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Emotion Regulation Strategies on Depression through a Problematic Use of Technology: Toward an Explanation of the Association between Depressive Symptomatology and Internet Addiction

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2. Abstract.

Depression has been reliably associated in the past with uncontrolled use of the Internet regardless of its consequences, a phenomenon commonly referred to as Internet addiction. However, less attention has been afforded to explaining this association. The present study aims to provide a potential explanation based on current theoretical accounts of emotion regulation and the problematic use of the Internet. To achieve this goal, this dissertation comprises three articles. The first discusses a transcultural adaptation of the most psychometrically evaluated measure of Internet addiction and a test of its psychometric properties on an adult sample from Chile. Next, using a sample of Chilean high school students, a cross-sectional test of two potential mechanisms linking depressive symptomatology and Internet addiction investigates the possibility of being cognitively absorbed on the Internet (referred to as flow experiences online) and using the Internet to postpone unpleasant tasks (referred to as Internet procrastination). The final article analyzed data from the follow-up measurements of the adolescent sample to provide a longitudinal explanation of the association between depressive symptomatology and Internet addiction for those using the Internet to disconnect from life situations, that is, using the Internet as a proxy for an attentional deployment emotion regulation strategy. Taken together, results suggest that the inflexible use of the Internet to regulate emotional experiences may influence the development of Internet addiction based on a negative affective state such as the presence of depressive symptomatology. A possible vicious circle is theoretically discussed, together with the study limitations and potential implications for both clinical practice and future research efforts. It is hoped that the present study sheds light on the mechanisms linking the technologically mediated context with adolescent affective processes.

3. Introduction.

Depression is considered the third leading cause of disability in adolescents worldwide (World Health Organization, 2018a), with the prevalence of depressive disorders in children and adolescents ranging from 1.7% to 3.9% (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015). Specifically in Chile, the prevalence of depressive symptomatology was reported to be 12.7% for people aged fifteen years or older (MINSAL, 2011), while 32.6% of adolescents between the ages of fourteen and twenty presented a clinically relevant level of depressive symptomatology (Cova, Melipillán, Valdivia, Bravo & Valenzuela, 2007), thereby exposing a comparatively high prevalence among Chilean youth. Studying adolescent depression is crucial given its role in future psychosocial adjustment. In fact, the presence of depression during adolescence has been associated with psychosocial maladjustment in young adulthood, as exemplified by higher rates of unemployment and failure to complete secondary school (Clayborne, Varin, & Colman, 2018). Likewise, having a depressive disorder in adolescence has been associated with an increased likelihood of depression in young adulthood, a probability that increases when early manifestations are longer (Patton, et al., 2014). The incremental probability based on the disorder's length makes studies of the mechanisms that may influence its onset and maintenance even more relevant.

A newly emerging context for the development and maintenance of psychopathology may be the inclusion of the Internet in daily life. Adolescents are increasingly familiar with a wide range of digital technologies and have the possibility of immediate connection to the Internet by means of smartphones, personal computers, and tablets for diverse activities such as studying, searching for information, social networking, instant messaging, and playing videogames, among others. In fact, Internet penetration is estimated to be 56.1% worldwide, an estimate that

has risen by 1,104% in the last 19 years (Internet World Stats, 2019a). Chile is no exception with an Internet penetration of 77.5%, a figure somewhat higher than the South American continent's estimate of 71.5% (Internet World Stats, 2019b).

The impact of the Internet on the daily lives of adolescents may be reflected by a recent study by Pew Research Center (2018) that found that almost all U.S. adolescents between the ages of thirteen and seventeen reported owning or having access to a smartphone, while 89% use the Internet almost constantly or at least several times per day. These numbers are not exclusive to U.S. adolescents given that 92% of Chilean households with children and adolescents who use the Internet have at least one smartphone with an Internet connection, while 88% access the Internet every or almost every day (Cabello, Claro, Lazcano, Antezana, & Maldonado, 2017).

