found: Cohen's d = -.73, 95% CI [-.92, -.54]).

Table 6

Coefficients of Determination (R^2) Depicting the Proportion of Variance in Unhealthy Family Functioning that can be Explained by the Variance in the Frequency of PUI-related Symptoms (Represented as Items on the JEG-IAT 10-item Instrument)

		R^2
Item 1	"Do you prefer excitement of the Internet to intimacy with your partner?"	.04
Item 2	"Do others in your life complain to you about the amount of time you spend online?	.01
Item 3	"Do you become defensive or secretive when anyone asks you what you do online?"	.06
Item 4	"Do you block out disturbing thoughts about your life with soothing thoughts of the Internet?"	.06
Item 5	"Do you fear that life without the Internet would be boring, empty, and joyless?"	.06
Item 7	"Do you lose sleep due to late-night logins?"	.06
Item 8	"Do you feel preoccupied with the Internet when offline, or fantasize about being on-line?"	.05
Item 9	"Do you try to hide how long you've been on-line?"	.03
Item 10	"Do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back on-line?"	.06

Hypothesis Four: The Relationship Between Time Spent on the Online Activities and Family Functioning

As depicted in Table 7, Pearson's r analyses showed significant but relatively weak correlations between family functioning and time spent on social networking (r = .11, p = .003), pornography (r = .20, p < .001), streaming media (r = .11, p = .003), and cyberbullying (r = .17, p < .001). Such positive correlations indicated that, as time spent on these various online activities increased, family functioning became unhealthier

Table 7

Pearson's r Correlations Between Time Spent on Online Activities and Severity of Unhealthy Family Functioning

	General surfing	Internet gaming	Skill games and time wasters	Online shopping	Online gambling	Social networking	Health and medicine	Pornography	Streaming media	Cyber-bullying	Unhealthy family functioning
General surfing	-										
Internet gaming	.15**	-									
Skill games and time wasters	.29**	.38**	-								
Online shopping	.24**	.06	.14**	-							
Online gambling	.10**	.16**	.13**	.16**	-						
Social networking	.29**	.04	.13**	.25**	.01	-					
Health and medicine	.13**	.02	.03	.20**	.15**	.22**	-				
Pornography	.22**	.21**	.18**	.04	.20**	.14**	0	-			
Streaming media	.30**	.09**	.17**	.18**	.03	.37**	.16**	.22**	-		
Cyberbullying	.07	.10**	.10**	.01	.16**	.04	.04	.26**	.05	-	
Unhealthy family functioning	.08*	.01	.06	.02	.06	.11**	.06	.20**	.11**	.17**	-

*$p < .05$, p ** $< .01$

According to the calculated effect sizes (see Table 8), increased time spent on pornography and cyberbullying correlated stronger with unhealthy family functioning than social networking and streaming media. As such, it is hypothesized that cyberbullying and pornography may be more problematic to family functioning than social networking and streaming media.

Table 8

Effect Sizes (R^2) of Relationship Strength Between Time Spent on Certain Online Activities and Severity of Unhealthy Family Functioning

Online activities	Effect size (R^2)	**Effect size in percentage form**	*M*	*SD*	Cl%
Social networking	.01	**1.2%**	3.44	1.33	3.35 - 3.53
Pornography	.04	**4%**	1.09	1.29	1.00 - 1.18
Streaming media	.01	**1.2%**	3.43	1.34	3.34 - 3.53
Cyberbullying	.03	**2.9%**	.11	.48	.08 - .15

Hypothesis Five: The Interaction Effect of PUI and Various Comorbid Psychiatric Disorders on Family Functioning

Hypothesis five was not supported. In each comorbidity instance, the Levene's test for homogeneity of variance of the independent variable (family functioning) was not statistically significant ($p > .05$), indicating equal variances across samples. No statistically significant interaction effects were found between any of the comorbid psychiatric disorders and PUI on family functioning.

CHAPTER SIX

Discussion

In this chapter, the main findings are discussed in relation to existing literature and family systems theory (Guy-Evans, 2020; Pardeck, 1989; Spencer, 2007; Wood & Talmon, 1983). Firstly, prevalence and demographic findings are discussed, and next, clinical findings are considered.

Prevalence and Demographics

The high PUI prevalence (15%) among our sample in the present study indicates that PUI may be a serious health concern among SA youth, warranting clinical attention. The prevalence rate found here is consistent with those of Asian countries such as China (Ni et al., 2009), the Philippines (Mak et al., 2014), and South Korea (Park et al., 2009) where PUI is a common phenomenon among young people. Since the thesis data was gathered from July to November 2020 (during the COVID-19 outbreak), the increased reliance on and use of technological devices (including the internet) may have had a pronounced impact on reported prevalence rates. Furthermore, being single, having completed high school (grade 12), having *some* college/university education, and currently being a university/college student were identified as potentially significant risk factors for PUI among our sample. The above-mentioned potential risk factors found in the present study are consistent with existing research findings on potential PUI risk factors among Asian youth.

Clinical Findings

PUI, Time Spent on Various Online Activities, and Family Functioning

The investigation rendered findings that were partly or fully consistent with most (4 out of the 5) study hypotheses, namely: 1) The findings suggested a significant correlation between PUI and family functioning. As PUI severity increased, the severity of unhealthy family functioning increased linearly. 2) The frequency of all but one of the PUI symptoms (i.e., symptom six: “Do

you snap, yell, or act annoyed if someone bothers you while you are on-line?") correlated significantly with severity of unhealthy family functioning. The following PUI symptoms correlated stronger with severity of unhealthy family functioning than the other symptoms: defensiveness and secretiveness about internet use (symptom 3), soothing thoughts on internet use to relieve negative moods (symptom 4), feelings of emptiness without the internet (symptom 5), losing sleep due to late-night logins (symptom 7), and withdrawal symptoms (feeling depressed, moody, or nervous when offline, which dissipates when one goes back on-line [i.e., symptom 10]). These symptoms, often characteristic of addiction (American Psychiatric Association, 2013; Ko et al., 2015; Rosenthal et al., 2018), manifest as maladaptive cognitions and behaviours (Jorgenson et al., 2016). It is argued that increased frequency of these symptoms may, in particular, contribute to increased tensions among family members (Wu et al., 2016) and, in turn, unhealthy boundaries. 3) There was also a significant difference in the level of family functioning between individuals with PUI and those without PUI. The family functioning of individuals with PUI was shown to be unhealthier than that of individuals without PUI. 4) Significant correlations were found between time spent on some of the online activities (i.e., streaming media, online pornography, social networking, and cyberbullying) and severity of unhealthy family functioning. As time spent on these particular online activities increased, the severity of unhealthy family functioning increased. Results related to time spent on these online activities are of particular interest since they may be unique to the South African context. Most research, especially in Asia, focuses on the relationship between *online gaming* and family functioning (Bonnaire & Phan, 2017; Choo et al., 2015; Da Charlie et al., 2011), and continually shows an adverse relationship between increased time spent on online gaming and healthy family functioning (Bonnaire & Phan, 2017; Da Charlie et al., 2011). Nevertheless, the present study indicated that time spent on online gaming did not correlate with

family functioning in our respondents. Such a discrepancy may be due to online gaming being less popular among SA youth compared to Asian youth, as of yet. In accord with existing literature on statistics on South African online trends, it seems likely that SA youth prefer spending time on other online activities such as social networking, pornography, streaming media, and cyberbullying.

In considering the above-mentioned findings, it is argued that PUI, and, in particular, all but one of the PUI symptoms on the JEG-IAT (see table 7 for significant correlations), as well as increased time spent on social networking, online pornography, streaming media, and cyberbullying, may penetrate family system boundaries of South African families. Boundary penetration refers to the disruption of family interactional and relational patterns associated with, for example, family time, communication, family values and norms, and hierarchy (Kerig & Swanson, 2010; Lindahl et al., 2012).

According to the time-displacement hypothesis posed by earlier researchers (e.g., Lee & Kuo, 2002; Nie et al., 2008; Subrahmanyam et al., 2001), excessive time spent on the internet may result in less time spent together as a family unit (Nie et al., 2008; Subrahmanyam et al., 2001). When less time is spent together, interaction among family members decrease, resulting in changes in patterns of family functioning. Family cohesion may deteriorate and detached boundaries may develop (Nie et al., 2008; Williams & Merten, 2011). For example, excessive time spent on social networking may interfere with face-to-face interactions between family members. If an individual constantly interacts with peers online, they may fail to learn essential non-verbal communication skills (Kumar & Geethakumari, 2014; Mallen et al., 2003; Okdie et al., 2011). Identifying tone of voice and deciphering body language are important in understanding the content and context of a message (Kumar & Geethakumari, 2014; Okdie et al., 2011; Szwedo et al., 2012). Research argues

that the inability to "pick up" on certain communication cues (Mallen et al., 2003, p. 155) and the inability to figuratively "read the room" (Okdie et al., 2011, p. 157) may cause miscommunication and false impressions among family members (Kumar & Geethakumari, 2014).

Moreover, engagement with potentially harmful online content (i.e., any online material that may cause subjective distress and harm to healthy development; Kvardova et al., 2021; Scheuerman et al., 2021) in the form of cyberbullying (e.g., being exposed to online insults, nasty texts/emails, unpleasant media, pranks) and online pornography (i.e., cybersex, cyber-texting, viewing pornography and other online sexual activities), may interfere with established family values and norms (Elsaesser et al., 2017; Wright, 2017). As the frequency of exposure to harmful content increases, individuals become more susceptible to the internalization and personification of potentially immoral values which are likely incongruent with the established values of the family (Buelga et al., 2015; Mladenovic et al., 2021; Rivera et al., 2016). According to the principles of FST, if the parental subsystem expresses disapproval, the child subsystem may retaliate, resulting in parent-child conflict (Buelga et al., 2015; Mladenovic et al., 2021). In this way, such aberrant use of the internet may also impede on family hierarchy and structure (Faltýnková et al., 2020; Tomczyk et al., 2020) and result in power struggles among family members (Mesch, 2006a; Watt & White, 1999), especially among the parent-child subsystem. Since the child subsystem is frequently considered to be more technologically advanced than the parental subsystem (Mesch, 2006a; Watt & White, 1999), and seeing that children frequently spend much time on streaming media and social networking (D'Mello & Monteiro, 2019), it is presumed that children retain a bigger share in average data/Wi-Fi consumption than the parental subsystem. Excessive amounts of time spent on especially streaming media may result in high rates of data consumption. A shift in the hierarchical structure of the family may be brought about,

since children often rise in status when they are considered more technologically advanced than their parents (Mesch, 2006a; Watt & White, 1999). A shift in authority can leave children's internet behaviour unsupervised (facilitating the development and maintenance of PUI) and lead to role confusion (e.g., who holds more power?) within the family environment (Mesch, 2006a; Watt & White, 1999). Sequentially, when parents realize that they are losing a grip on their power status, they may try to regain control of the family, resulting in increased parent-child tensions. Conflict between family members may especially arise when a considerable amount of time spent on streaming media drains household funds and contributes to a decreased average internet connection speed.

In summary, PUI may result in less time spent together and poorer communication, which may ultimately lead to emotional and/or physical disconnect and decreased cohesion between family members. Such *disconnect* and decreased family cohesion may give rise to more detached boundaries. Furthermore, online activities that challenge family values, norms, and hierarchy may facilitate power struggles among family members and result in increased emotional reactivity (the experience of intense and heightened emotions; Shapero et al., 2019) in the form of conflict and tension. Such emotional reactivity is characteristic of enmeshed boundaries.

As noted in the section on the discussion of the FST framework, when boundaries tend to gravitate to the unhealthier ends of the boundary spectrum (i.e., enmeshed and detached), families often attempt to regain homeostasis through the process of *morphogenesis.* In order to adapt to the challenges related to PUI, various positive feedback loops (i.e., patterns of interaction and communication that emerge as a result of the need for change; Schmaling & Jacobson, 1990) are activated to achieve homeostasis, and return to a healthier state of functioning. Numerous adaptive strategies (in this context referred to as equifinality) can be implemented to activate positive

feedback loops to manage PUI and unhealthy family functioning. For example, the family may emphasise support and trust as fundamental norms in the family to reinstate family cohesiveness (Winefield et al., 2015) and deal with detached boundaries. Additionally, novel family rules, such as limited screen-time (Lauricella et al., 2015; Ramirez et al., 2011), may be communicated and implemented within the family unit in an attempt to ameliorate excessive internet use. Children may be expected to adhere to certain time limits when online. Parents may also set a positive example by immediately disconnecting from digital devices after they arrive home from work (Flint-Bretler et al., 2013). Such rules may increase time spent together, face-to-face interactions (Ko et al., 2015), and communication between family members (Duriez, 2021), as well as contribute to a better work-life balance (Neto et al., 2018), and ultimately address more detached boundaries. In a dual-career family, members may decide to restructure in such a manner to allow one parent to leave their career and engender the role of stay-at-home-parent to ensure better supervision of internet use. The family may also seek professional assistance from a trained family therapist, who will guide and inform the above-mentioned strategies (Duriez, 2021). Nevertheless, if the family does not have adaptive strategies in place but rather make use of maladaptive coping mechanisms (such as denial and behavioural disengagement, hostility, withdrawal, retaliation, or confrontation; Gervais & Jose, 2020) or assume an authoritarian parenting style (Mesch, 2003, 2006a), they may fail to activate functional positive feedback loops (that facilitate growth and change) and a new state of homeostasis may not be attained. Unhealthy functioning may escalate and endure in the form of conflict, poor communication and low levels of cohesion (Mesch, 2003, 2006a).

It is suggested that a bi-directional relationship exists between PUI and family functioning (Ko et al., 2015). PUI may result in unhealthy family functioning and, in turn, unhealthy family

interactional patterns may result in feelings of frustration (Ko et al., 2008), loneliness (Kawa & Shafi, 2015; Matthews et al., 2016), and anxiety (Malinga, 2016) among family members. Since the internet is able to activate *flow state* (Chen, 2006), it may potentially serve as form of escapism (Chang et al., 2018) from such feelings of frustration and anxiety (Geyer et al., 2017; Ohno, 2016). Increasingly relying on the internet to avoid negative feelings about the self or one's environment may facilitate the develop of PUI (Ko et al., 2015; Ohno, 2016), resulting in a vicious cycle of reinforcement.

The Interaction Effect of PUI and Comorbid Psychiatric Disorders on Family Functioning

The study findings did not support hypothesis five of a significant interaction effect between the level of PUI and the level of comorbid disorders on severity of unhealthy family functioning. Our results showed that none of the comorbid psychiatric disorders investigated here had a moderating effect on the relationship between PUI and family functioning. This stands in contrast to earlier studies that suggested that the relationship between family functioning and PUI in young adults may be mediated or moderated by comorbid symptoms (Marzilli et al., 2020). When PUI is presented as the primary concern during the course of family therapy, the clinician is advised to specifically focus on PUI since it presents as a significant contributor to unhealthy family functioning, but also to be cognisant of the potential influence of comorbidities. More work is warranted on the interaction effect between PUI and comorbidities. Existing studies on such interaction effects usually place a narrow focus on psychiatric traits such as loneliness or self-esteem (Shi et al., 2017), not considering diagnosable psychiatric disorders such as eating disorders or obsessive-compulsive disorder.

Strengths and Limitations

This is the first study investigating the rates of PUI and the relationship between PUI and family functioning among a large cohort of young South Africans. The survey that was used included scales with established and sound psychometric qualities to assess the nature and extent of internet use and family functioning. Locally, services that specialize in behavioural addictions, and PUI in particular, and specifically within the family unit, are scarce. Our findings may be useful in directing novel family-based treatment approaches and aid in the regulation of protective internet use policies (in particular pertaining to social networking, online pornography, streaming media, and cyberbullying). Furthermore, this study may increase awareness among parents about the potential negative consequences of PUI on the family and contribute to a better understanding of the benefits of cultivating a healthy family environment to prevent PUI development. Study limitations are methodological in nature and concern research design, data collection tools, measurements, and sampling.

Of note is the cross-sectional nature of the study, which makes it difficult to determine causation (Curtis et al., 2016; Field, 2013; Lau, 2017). The implementation of a self-administered questionnaire may have introduced social desirability (Chung & Monroe, 2003) and neutral responding (Randall & Fernandes, 1991). Since some of the questions were of a sensitive, personal nature, respondents may have under-reported on undesirable behaviours or overreported on desirable behaviours. Since the survey was time-consuming and lengthy (50-60 minutes in duration), fatigue may have transpired and resulted in either the overreporting of neutral answers or non-response bias (Field, 2013). Furthermore, the survey was exclusively available in English. Individuals who were not able to understand or write in English were therefore excluded for the study. This may prove problematic when considering that most people in SA either speak IsiZulu

or isiXhosa as a first language (These Are the Most Spoken Languages in South Africa, 2015, 2019; Wambugu, 2021). On the other hand, all South African pupils learn English at school. Moreover, it is assumed that people who use the internet are generally proficient in English (Johnson, 2021).