Given the ubiquitous presence of information and communication technologies in daily life, several authors have proposed that the Internet may have modified how interpersonal relationships are established (Hertlein & Stevenson, 2010), how we think (Carr, 2010), and even how we experience and express our emotions (Arciero & Bondolfi, 2009), thereby constituting a new ecological pressure on human development (Smart, Heersmink & Clowes, 2017). In light of the Internet's potential influence on affective processes, it may be considered an important context for the development and maintenance of mood psychopathology, and therefore depression.

In fact, depressive symptomatology has been consistently associated with uncontrolled use of the Internet (Orsal, Orsal, Unsal, & Ozalp, 2012, Yadav, Banwari, Parmar, & Maniar, 2013, Strittmatter, et al., 2015a; Chen & Lin, 2016; Liang, Zhou, Yuan, Shao, & Bian, 2016; Fumero, Marrero, Voltes, & Peñate, 2018), a clinical phenomenon referred to as Internet Addiction (Young, 1998; 2010), pathological Internet use (Davis, 2001), and problematic Internet use

(Caplan, 2002). For consistency, the term Internet addiction is used in the remainder of this document.

Even though previous studies have established the association between depressive symptomatology and Internet addiction in different countries and settings, less attention has been given to providing potential explanations for this association: Does depressive symptomatology lead to Internet addiction or vice-versa? Through which mechanisms and under which conditions is depressive symptomatology linked with Internet addiction? These are some of the questions that remain partly unanswered; however, they can still shed light on new ways in which depressive symptomatology emerges and is maintained in the context of a world exceedingly permeated by technology. On the other hand, focusing on the same questions may uncover potential mechanisms for the emergence and maintenance of problematic uses of technology and their relationship to mood.

This dissertation aimed to address these questions by offering a set of potential mechanisms and then testing them empirically through a sample group of Chilean high school students.

To achieve this goal, the present document is structured in the following fashion: The theoretical background discusses the problems that emerge when depression is studied based on its vast array of clinical presentations (Fried & Nesse, 2015) culminating with a potential solution offered by the Research Domain Criteria initiative from the National Institute of Mental Health (NIMH, 2018a) and emotion regulation theory (Gross & Thompson, 2007; Werner & Gross, 2010). Once a concept of depression rooted in emotion regulation theory has been provided, an account of the influence of the current technologically mediated context in a vast array of human cognitive processes is discussed in terms of situated cognition theory (Smart, et al., 2017). Special attention is paid to the influence of technology in affective processes. Contextualized in

this manner, a discussion of the concept of Internet addiction and its problems then relates a problematic use of technology with negative emotions by means of the recently proposed Compensatory Internet Use Model (CIU; Kardefelt-Winther, 2014a). By doing this, a specific set of affordances offered by the Internet to cope with emotional experiences is further discussed. One is based on the possibility of being absorbed by relevant Internet content, while two are based on the motivation to use the Internet to disconnect or be distracted from life situations and also to postpone the resolution of unpleasant tasks.

After a theoretical discussion of the relevant constructs, the methods supporting the present study are briefly described as they are further developed in each of the articles comprising the present document.

The three thematically related articles comprising the present dissertation initially offer a transcultural adaptation and evaluation of the psychometric properties of the most evaluated measure to capture Internet addiction (Laconi, Rodgers, & Chabrol, 2014), that is, Young's Internet addiction test (IAT; Young, 2010) to the Chilean culture. The second article evaluated, in a cross-sectional setting, two potential conditions for the aforementioned relationship to emerge: absorption on the Internet under the concept of flow (Yang, Wang, Zhao, 2014), and postponement of unpleasant tasks under the concept of Internet procrastination. The third and final article of this dissertation expands on the second article by providing a longitudinal account of the role of attentional shifts under the concept of Internet disconnection in the relationship between depressive symptomatology and Internet addiction.