The GF-FAD is yet to be validated within the SA context. Nevertheless, it is a well-known instrument that is frequently used to assess perceived overall family functioning among individuals in countries such as China (Zhang et al., 2013), Portugal (Almeida et al., 2020), Malaysia (Wo et al., 2018), North America (Keitner et al., 1990), and Lebanon (Kazarian, 2015). A pertinent issue concerning the JEG-IAT 10-item instrument is the fact that arbitrary cut-off scores were used to distinguish between individuals with PUI and without PUI. Such arbitrary cut-off scores may have resulted in the overestimation or underestimation of PUI prevalence among the sample. Nevertheless, it is worth noting that these particular cut-off scores were based on rigorous, empirical testing (Ioannidis et al., 2018).

The MINI (Sheehan et al., 1998), which was used to screen for OCD and SUD, is a brief structured interview which is usually conducted by a clinician. However, in the present study, the MINI was implemented as a screening tool. As such, the unconventional administration of the MINI and arbitrary cut-off scores may have incited underreporting or overreporting of signs or symptoms.

The non-probability data sampling methods used in the thesis may have resulted in sampling bias (Field, 2013). This especially holds true when considering the skewed response numbers toward the female gender and student occupation. Additionally, it is argued that individuals who already had a tendency to PUI during the time of survey completion, may have been more readily inclined to answer the survey.

Recommendations

With these limitations in mind, the use of a longitudinal research design (to determine cause and effect), and probability sampling may be beneficial going forward. Future research could also include in-depth clinical interviews to establish the accurate diagnosis of PUI among participants. Survey-based research is however worthwhile, especially during the COVID-19 era where face-to-face contact was restricted in 2020. In such circumstances, adjustments, including imparting the survey in more than one representative SA language, limiting the length of the survey, and using measurements with established psychometric properties (specifically pertaining to validated cut-off scores and cross-cultural validity) are recommended. Obtaining information from various sources, for example, both parents and children, may result in triangulation of findings (Honorene, 2017). Furthermore, it would be interesting to ascertain how family functioning differs in terms of the presence of PUI in different age-cohorts (early childhood, middle childhood, adolescence and young adults), since the rapid technological changes introduced in the 4th Industrial Revolution (Schwab, 2017), and especially the impact of COVID-19, has necessitated the absorption of the internet at much earlier stages of the life cycle (Li et al., 2021; Sun et al., 2020). It is recommended that prospective studies specifically investigate PUI among SA individuals younger than 18. From a family focused research perspective, the investigation of PUI among children below the age of 18 may produce particularly insightful results on the dynamic of PUI and the family, since increased opportunity for interaction with family members are predicted among such individuals. It is also argued that in-depth research is necessary for a better understanding of the underlying mechanisms of PUI and comorbidities and their effect on the family environment.

In terms of future implementation of theoretical frameworks, the use of Douglas' internet addiction model (IAM; Douglas et al., 2008) and the socio-technological family model (Lanigan,

2009) are recommended. These novel frameworks are proposed as holistic approaches in understanding the complex interactions between different features of the internet, developmental factors, contextual factors (in particular the family environment), and individual factors. Nevertheless, these theoretical frameworks are still in their infancy and require more validity testing, and, as such, were not considered in this thesis.

Conclusions

Research continually indicates a complex, interdependent relationship between the internet and family functioning. The relationship between excessive and maladaptive internet use, termed problematic use of the internet (PUI), and unhealthy family functioning is of particular concern, especially among youth. Since no studies have investigated the link between PUI and family functioning among South Africans, the present study aimed to do so, addressing an important knowledge gap. In summary, the first objective of the study was to determine the demographic profile of our sample of South African participants between the ages of 18 and 30 years with PUI (including PUI prevalence among this age-cohort). The second objective was to investigate whether there is a relationship between PUI and family functioning. The third objective was to explore whether there is a relationship between time spent on various online activities (e.g., online gaming, online gambling, and online pornography) and family functioning. Since high rates of comorbidity are consistently found in individuals with PUI, the fourth objective was to determine whether there is an interaction effect between PUI and comorbid psychiatric disorders (e.g., obsessive-compulsive disorder, autism spectrum disorder, and attention deficit/hyperactivity disorder) on family functioning.

A quantitative, correlational research design was implemented, and data collected via an online self-administered survey. Non-probability sampling yielded a final sample of 814

respondents. The present study findings seem to suggest that PUI is common in the youth of South Africa, and constitutes a serious health concern. Possible demographical risk factors were identified and are generally consistent with global research findings, especially research conducted in Asia, a country with high rates of PUI. Results pertaining to the significant relationship between PUI and family functioning are of clinical relevance. The increased frequency of particular PUI-related symptoms is considered especially valuable in potentially predicting unhealthy family functioning in the future. Unique to the present study are results on the significant association between increased time spent on social networking, pornography, streaming media, and cyberbullying and increased severity of unhealthy family functioning. In particular, it is argued that PUI and time spent on the above-mentioned online activities may penetrate family boundaries of South African families. Boundary penetration may disrupt family systems' healthy interactional and relational patterns resulting in disequilibrium when boundaries become too detached or enmeshed (i.e., unhealthy boundaries). Usually, families will try to adapt and regain a sense of homeostasis (that sees boundaries return to a "normal"/functioning/healthy state) through the process of morphogenesis. Morphogenesis is attained through the activation of positive feedback loops (which are patterns of interaction and communication that emerge as a result of the need for change). Numerous adaptive strategies (in this context referred to as equifinality) can be implemented to activate positive feedback loops to manage PUI and unhealthy family functioning. For example, parents can implement new rules (such as screentime) and increase family cohesion through increased quantity of time spent together (in case of detached boundaries). Nevertheless, if the family does not have adaptive strategies in place but rather make use of maladaptive coping mechanisms (such as denial and behavioural disengagement), they may fail to activate functional positive feedback loops and a new state of homeostasis may not be attained. Unhealthy functioning

may escalate and endure in the form of conflict, poor communication, and low levels of cohesion. In accord with the FST's tenet of bi-directionality it is theorized that, in turn, unhealthy family functioning may reinforce PUI when individuals excessively use the internet to cope with an unhealthy family environment. Since none of the comorbid psychiatric disorders had a moderating effect on the relationship between PUI and family functioning, it is argued that PUI may influence family functioning negatively, regardless of the presence or absence of comorbidity. Nevertheless, clinicians are advised to remain cognisant of the potential influence of comorbidities even if PUI is the primary concern.

The FST framework proved useful in elucidating the complexities between PUI and family functioning. The present study findings contribute to a better understanding of the extent and nature of the relationship between PUI and family functioning among youth in South Africa. The relationship between increased severity of PUI and increased severity of unhealthy family functioning demand sustained attention and effort from role-players such as parents, schools, clinicians and policymakers alike, to mitigate its negative impact and to promote optimal development of youth. The current findings, within this framework, also send a strong message to people of all ages about the potential harmful association between excessive time spent on seemingly innocuous time-fillers (e.g., streaming media, and social networking) and unhealthy family functioning.

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Appendices

Appendix A

CONSENT FORM

Use of the Internet and Related Behaviours: A Comprehensive Enquiry

We are interested in establishing how internet use relates to mental health and well-being.

We would appreciate your thoughtful and honest responses.
All the information you provide will be kept confidential.

While there are positive aspects to the internet, some people find they use it too much, which can have negative effects on their lives. The aim of this study is to explore positives but also potential downsides to using the internet. Problematic use of the internet (when using it too much, or PUI) is a global public health concern and has drawn the attention of many international bodies including the World Health Organization (WHO). Important knowledge gaps remain and we are undertaking this research to find out more. We will also be asking you questions about your mental health to learn more about your stress levels, mood, and current and past experiences that may be linked to your use of the internet. By doing so we aim to facilitate the understanding of PUI by improving its measurement, knowledge of its demographic and clinical correlates and uncovering its causes.

You are invited to take part in this cutting-edge project which aims to investigate internet use and how it relates to mental health and well-being in people aged 18-65 years.

The project is divided into 2 stages.

Stage 1: Following informed consent, you will complete an online survey and play three games. On completion, you will have the option to be entered into a lucky prize draw.

Stage 2: Of those who complete the survey (residing in the Western Cape of South Africa), 300 individuals will be invited to take part in Stage 2 (200 people with identified PUI and 100 matched healthy controls). These individuals will then have the option to complete an in-person assessment.

You stand a chance of winning a lucky prize (cash voucher) if you complete the online survey and play all three games.

Although taking part in this study may not benefit you directly, it will provide information on PUI and its causes, consequences, and links to other mental health issues. There are no expected risks in taking part in this research. You may however feel tired or inconvenienced by the survey. This discomfort is likely to be minimal as the survey should take 50-60 minutes or less to complete and can be done at a time that is convenient for you. You can also log off and log in again (ON THE SAME DEVICE) during the online survey, without losing already entered responses. You cannot log off halfway during playing the games though.

Your participation is **entirely voluntary** and you are **free to decline to participate in all or part of the survey**. If you say 'no', this will not affect you negatively. Your responses will not form part of your own personal, medical or mental health records in any way.

Only the Stellenbosch University researchers that are directly involved with the project will have access to your identifiable personal information (your contact details) where you agree to be contacted for taking part in Stage 2. Once the information collections have been completed, contact information will be deleted from our database. All participants will be allocated a unique study code on the electronic database which will be used during the analysis stages. The researchers will keep any information they collect on password-protected computers at all times.

This study is done in collaboration with researchers from other universities worldwide, including Monash University (Australia), Cambridge University (United Kingdom) and the University of Chicago (USA) and de-identified answers to the Stage 1 online survey will be shared with these universities. De-identified demographic information and information associated with the neurocognitive (BrainPAC) games will be transferred to Monash University and saved in a database and managed there. Monash University will then share this information with Stellenbosch University, Cambridge University and the University of Chicago.

Participating in this research will be free of cost. If you take part in Stage 2, you should be able to attend an in-person interview at the MRC Unit on Risk and Resilience in Mental Disorders, Department of Psychiatry, Stellenbosch University (located in the Bellville area). Stage 2 participants will be reimbursed for their time and travel costs.

This study is led by Prof xxxxxx xxxxxx who is affiliated with the Medical Research Council Unit on Risk and Resilience in Mental Disorders, at Stellenbosch University and the University of Cape Town. Her contact details are: 021 930 0000 or email: xxx@sun.ac.za.

You can contact Ms xxxxx xxxxxxxxx from the above-mentioned unit on 021 930 0000 or email: xxxxxx@sun.ac.za if you have any further queries or encounter any problems relating to this research. You can contact the Health Research Ethics Committee on 021-938 9207 if you have any concerns or complaints that have not been adequately addressed. You may print a copy of this information form for your own records.

Participant consent: In order to proceed with the survey, tick "YES" to all five of the items below.

I agree voluntarily to take part in this study (Stage 1).

I agree to my survey results being shared on a de-identified basis with Monash University, Cambridge University and the University of Chicago for scientific and research purposes.

I understand that my data will be transferred to other universities worldwide on a de-identified basis and that different privacy laws and data security levels may apply.

I agree to allow the processing of my information for scientific purposes and for publication in scientific journals, on the understanding that the information is treated as strictly confidential according to the regulations of the Data Protection Act.

I have been informed that I am entitled to withdraw at any time without giving reasons and without negative consequences to myself.

Items 6 to 8 are optional, i.e. even if you answer "NO" to any of these, you can still take the survey.

I agree to Monash University using my de-identified demographic information and information associated with the BrainPAC games results to make improvements that can be incorporated into future uses of the BrainPAC.

YES NO

I understand and agree that I may be contacted to take part in Stage 2 (in-person interview) of the project, as explained above. I will then be presented with another informed consent form to explain procedures.

YES NO

If YES, please enter your email address here:

I agree to be entered into the lucky prize draw.

YES NO

If YES, please enter your email address here:

Appendix B1

RECRUITMENT DOCUMENT 1

Stellenbosch University researchers in collaboration with researchers from other universities worldwide, including Monash University (Australia) and Cambridge University (United Kingdom), are interested in establishing how internet use relates to mental health and well-being. The aim of this study is to explore positives but also potential downsides to using the internet.

You are invited to take part in this cutting-edge project that is divided into 2 stages:
Stage 1: Following informed consent, you will complete an online survey and play three games. Based on your responses you will receive feedback on your level of internet use (i.e., low level of internet use problems (i.e., you likely use the internet appropriately), medium level of internet use problems (i.e., you likely have moderate internet use problems), or high level of internet use problems (i.e., you may have high rates of internet use problems such as loss of control, neglect of duties and relationships etc.)) You can also log off and log in again (ON THE SAME DEVICE) during the online survey, without losing already entered responses. You cannot log off halfway during playing the games though.
Stage 2: Of those who complete the survey (and who reside in the Western Cape of South Africa), 300 individuals will be invited to take part in Stage 2 (200 people with identified problematic internet use and 100 matched healthy controls). These individuals will then have the option to complete an in-person assessment.
You stand a chance of winning a lucky prize (cash voucher) if you complete the online survey and play all three games.
Your participation is entirely voluntary and you are free to decline to participate in all or part of the survey.
Anonymized data may be shared with Monash University, Cambridge University and the University of Chicago for additional PUI-related research.
The project has been approved by the Institutional Review Boards at all study sites, including Stellenbosch University.
Click My Internet Use and Health to take the survey.

Appendix B2

RECRUITMENT DOCUMENT 2

Appendix C

ONLINE SURVEY (PARENT STUDY)

SECTION 1:

1. Please indicate your gender?
   Male Female Transgender/other

2. How old are you? (years) _____
3. What is your ethnicity?
   Black Colored / Mixed race Indian White/Caucasian
   Other (please specify)_____

4. What is your relationship status?
   Single Married / domestic partner Separated Widowed Divorced

   Engaged / committed dating relationship

5. Which of the following best describes you?
   Heterosexual Gay/Lesbian Bisexual Asexual Unsure

6. What is your COMPLETED level of education?:
   Less than high school (less than grade 12)

   High school graduate (completed grade 12)

   Some college/university

   College/University graduate

7. Where do you live? (Geographical area)
   Suburb of Cape Town or city near Cape Town (e.g. Tygerberg, Bellville, Stellenbosch)
   Other places in South Africa
   Other country than South Africa
   If another country (not South Africa), specify which: _____
8. What is your occupational status?
   Professional

   Business Owner, Business director / Manager

   Homemaker

   Sales, Admin, Clerical, Technician

   Laborer / Cleaner

   Student

   Artist / Musician / Writer

Pensioner

Disability Pensioner

Unemployed

Other:

If "Other", specify which: _____

9. What is your current weight? (An estimate is acceptable.)
   <30kg (>67 lb)
   31 – 40kg (67-89 lb)
   41 – 50kg (90-110 lb)
   51 – 60kg (111-133 lb)
   61 – 70kg (134-155 lb)
   71 – 80kg (156-177 lb)
   81 – 100kg (178-220 lb)
   >100kg (>200 lb)
   Don't know
10. What is your height? (An estimate is acceptable.)
    <100cm (<1m; <3ft 2in)

    100cm – 150cm (1-1.5m; 3ft 2in – 4ft 11in)

    151cm – 160cm (1.51-1.6m; 4ft 12in – 5ft 3in)

    161cm – 170cm (1.61-1.7m; 5ft 4in – 5ft 7in))

    171cm – 180cm (1.71-1.8m; 5ft 8in – 5ft 11in))

    181cm – 200cm (1.8-2.0m; 5ft 12in – 6ft 7in)

    >200cm (>2.1m; >6ft 7in)

SECTION 2: This section asks questions about your internet use.

	Item	**1 rarely**	**2 occasionally**	**3 frequently**	**4 often**	**5 always**
1	Do you prefer excitement of the internet to intimacy with your partner?	1	2	3	4	5
2	Do others in your life complain to you about the amount of time you spend online?	1	2	3	4	5
3	Do you become defensive or secretive when anyone asks you what you do online?	1	2	3	4	5

4	Do you block out disturbing thoughts about your life with soothing thoughts of the internet?	1	2	3	4	5
5	Do you fear that life without the internet would be boring, empty, and joyless?	1	2	3	4	5
6	Do you snap, yell, or act annoyed if someone bothers you while you are on-line?	1	2	3	4	5
7	Do you lose sleep due to late-night logins?	1	2	3	4	5
8	Do you feel preoccupied with the internet when offline, or fantasize about being on-line?	1	2	3	4	5
9	Do you try to hide how long you've been on-line?	1	2	3	4	5
10	Do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back on-line?	1	2	3	4	5

	0 never	**1 seldom**	**2 some-times**	**3 often**	**4 very often**
1. How often do you find it difficult to stop using the internet when you are online?					
2. How often do others (e.g., partner, children, parents) say you should use the internet less?					
3. How often are you short of sleep because of the internet?					
4. How often do you neglect your daily obligations (work, school, or family life) because you prefer to go on the internet?					
5. How often do you go on the internet when you are feeling down?					