After presentation of the articles, a brief discussion of the study results and their relationship to the study hypotheses is provided. Potential explanations of the results are provided by integrating them to the broader picture offered by the theoretical background. As every study is

limited by the scope of its design and measures, limitations of the present study are further elaborated to culminate with a discussion of potential clinical and future research implications.

It is hoped that this study offers useful background support for further studies on the influence of the technologically mediated context in adolescent mood psychopathology and addictive behaviors, while simultaneously raising the possibility of conducting said studies in Chile, a country exceedingly permeated by the Internet and depression.

4. Theoretical Background

4.1.The problem of depression and its definition.

In the current Diagnostic and Statistical Manual of Mental Disorders (DSM-5, American Psychiatric Association, 2013), the diagnosis of a "major depressive episode*"* consists of exhibiting five or more of the nine symptoms listed in the manual during a two-week period. They are a depressed mood, diminished interest or pleasure, significant weight loss or weight gain, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness or inappropriate guilt, a diminished ability to concentrate and to think or indecisiveness, and recurrent thoughts of death or suicidal ideation. At least two of the symptoms must be a depressed mood and a loss of interest and pleasure as these are considered its principle characteristics. The symptoms should not be attributable to the physiological effects of a substance or another medical affliction, and they must cause clinically significant distress. To be diagnosed with a "major depressive disorder," a person should never have had a manic or hypomanic episode, and the episode should not have been better explained by a schizoaffective disorder, schizophrenia, or other specified or unspecified psychotic disorder. When a study does not account for these exclusionary criteria and measures depression only by means such as a self-report questionnaire, it facilitates dialogue about depressive symptomatology and not about depression, a nomenclature that is used throughout the present manuscript.

As noted by Fried and Nesse (2015), when solely based on the nine diagnostic criteria listed above without considering contrasting domains such as insomnia and hypersomnia, it is possible to extract at least 227 unique symptom profiles that qualify for a diagnosis of a major depressive disorder (MDD). They tested this idea in a sample of 3,703 patients from a large multisite randomized clinical trial for patients with depressive disorders (STAR*D; Rush, et al., 2004)

using the Quick Inventory of Depressive Symptomatology (QIDS-16; Rush, et al., 2003). By analyzing symptom combinations, the authors found a total of 1,030 unique symptomatic profiles for depression (Fried & Nesse, 2015), thereby highlighting the syndrome's vast array of presentations, a characteristic often referred to as phenotypic heterogeneity (Levinson, et al., 2014). The heterogenous characteristic of mental disorders is thought to be one of the possible explanations for the inconsistent findings arising in both bio-behavioral and clinical treatments research (Insel, et al., 2010), and it constitutes an important obstacle to overcome. Based on their findings, Fried and Nesse (2015) offered three possible explanations for depression's high heterogeneity of presentations: The first is methodological in nature and related to the differences that emerge when symptoms are treated in their dimensional or dichotomic form. The second and third explanations relate to concepts of mental diseases underlying empirical research. The second explanation posits that depression has many manifestations but a common underlying cause, an explanation that mirrors the statistical methods related to latent variable modeling (i.e., Brown, 2015). The third explanation proposes that it is also possible that different symptomatic profiles reflect different etiologies and biological substrates, wherein individual symptoms interact with each other in the form of a complex network (Fried & Nesse, 2015; Fried, 2017) that mirrors the relatively new field of network psychometrics (Marsman, et al., 2017). Focusing on the intra-syndrome symptom dynamics of depression can prove beneficial in reducing the number of meaningful clinical presentations and in redefining mechanisms of emergence and maintenance of mental disorders. However, based on their focus on signs and symptoms, it is also possible that these descriptive diagnostic categories may fail to capture some fundamental mechanisms of dysfunction (Insel, et al., 2010). For this purpose, another recent proposition is to focus on core underlying dimensions across different psychopathological entities, a set of dimensions called "transdiagnostic factors" of mental diseases (Krueger &

Eaton, 2015). While searching for transdiagnostic factors of mental diseases, the Research Domain Criteria (RDoC) initiative from the National Institute of Mental Health (NIMH, 2018a) proposed another option to overcome the problems associated with the phenotypic heterogeneity of psychopathological phenomena.

4.2. The RDoC initiative, transdiagnostic factors and depression.

Given that the study of depression is partly hindered by its characteristic phenotypic heterogeneity, together with its comorbidity with other psychopathological entities such as anxiety disorders (Watson, 2005; Löwe, Spitzer, Williams, Mussell, Schellberg & Kroenke, 2008), the RDoC initiative may also serve as a useful background to overcome these emerging problems, an idea that is further developed below.

Aiming to find transdiagnostic factors across psychopathology, The RDoC initiative recommends focusing on smaller units of analysis called domain criteria. There are currently five domains including the negative and positive valence systems, the cognitive system, the social processing system and the arousal/regulatory systems (NIMH, 2018a). The RDoC initiative also recommends accounting for different levels of analysis such as genes, molecules, cells, circuits, physiology, behavior, self-report measures and experimental paradigms when studying these domains (NIMH, 2019a). By crossing the domain criteria with their corresponding levels of analysis, it is possible to create a guiding matrix for the study of mental diseases.

With special focus on the problems of depression, Woddy and Gibb (2015) proposed that the loss construct of the negative valence system—defined as a state of deprivation of a

motivationally significant object or situation (NIMH, 2019b)—may be of particular importance for depression research. This proposition is based on research findings suggesting that depression onset is strongly predicted by severe negative life events (Kendler, Karkowski, & Prescott. 1999; Monroe, Slavich, & Giorgiades, 2014). It is possible to understand the importance attributed to the loss construct of the RDoCs matrix if two core features of depression are considered, namely, a depressed mood and a diminished experience of interest or pleasure. These characteristics are intimately related to the experience of sadness, a common basic emotion that emerges during events that are experienced as adverse and unalterable (Arciero & Bondolfi, 2009; Bondolfi, Mazzolla, & Arciero, 2015). The adversity of a given event is related to the experience of unpleasantness and sorrow, while the intensity of the perceived inalterability serves as the grounds for a variable degree of inactivity based on the perception of an unreachable or blocked goal (Arciero & Bondolfi, 2009; Bondolfi, et al., 2015). This conceptualization is consistent with an evolutive theory of sadness where its emergence its thought to instigate a space of disengagement of the goal (Nesse, 2000) which in turn may foster a new engagement with a different commitment. This space of withdrawal and reflection is considered a necessary step to reorient any given life trajectory while avoiding an unnecessary expenditure of metabolic resources.

By considering sadness as having a specific adaptive function, it is then possible to ask the following question: Through which mechanisms can sadness escalate into a major depressive disorder?

One possibility is that the way in which a negative emotional experience triggered by an adverse and unmodifiable event is managed may be part of the mechanism of emergence and maintenance of depression. This process of managing emotional experiences is called emotion

regulation (Gross & Thompson, 2007). It has been proposed before by Fernández, Jazaieri and Gross (2016) as a transdiagnostic factor for psychopathology that emerges from the interplay of the different components of the RDoCs matrix. Before developing this idea in depth, however, it is important to discuss a definition of the object of said regulation: emotions.

4.3. "What" or "how" are emotions?

Historically, defining "emotions" has been a challenging endeavor. The term covers a broad spectrum of common human experiences that place it firmly in daily conversations. Therefore, many of the definitions of emotions have been derived from common-sense language (Gross & Thompson, 2007). Common-sense definitions are often useful for daily communication; however, they also constitute an important obstacle for scientific inquiry given their high degree of polysemy, a trait that is especially pronounced when they are used in reference to mental states (Nordgaard, Saas & Parnas, 2013). Because of common-sense language, today we have many kinds of typologies and definitions for emotions. As a consequence, researchers have opted to define emotions based on a prototypical interaction of different components (Scherer, 1984; Prinz, 2004; Gross & Thompson, 2007). This process-oriented definition shifts the focus from "what" are emotions to "how" emotions are constituted, analytically separating a complex experience into a set of smaller units, thus making it useful for scientific practice. One possible answer to the question of how emotions are constituted was proposed by Scherer's (1984) components process model of emotions where the author described a series of interrelated and interdependent components that interact dynamically between them. These components include the cognitive processing of stimuli, neurophysiological processes, motivations and behavioral tendencies, motor expressions, and subjective states. They reflect a list of qualities or attributes