	SEVERITY SCALE: QUESTIONS	SCALE					
1	How often do you find yourself loosing track of time while engaging on an internet related activity?	0 Not at all	1 Rarely	2 Occasionally	3 Frequently	4 Very often	5 All the time
2	How often do you use internet related activities to block out disturbing thoughts about your life and to soothe yourself?	0	1	2	3	4	5
3	How often do you choose to spend time on internet related activities to battle loneliness or boredom?	0	1	2	3	4	5
4	How often do you neglect your normal day-to-day activities to spend more time on an internet related activity?	0	1	2	3	4	5
5	How often do you find yourself choosing to spend time in an online activity over intimacy with your partner?	0	1	2	3	4	5
6	How often do you suffer from negative financial consequences because of an online activity?	0	1	2	3	4	5
7	How often do your school/study suffer because of the amount of time you spend on internet related activities?	0	1	2	3	4	5
8	How often do you check your email or social media account or equivalent before something else that you need to do?	0	1	2	3	4	5
9	How often do others in your life complain to you about the amount of time you spend online on your computer, tablet, mobile or similar device?	0	1	2	3	4	5
10	How often do you become defensive or secretive about your online activities?	0	1	2	3	4	5
11	How often do you find yourself trying to stop an excessive or repetitive online activity but feeling an urge to continue?	0	1	2	3	4	5
12	How often do you feel preoccupied with the internet when off-line, or	0	1	2	3	4	5

	fantasize or get repetitive urges to get on-line?						
13	How often do you lose sleep due to late-night internet related activities?	0	1	2	3	4	5
14	How often do you find yourself experiencing physical or psychological problems as a consequence of prolonged internet related activities?	0	1	2	3	4	5
15	How often do you try to cut down the amount of time you spend online and fail?	0	1	2	3	4	5

Over the **last 6 months**, I have spent time on **non-work or study** related online activities such as:

	INTERNET ACTIVITIES SCALE	**SCALE**					
1	**General Surfing** (includes any unstructured online activities)	0	1	2	3	4	5
2	**Internet gaming including Massively-Multiplayer-Online-Role-Playing-Games** (includes online gaming and gaming with multiple other players and role-playing format)	0	1	2	3	4	5
3	**Skill games & Time wasters** (includes games & applications on computer, tablet, mobile phone or similar for which activity is without specific benefit)	0	1	2	3	4	5
4	**Online Shopping** (includes activity on online shopping platforms and auction websites)	0	1	2	3	4	5
5	**Online gambling** (includes any online activity in which there is a chance for monetary gain or other stakes)	0	1	2	3	4	5
6	**Social networking** (includes browsing social media and messaging/communicating over online social platforms)	0	1	2	3	4	5
7	**Health & medicine** (includes any online activity relating to reading & researching medical facts, diagnoses, treatments and risks)	0	1	2	3	4	5
8	**Pornography** (includes cybersex, cyber-texting, viewing pornography and other online sexual activities)	0	1	2	3	4	5
9	**Streaming media** (include music or video streaming activities on any platform)	0	1	2	3	4	5
10	**Cyberbullying** (includes exchange of insults, nasty texts/emails, unpleasant media, pranks)	0	1	2	3	4	5

Please read the statements below regarding online video gaming. The questionnaire refers to ONLINE GAMES, but the reference to 'game' or 'gaming' is used for the sake of simplicity. Please indicate on the scale from 0 to 2 (Never, Sometimes, Often) to what extent, and how often, these statements applied to you over the PAST 12 MONTHS:

1. When you were not playing, how often have you fantasized about gaming, thought of previous gaming sessions, and/or anticipated the next game?
2. How often have you felt restless, irritable, anxious and/or sad when you were unable to play or played less than usual?
3. Have you ever in the past 12 months felt the need to play more often or played for longer periods to feel that you have played enough?
4. Have you ever in the past 12 months unsuccessfully tried to reduce the time spent on gaming
5. Have you ever in the past 12 months played games rather than meet your friends or participate in hobbies and pastimes that you used to enjoy before?
6. Have you played a lot despite negative consequences (for instance losing sleep, not being able to do well in school or work, having arguments with your family or friends, and/or neglecting important duties)?

7. Have you tried to keep your family, friends or other important people from knowing how much you were gaming or have you lied to them regarding your gamin

8. Have you played to relieve a negative mood (for instance helplessness, guilt, or anxiety)?

9. Have you risked or lost a significant relationship because of gaming?

10. Have you ever in the past 12 months jeopardized your school or work performance because of gaming?

The following two questions ask about cyberbullying specifically:

1) In the past four weeks, have you been bullied via the internet (e.g. email / Facebook / Instagram / SMS / WhatsApp)? Yes / No
2) If so, how often did this happen:
   Never Once or twice Once a week Several times a week Daily

In relation with your mobile phone/smartphone, please answer these questions on a scale from 1 to 4, the numbers corresponding to:

1 “Strongly agree”, 2 “Agree”, 3 “Disagree”, 4 “Strongly disagree”

1. It is easy for me to spend all day not using my mobile phone.
2. I use my mobile phone while driving.
3. I don’t use my mobile phone when it is completely forbidden to use it.
4. Is it hard for me not to use my mobile phone when I feel like it.
5. I try to avoid using my mobile phone when driving on the motorway.
6. I don’t use my mobile phone in a library.
7. I can easily live without my mobile phone.
8. I use my mobile phone in situations that would qualify as dangerous.
9. I use my mobile phone where it is forbidden to do so.
10. I feel lost without my mobile phone.
11. While driving, I find myself in dangerous situations because of my mobile phone use.
12. When using my mobile phone on public transport, I try not to talk too loud.
13. It is hard for me to turn my mobile phone off.
14. I use my mobile phone while driving, even in situations that require a lot of concentration.
15. I try to avoid using mobile phone where people need silence.

SECTION 3: This section is focused on other habits and behaviours that are not necessarily linked to internet use.

Please tick one option per question only:

Strongly agree Slightly agree Slightly disagree Strongly disagree

1. I generally like to see things through to the end.

2. My thinking is usually careful and purposeful.

3. When I am in great mood, I tend to get into situations that could cause me problems.

4. Unfinished tasks really bother me.

5. I like to stop and think things over before I do them.

6. When I feel bad, I will often do things I later regret in order to make myself feel better now.

7. Once I get going on something I hate to stop.

8. Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse.

9. I quite enjoy taking risks.

10. I tend to lose control when I am in a great mood.

11. I finish what I start.

12. I tend to value and follow a rational, "sensible" approach to things.

13. When I am upset I often act without thinking.

14. I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.

15. When I feel rejected, I will often say things that I later regret.

16. I would like to learn to fly an airplane.

17. Others are shocked or worried about the things I do when I am feeling very excited.

18. I would enjoy the sensation of skiing very fast down a high mountain slope.

19. I usually think carefully before doing anything.

20. I tend to act without thinking when I am really excited.

The following list consists of several behaviours that we all engage in from time to time. Please answer the questions below for every behaviour on the list by selecting ONE appropriate response on the scale ranging

from 'Never' to 'Always'. Please answer each question as it applies to you **over the last 12 months**. For each item, please also click if this caused you distress.

When considering your responses, please do not include issues that are caused by medical conditions (e.g. diabetes, erectile dysfunction).

Do **YOU and/or OTHERS** think you have an issue/ problem with any of the following behaviours?

	Never	**Some-times**	**Often**	**Always**	**This behaviour / urge / desire causes ME distress (tick if "yes")**
1. Washing	1	2	3	4	
2. Smoking	1	2	3	4	
3. Feeling compelled to collect free things (books, journals, sample items when shopping) or saving something you know you will never use	1	2	3	4	
4. Being overly cautious with money	1	2	3	4	
5. Re(arranging/ordering	1	2	3	4	
6. Shopping	1	2	3	4	
7. List making	1	2	3	4	
8. Counting (e.g., money, tiles)	1	2	3	4	
9. Grooming	1	2	3	4	
10. Idiosyncratic routines (performing a very personalised sequence of actions)	1	2	3	4	
11. Repeating actions (performing actions over and over again)	1	2	3	4	
12. Exercising	1	2	3	4	
13. Betting/gambling	1	2	3	4	
14. Hair picking	1	2	3	4	
15. Lying	1	2	3	4	
16. Sexual activities/behaviours	1	2	3	4	
17. Alcohol consumption	1	2	3	4	
18. Planning (e.g., over-organising)	1	2	3	4	
19. Illicit drug use	1	2	3	4	
20. Cleaning too much	1	2	3	4	
21. Verbal aggression	1	2	3	4	
22. Violence towards objects/properties	1	2	3	4	
23. Swearing	1	2	3	4	
24. Checking (e.g., locks, light switches)	1	2	3	4	
25. Checking (e.g., yourself in the mirror)	1	2	3	4	
26. Speed driving	1	2	3	4	

27. Medication use	1	2	3	4	
28. Physical aggression	1	2	3	4	
29. Social networking (e.g., Facebook, twitter, Google+, Myspace)	1	2	3	4	
30. Applying rules	1	2	3	4	
31. Purposeful self-injury (i.e., not accidental)	1	2	3	4	
32. Re-writing/re-reading	1	2	3	4	
33. Tattooing	1	2	3	4	

Please carefully read the following questions regarding your eating habits (current):

1) Do you make yourself **S**ick because you feel uncomfortably full?
2) Do you worry you have lost **C**ontrol over how much you eat?
3) Have you recently lost more than approximately fifteen pounds in a 3 month period?
4) Do you believe yourself to be **F**at when others say you are too thin?
5) Would you say that **F**ood dominates your life?