that functionally characterize the process involved in the generation and maintenance of an emotion. By doing this, Scherer (1984) abandoned the goal of providing a conceptual or structural definition of the term in favor of a functional operationalization. A similar perspective was taken by Prinz (2004) who characterized a typical emotional episode as composed of thoughts, corporal changes, action tendencies, modulation of mental processes, and conscious feelings. For Prinz, different theories of emotions would focus on one or more aspects of an emotional episode, for example, those more associated with the cognitive processes of appraisal (i.e. Gross & Thompson, 2007), or by focusing on physiological arousal (i.e. James, 1884).

With a focus on appraisal processes, Gross and Thompson (2007) proposed a prototypical definition of emotions named the "modal model of emotions" emphasizing that emotions are responses emerging in situations that individuals appraise as relevant to their goals. In these cases, the meaning associated to a particular situation will determine the characteristics of the emotional response. Consistent with the proposals of Prinz (2004) and Scherer (1984), Gross and Thompson (2007) also considered emotions as multifaceted phenomena associated with changes in central and peripheral physiology, subjective experience, behavior, and action tendencies. However, their model was functionally restricted to a specific sequence of emotion generation. It started when "attention" was placed into a "situation" that was later appraised as relevant. The process of "appraisal" would give rise to an "emotional response" that motivated an action to deal with the ongoing context. Because the emotional response could also modify the situation, it could simultaneously create the conditions to modify future emotional responses, thereby giving the model a recursive character.

By shifting attention toward the dynamics that relate emotional experiences to the surrounding environment, Frijda (2008) proposed emotions as states instigated by events or objects that

prepare the organism to act. By preparation, the author stated that the organism becomes ready to act if/when the appropriate conditions emerge and when relevant actions exist in its own repertoire. This implies that the possibility to enact a particular action tendency is dependent on both the organism and its context, while at the same time it is aimed to modify or maintain the engagement with the ongoing situation.

For this action to occur, almost all if not all of the organism's sub-systems should be coordinated in what Scherer (2005) called a "response synchronization." At the same time, the situation should be sufficiently relevant to interrupt the organism's previous action flow. As in previous perspectives, emotions are phenomena that must be anchored to a meaningful external or internal event. Emotions are also intense and relatively short in duration given the great mobilization of resources they expend (Scherer, 2005). However, the previously described conceptualization does not exclude the existence of longer and more diffuse affective states referred to as "mood" (Gross & Thompson, 2007).

The functional definitions described above imply that emotions always emerge in relationship to a meaningful context, mobilizing the organism's different subsystems to prepare for an action that can modify or maintain the engagement with the surrounding environment. Further, their enaction is also dependent on the concrete conditions and available action repertoires, an idea to be further developed in the following discussion about emotion regulation.

4.4. Emotion Regulation as a transdiagnostic factor.

Now that emotions are functionally conceptualized, it is possible to define emotion regulation as "the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying

emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (Thompson, 1994, p. 27). Gross and Thompson's (2007) modal model of emotions is also extended to five families of emotion regulation processes distinguished by the point of the emotion generation process where they have their primary impact (Werner & Gross, 2010).