SECTION 4: The next section includes more general questions about you.

For the questions below, please tick any that apply to you. Please consider not only what you think, but also what "someone who knows you well" might think:

In the **past month**:	Tick if YES		**I found this hard to resist** Tick if YES	**This led to problems in my life (e.g. at school, work, socially, in relationships…)** Tick if YES
I have bought things too often, or spent too much money		If YES:		
I have stolen things I did not need		If YES:		
I have pulled out my own hair, but not for cosmetic reasons		If YES:		
I have picked at my skin (such as picking at blemishes, nail skin, or bumps/uneven skin)		If YES:		

I have been biting my nails		If YES:		
I have gambled, involving amounts of money that for me were significant (not trivial)		If YES:		
I have set fire to things secretly (i.e. set fires I would be ashamed to admit to)		If YES:		
I have been focusing a lot on sex - thinking about sex too much, and/or undertaking a lot of sexual activities		If YES:		
I have consumed large amounts of food in a short time period, and regretted it soon after ('food binges')		If YES:		
I have been focusing a lot on the internet (e.g. social media) - thinking about it too much, and/or spending a lot of time using it		If YES:		
I have lost my temper in an extreme way (in what I said or did) (e.g. hitting out, shouting...)		If YES:		
I have deliberately injured myself, but not by mistake (e.g. cutting, overdoses…)		If YES:		

Please answer the following questions about your mood and other symptoms:

In the past month, have you been bothered by recurrent thoughts, impulses, or images that were unwanted, distasteful, inappropriate, intrusive, or distressing? Y N

In the past monthdid you try to suppress those thoughts, impulses or images or to neutralize or reduce them with some other thought or action? Y N

In the past month, did you feel driven to do something repeatedly in response to an obsession or in response to a rigid rule, like washing or cleaning excessively, counting or checking things over and over, or repeating or arranging things or other superstitious rituals? Y N

Are these rituals done to prevent or reduce anxiety or distress or to prevent something bad from happening and are they excessive or unreasonable? Y N

In the past 12 months, have you had 3 or more alcoholic drinks – within a 3-hour period, on 3 or more occasions? Y N

In the past 12 months, did you take any drugs (non-alcohol) more than once, to get high, to feel elated, to get "a buzz" or to change your mood? Y N

Please answer the following questions about your personality traits:	Strongly disagree	Disagree	Agree	Strongly agree
I hate leaving a task unfinished				
I'm most comfortable when things are done 'just right'				
I will keep doing a task over and over until I feel it is done to the highest standards				
I get stuck thinking about one thing repeatedly				
I am a creature of habit				
I have an 'addictive' personality				
People have told me I can be stubborn or rigid				
I can't resist acting on urges				
I do things that are immediately rewarding, even if I know it is bad for me in the long run				
I find it hard moving from task to task, if the first part isn't perfect/just right				
I have high standards, higher than most people				
My parent(s) taught me there is always scope for improvement/nothing is ever good enough				
Making things "complete" makes me feel calmer / soothed				
I avoid situations that I cannot predict or control				
If I start a new hobby or interest, I am not comfortable or happy until I am the best at it				

Do any of the above have a negative effect on your life (e.g. interfere with your relationships, ability to work, or quality of life)

Yes [ ] No [ ]

Please also answer the following questions about your personality traits: '1' for "no/absent/false", '2' for "subclinical/sub threshold" and '3' for "yes/present/true":

1. Are you the type of person who focuses on details, order, and organization or likes to make lists and schedules?
2. Do you have trouble finishing jobs because you spend so much time trying to get things exactly right?
3. Do you or other people feel that you are so devoted to work (or school) that you have no time left for anyone else or for just having fun?
4. Do you have very high standards about what is right and what is wrong?
5. Do you have trouble throwing things out because they might come in handy some day?
6. Is it hard for you to let other people help out if they don't agree to do things exactly the way you want?
7. Is it hard for you to spend money on yourself and other people even when you have enough?
8. Are you often so sure you are right that it doesn't matter what other people say?
9. Have other people told you that you are stubborn or rigid?

The next section is about self-harming behaviours:

Have you ever tried to hurt yourself on purpose **without trying to kill yourself**? (For example: things like burning, cutting or scratching yourself)." Yes No

If YES: What is the greatest number of times, in any one year, that you have tried to hurt yourself in the way described [in the previous question]?"

Answer choices: "never," "once," "2-3 times in a year," and "4 or more times in a year."

Please answer the following questions about yourself.

Definitely agree Slightly agree Slightly disagree Definitely disagree

1. I often notice small sounds when others do not

2. I usually concentrate more on the whole picture, rather than the small details

3. I find it easy to do more than one thing at once

4. If there is an interruption, I can switch back to what I was doing very quickly

5. I find it easy to 'read between the lines' when someone is talking to me

6. I know how to tell if someone listening to me is getting bored

7. When I'm reading a story I find it difficult to work out the characters' intentions

8. I like to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant etc.)

9. I find it easy to work out what someone is thinking or feeling just by looking at their face

10. I find it difficult to work out people's intentions

As you answer each question below, place an X in the box that best describes how you have felt and conducted yourself over the past 6 months.						
PART A						
1	How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?	NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN
2	How often do you have difficulty getting things in order when you have to do a task that requires organization?					
3	How often do you have problems remembering appointments or obligations?					
4	When you have a task that requires a lot of thought, how often do you avoid or delay getting started?					
5	How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?					
6	How often do you feel overly active and compelled to do things, like you were driven by a motor?					

Please respond to the following questions about your sleep behaviour.

How likely are you to doze off or fall asleep in the following situations, in contrast to feeling just tired?

This refers to your usual way of life in recent times. Even if you haven't done some of these things recently try to work out how they would have affected you.

Use the following scale to choose the **most appropriate number** for each situation:

0 = would **never** doze; 1 = **slight chance** of dozing; 2 = **moderate chance** of dozing; 3 = **high chance** of dozing

Sitting and reading _____

Watching TV _____

Sitting, inactive in a public place (e.g. a theatre or a meeting) _____

As a passenger in a car for an hour without a break _____

Lying down to rest in the afternoon when circumstances permit _____

Sitting and talking to someone _____

Sitting quietly after a lunch without alcohol _____

In a car, while stopped for a few minutes in the traffic _____

Please answer the following questions about your alcohol consumption.

0 = Never; 1 = Less than monthly; 2 = Monthly; 3 = Weekly; 4 = Daily or almost daily

Questions	**0**	**1**	**2**	**3**	**4**
How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year?					
Only answer the following questions if the answer above is Never (0), Less than monthly (1) or Monthly (2). Stop here if the answer is Weekly (3) or Daily (4).					
How often during the last year have you failed to do what was normally expected from you because of your drinking?					
How often during the last year have you been unable to remember what happened the night before because you had been drinking?					
Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested that you cut down?	**No**		**Yes, but not in the last year**		**Yes, during the last year**

Please answer the following questions about your smoking habits.

Do you smoke tobacco cigarettes? YES NO

If yes, continue with the following questions. If not, skip this scale:

INSTRUCTIONS: For each question, choose the correct answer. Keep track of your points as you go.

1. How soon after you wake up do you smoke your first cigarette?

a. Within 5 minutes

b. Within 6-30 minutes

c. Within 31-60 minutes

d. After 60 minutes

2. Do you find it difficult to refrain from smoking in places where it is forbidden (e.g., in church, at the library, in cinema, etc)?

a. Yes

b. No

3. Which cigarette would you hate most to give up?

a. The first one in the morning

b. Any other

4. How many cigarettes per day do you smoke?

a. 10 or less

b. 11-20

c. 21-30

d. 31 or more

5. Do you smoke more during the first hours after waking than during the rest of the day?

a. Yes

b. No

6. Do you smoke even when you are ill enough to be in bed most of the day?

a. Yes

b. No

SECTION 5: GENERAL FUNCTIONING
Please answer the following questions about your levels of distress.

Please tick the answer that is correct for you:

None of the time A little of the time Some of the time Most of the time All of the time

1 2 3 4 5

1. In the past 4 weeks, about how often did you feel tired out for no good reason?

2. In the past 4 weeks, about how often did you feel nervous?

3. In the past 4 weeks, about how often did you feel so nervous that nothing could calm you down?

4. In the past 4 weeks, about how often did you feel hopeless?

5. In the past 4 weeks, about how often did you feel restless or fidgety?

6. In the past 4 weeks, about how often did you feel so restless you could not sit still?

7. In the past 4 weeks, about how often did you feel depressed?

8. In the past 4 weeks, about how often did you feel that everything was an effort?

9. In the past 4 weeks, about how often did you feel so sad that nothing could cheer you up?

10. In the past 4 weeks, about how often did you feel worthless?

Please answer the following questions about your quality of life.

#	ITEM	Do not agree at all	Slightly disagree	Neutral	Slightly agree	Com-pletely agree
1	I am satisfied with my **leisure time:** I have the opportunity to do what I want in order to relax and enjoy myself.	**0**	**1**	**2**	**3**	**4**
2	My **leisure time** is important for my quality of life.	**0**	**1**	**2**	**3**	**4**
3	I am satisfied with how I **view my life**: I know what means a lot to me, what I believe in, and what I want to do with my life.	**0**	**1**	**2**	**3**	**4**
4	How I **view my life** is important for my quality of life.	**0**	**1**	**2**	**3**	**4**
5	I am satisfied with opportunities to be **creative:** to get to use my imagination in my everyday life, in a hobby, on the job, or in my studies.	**0**	**1**	**2**	**3**	**4**
6	Being able to be **creative** is important for my quality of life.	**0**	**1**	**2**	**3**	**4**
7	I am satisfied with my **learning:** I have the opportunity and desire to learn new, exciting things and skills that interest me.	**0**	**1**	**2**	**3**	**4**
8	**Learning** is important for my quality of life.	**0**	**1**	**2**	**3**	**4**
9	I am satisfied with **friends and friendship:** I have friends that I associate with and who support me (as many friends as I want and need).	**0**	**1**	**2**	**3**	**4**
10	**Friends and friendship** are important for my quality of life.	**0**	**1**	**2**	**3**	**4**
11	I am satisfied with **myself as a person:** I like and respect myself.	**0**	**1**	**2**	**3**	**4**
12	My satisfaction with **myself as a person** is important for my quality of life.	**0**	**1**	**2**	**3**	**4**

Please answer the following questions about your ability to bounce back. Possible responses are:

0 – Not true at all.
1 – Rarely true.
2 – Sometimes true.
3 – Often true.
4 – True nearly all the time.

1. I am able to adapt when changes occur.
2. I can deal with whatever comes my way.
3. I try to see the humorous side of things when I am faced with problems.
4. Having to cope with stress can make me stronger.
5. I tend to bounce back after illness, injury or other hardships.
6. I believe I can achieve my goals, even if there are obstacles.
7. Under pressure, I stay focused and think clearly.
8. I am not easily discouraged by failure.
9. I think of myself as a strong person when dealing with life's challenges and difficulties.
10. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.

While you were growing up, during your first 18 years of life:

1. Did a parent or other adult in the household often swear at you, insult you, put you down, or humiliate you? or Act in a way that made you afraid that you might be physically hurt? Yes No

2. Did a parent or other adult in the household often push, grab, slap, or throw something at you? or Ever hit you so hard that you had marks or were injured? Yes No

3. Did an adult or person at least 5 years older than you ever touch or fondle you or have you touch their body in a sexual way? or Try to or actually have oral, anal, or vaginal sex with you? Yes No

4. Did you often feel that … No one in your family loved you or thought you were important or special? or Your family didn't look out for each other, feel close to each other, or support each other? Yes No

5. Did you often feel that … You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? or Your parents were too drunk or high to take care of you or take you to the doctor if you needed it? Yes No

6. Were your parents ever separated or divorced? Yes No

7. Was your mother or stepmother often pushed, grabbed, slapped, or had something thrown at her? or Sometimes or often kicked, bitten, hit with a fist, or hit with something hard? or Ever repeatedly hit over at least a few minutes or threatened with a gun or knife? Yes No

8. Did you live with anyone who was a problem drinker or alcoholic or who used street drugs? Yes No

9. Was a household member depressed or mentally ill or did a household member attempt suicide? Yes No

10. Did a household member go to prison? Yes No

Choose the response that reflects your experience of family life:

Strongly agree Agree Disagree Strongly disagree

Planning family activities is difficult because we misunderstand each other

In times of crisis we can turn to each other for support

We cannot talk to each other about the sadness we feel

Individuals are accepted for what they are

We avoid discussing our fears and concerns

We can express feelings to each other

There are lots of bad feelings in our family

We feel accepted for what we are

Making decisions is a problem for our family

We are able to make decisions about how to solve problems

We don't get along well together

We confide in each other

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you **DURING THE PAST SEVEN DAYS with respect to the COVID-19 / CORONA pandemic**. How much were you distressed or bothered by each?

	Not at all	**A little bit**	**Mode-rately**	**Quite a bit**	**Extremely**

1. Any reminder brought back feelings about it.	0	1	2	3	4
2. I had trouble staying asleep.	0	1	2	3	4
3. Other things kept making me think about it.	0	1	2	3	4
4. I felt irritable and angry.	0	1	2	3	4
5. I avoided letting myself get upset when I thought about it or was reminded of it.	0	1	2	3	4
6. I thought about it when I didn't mean to.	0	1	2	3	4
7. I felt as if it hadn't happened or wasn't real.	0	1	2	3	4
8. I stayed away from reminders of it.	0	1	2	3	4
9. Pictures about it popped into my mind.	0	1	2	3	4
10. I was jumpy and easily startled.	0	1	2	3	4
11. I tried not to think about it.	0	1	2	3	4
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.	0	1	2	3	4
13. My feelings about it were kind of numb.	0	1	2	3	4
14. I found myself acting or feeling like I was back at the time when I was first confronted with news of COVID-19.	0	1	2	3	4
15. I had trouble falling asleep.	0	1	2	3	4
16. I had waves of strong feelings about it.	0	1	2	3	4
17. I tried to remove it from my memory.	0	1	2	3	4
18. I had trouble concentrating.	0	1	2	3	4
19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	0	1	2	3	4
20. I had dreams about it.	0	1	2	3	4
21. I felt watchful and on-guard.	0	1	2	3	4
22. I tried not to talk about it.	0	1	2	3	4

Feedback to respondents re their IAT scores (programmed using Qualtrics):

Based on your responses to one of the sections on internet use, you scored a total of _xxxxxx. Please take note of the description of your probable level of internet use below.

1) 10 - 20: low level of internet use problems (i.e. you likely use the internet appropriately)
2) 21 - 40: medium level of internet use problems (i.e. you likely have moderate internet use problems)
3) 41 - 50: high level of internet use problems (i.e. you may have high rates of internet use problems such as loss of control, neglect of duties and relationships etc.)

SECTION 6: NEUROCOGNITIVE ASSESSMENT

In this last section of the survey, you will play 3 games to show us how you think and behave. You will also be given feedback on your performance after each game.

What to do next:

Make sure your computer sound is turned on. Copy and paste the full link below in a separate tab in Google Chrome to play the 3 games. Please be patient as the games may take a few moments (up to 10 minutes, depending on your internet speed) to load. While loading, your screen may go black. This is normal!

Remember that once you have started playing, you cannot exit before reaching the end. It will take about 30 minutes. Once you have completed the games, you will be given a 4-digit code. Write this down on a piece of paper and return to the survey. You should enter these digits into the box to confirm that you have completed the games. This would then also facilitate entry into the lucky prize draw (if relevant).

https://monash-piu-20-prod.firebaseapp.com/MonCog.html?game=Multi&game1=BART&slot1=2708829993&game2=SST&slot2=2032133607&game3=VMAC&slot3=3242921456&research=turk&code=${e://Field/Create%20New%20Field%20or%20Choose%20From%20Dropdown...}

Notes at the bottom of the survey:

You have now completed the whole survey!

Thanks again for taking part in this survey on PUI and helping us to address the remaining knowledge gaps.

If you are in South Africa, and would like more information on and/or support for any mental health difficulties, including problematic use of the internet, please contact the Mental Health Information Centre of Southern Africa: +27 21 930 0000; xxxx@sun.ac.za; www.mentalhealthsa.org.za.

Appendix D

ONLINE SURVEY (PRESENT STUDY)

DEMOGRAPHIC QUESTIONNAIRE

1. Please indicate your gender?
   Male Female Transgender/other

2. How old are you? (years) _____

3. What is your relationship status?
   Single Married / domestic partner Separated Widowed Divorced

   Engaged / committed dating relationship

4. Which of the following best describes you?
   Heterosexual Gay/Lesbian Bisexual Asexual Unsure

5. What is your COMPLETED level of education?:
   Less than high school (less than grade 12)

   High school graduate (completed grade 12)

   Some college/university

   College/University graduate

6. What is your occupational status?
   Professional

   Business Owner, Business director / Manager

   Homemaker

   Sales, Admin, Clerical, Technician

   Laborer / Cleaner

   Student

   Artist / Musician / Writer

   Pensioner

   Disability Pensioner

   Unemployed

Other:

If “Other”, specify which: _____

INTERNET USE INSTRUMENTS

JEG-IAT 10 ITEM INSTRUMENT

	Item	1 rarely	2 occasionally	3 frequently	4 often	5 always
1	Do you prefer excitement of the internet to intimacy with your partner?	1	2	3	4	5
2	Do others in your life complain to you about the amount of time you spend online?	1	2	3	4	5
3	Do you become defensive or secretive when anyone asks you what you do online?	1	2	3	4	5
4	Do you block out disturbing thoughts about your life with soothing thoughts of the internet?	1	2	3	4	5
5	Do you fear that life without the internet would be boring, empty, and joyless?	1	2	3	4	5
6	Do you snap, yell, or act annoyed if someone bothers you while you are on-line?	1	2	3	4	5
7	Do you lose sleep due to late-night logins?	1	2	3	4	5
8	Do you feel preoccupied with the internet when offline, or fantasize about being on-line?	1	2	3	4	5
9	Do you try to hide how long you've been on-line?	1	2	3	4	5
10	Do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back on-line?	1	2	3	4	5

ISAAQ (PART B)

Over the **last 6 months**, I have spent time on **non-work or study** related online activities such as:

	INTERNET ACTIVITIES SCALE	SCALE					
1	**General Surfing** (includes any unstructured online activities)	0	1	2	3	4	5
2	**Internet gaming including Massively-Multiplayer-Online-Role-Playing-Games** (includes online gaming and gaming with multiple other players and role-playing format)	0	1	2	3	4	5
3	**Skill games & Time wasters** (includes games & applications on computer, tablet, mobile phone or similar for which activity is without specific benefit)	0	1	2	3	4	5
4	**Online Shopping** (includes activity on online shopping platforms and auction websites)	0	1	2	3	4	5
5	**Online gambling** (includes any online activity in which there is a chance for monetary gain or other stakes)	0	1	2	3	4	5
6	**Social networking** (includes browsing social media and messaging/communicating over online social platforms)	0	1	2	3	4	5
7	**Health & medicine** (includes any online activity relating to reading & researching medical facts, diagnoses, treatments and risks)	0	1	2	3	4	5
8	**Pornography** (includes cybersex, cyber-texting, viewing pornography and other online sexual activities)	0	1	2	3	4	5
9	**Streaming media** (include music or video streaming activities on any platform)	0	1	2	3	4	5
10	**Cyberbullying** (includes exchange of insults, nasty texts/emails, unpleasant media, pranks)	0	1	2	3	4	5

Coding system for ISAAQ (Part B):

0=Not at all

1=Rarely

2=Occasionally

3=Frequently

4=Very often

5=All the time

PSYCHIATRIC DISORDER ASSESSMENTS

SCOFF

Please carefully read the following questions regarding your eating habits (current):

1) Do you make yourself **S**ick because you feel uncomfortably full?
   NO YES
2) Do you worry you have lost **C**ontrol over how much you eat?
   NO YES
3) Have you recently lost more than approximately fifteen pounds in a 3 month period?
   NO YES
4) Do you believe yourself to be **F**at when others say you are too thin?
   NO YES
5) Would you say that **F**ood dominates your life?
   NO YES

MINI

Please answer the following questions about your mood and other symptoms:

In the past month, have you been bothered by recurrent thoughts, impulses, or images that were unwanted, distasteful, inappropriate, intrusive, or distressing?

NO YES

In the past monthdid you try to suppress those thoughts, impulses or images or to neutralize or reduce them with some other thought or action?

NO YES

In the past month, did you feel driven to do something repeatedly in response to an obsession or in response to a rigid rule, like washing or cleaning excessively, counting or checking things over and over, or repeating or arranging things or other superstitious rituals?

NO YES

Are these rituals done to prevent or reduce anxiety or distress or to prevent something bad from happening and are they excessive or unreasonable?

NO YES

In the past 12 months, did you take any drugs (non-alcohol) more than once, to get high, to feel elated, to get “a buzz” or to change your mood?

NO YES

OCPD

Please also answer the following questions about your personality traits:

'0' for "absent or clinically insignificant"

'1' for "present but of uncertain clinical significance"

'2' for "present and clinically significant"

1. Are you the type of person who focuses on details, order, and organization or likes to make lists and schedules?
2. Do you have trouble finishing jobs because you spend so much time trying to get things exactly right?
3. Do you or other people feel that you are so devoted to work (or school) that you have no time left for anyone else or for just having fun?
4. Do you have very high standards about what is right and what is wrong?
5. Do you have trouble throwing things out because they might come in handy some day?
6. Is it hard for you to let other people help out if they don't agree to do things exactly the way you want?
7. Is it hard for you to spend money on yourself and other people even when you have enough?
8. Are you often so sure you are right that it doesn't matter what other people say?
9. Have other people told you that you are stubborn or rigid?

ASD

Please answer the following questions about yourself.

	definitely agree **0**	**slightly agree** **1**	**slightly disagree** **2**	**definitely disagree** **3**
1. I often notice small sounds when others do not				
2. I usually concentrate more on the whole picture, rather than the small details				
3. I find it easy to do more than one thing at once				
4. If there is an interruption, I can switch				

back to what I was doing very quickly				
5. I find it easy to 'read between the lines' when someone is talking to me				
6. I know how to tell if someone listening to me is getting bored				
7. When I'm reading a story I find it difficult to work out the characters' intentions				
8. I like to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant etc.)				
9. I find it easy to work out what someone is thinking or feeling just by looking at their face				
10.I find it difficult to work out people's intentions				

ADHD

As you answer each question below, place an X in the box that best describes how you have felt and conducted yourself over the past 6 months.

	never 0	rarely 1	sometimes 2	often 3	very often 4
1. How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?					

2.How often do you have difficulty getting things in order when you have to do a task that requires organization?					
3. How often do you have problems remembering appointments or obligations?					
4. When you have a task that requires a lot of though, how often do you avoid or delay getting started?					
5. How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?					
6. How often do you feel overly active and compelled to do things, like you were driven by a motor?					

AUD

Please answer the following questions about your alcohol consumption.

0 = never; 1 = less than monthly; 2 = monthly; 3 = weekly; 4 = daily or almost daily

Questions	**0**	**1**	**2**	**3**	**4**
How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year?					

Only answer the following questions if the answer above is never (0), less than monthly (1) or monthly (2). Stop here if the answer is weekly (3) or daily or almost daily (4).

How often during the last year have you failed to do what was normally expected from you because of your drinking?					
How often during the last year have you been unable to remember what happened the night before because you had been drinking?					
Has a relative or friend, doctor or other health worker been	**no**		**yes,**		**yes,**

concerned about your drinking or suggested that you cut down?			**but not in the Last year**		**during the last year**

FAMILY FUNCTIONING INSTRUMENT

GF-FAD

When completing the following items on your family relationships, think of your current closest family members (i.e., nuclear or extended) with whom you have the most frequent interactions:

	strongly agree 1	**agree 2**	**disagree 3**	**strongly disagree 4**
1. Planning family activities is difficult because we misunderstand each other				
2. In times of crisis we can turn to each other for support				
3. We cannot talk to each other about the sadness we feel				
4. Individuals are accepted for what they are				
5. We avoid discussing our fears and concerns				
6. We can express feelings to each other				
7. There are lots of bad feelings in our family				
8. We feel accepted for what we are				
9. Making decisions is a problem for our family				
10. We are able to make decisions about how to solve problems				
11. We don't get along well together				
12. We confide in each other				

Notes at the bottom of the survey:

You have now completed the whole survey!

Thanks again for taking part in this survey on PUI and helping us to address the remaining knowledge gaps.

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