For instance, it is possible to select (i.e., avoid) or modify a situation to modulate its emotional impact. These families of strategies are respectively called "Situation Selection" and "Situation Modification." It is also possible to redirect the attentional focus in a given situation to influence an emotional experience, a family of strategies called "attentional deployment." Someone can also cognitively re-elaborate how to think about a situation or his/her own capabilities to cope with it, this from a family of strategies called "Cognitive Change." Finally, it is also possible to directly attempt to modify the response tendency of emotional experiences (e.g., exercise, relaxation, or taking drugs), a family of strategies called "Response Modulation" (Werner & Gross, 2010). Problems in emotion regulation have been documented across a vast array of psychopathological entities (Aldao, Nolen-Hoeksema & Schweizer, 2010; Werner & Gross, 2010); however, that which is considered problematic of an emotion regulation strategy should not be its implementation per se , rather its adequacy to one's goals and context. For an emotion regulation to be adaptive, a certain degree of implementation flexibility is required (Thompson & Calkin, 1996; Gross & Thompson, 2007; Werner & Gross, 2010; Aldao & Nolen-Hoeksema, 2012). In other words, for example, people commonly avoid certain situations to modulate their emotional impact; however, a chronic tendency for avoidance can create more problems in the long term than it was intended to solve. This implies another characteristic of maladaptive emotion regulation strategies, that is, the long term negative consequences of an inflexible

deployment of a set of strategies outweigh their short-term benefits (Gross & Thompson, 2007; Werner & Gross, 2010).

Given its ubiquity in mental disease processes, Fernández et al. (2016) proposed emotion regulation as an emergent construct arising from the functional interaction between different RDoC domains, thus constituting a new transdiagnostic factor for psychopathology. They proposed, from a theoretical perspective, that in emotion regulation the cognitive system should act as a top-down regulator of the positive, negative, and arousal systems in favor of a specific set of goals, thereby mirroring Gross and Thompson's (2007) appraisal-focused approach to emotions.

Supporting its role as a transdiagnostic factor, a previous meta-analysis of emotion regulation strategies across psychopathology included anxiety, depression, eating and substance-related disorders. Results found a positive and medium-to-large effect on general psychopathology (a collapsed measure of the aforementioned disorders) of avoidance of experiences and behaviors, and suppression of thoughts and emotional expression. Also, a negative medium-to-large effect was found for problem-solving (i.e., efforts to change the situation or to contain its consequences) as well as a negative small-to-medium effect of reappraisal (Aldao, et al., 2010). On the other hand, a recent systematic review of psychological interventions for anxiety, depression, substance use, eating disorders, and borderline personality disorders found that—regardless of the specific treatment protocol, the emotion regulation construct being evaluated, or the targeted disorder—sixty-four of sixty-seven studies showed decreases in emotion dysregulation and concomitant decreases in symptom severity after treatment (Sloan, Hall, Moulding, Bryce, Mildred & Staiger, 2017). These findings support the transdiagnostic role of emotion regulation in the genesis and maintenance of a vast array of psychopathological entities,

thus providing useful background support to continue clinical research even in the context of heterogeneous symptomatic presentations. Still, this approach does not resolve the question of whether it is better to analyze common causes (i.e., Latent Variable Modeling; Brown, 2015) or networks of symptoms (i.e., Network Psychometrics, Marsman, et al., 2017). In any case, this was not the focus of the present study.

4.5. Emotion regulation in depression.

A recent meta-analysis by Visted, Vøllestad, Nielsen and Schanche (2018) found that, compared to healthy controls, individuals with a current major depressive disorder showed a higher usage of rumination of negative emotions and their implications, a higher degree of avoidance of situations and suppression of emotions as well as a lower usage of acceptance of emotions and situations, problem solving, and cognitive reappraisal. When considering the discussion presented above regarding the characteristics of sadness, this pattern of emotion regulation strategies may serve as an indication of a possible emotion regulation mechanism of the etiopathogenesis and maintenance of depression. When confronted with a critical life event that may seem unalterable, rumination may maintain the commitment to the goal and hinder the acceptance of the situation by keeping the attentional focus toward one's self and the symptoms. At the same time, avoidance may lead to a certain degree of passivity when confronting a difficult context. This in turn may amplify the experience of inalterability and increase the painful experience. Moreover, the decrease in the use of acceptance, reappraisal, and problem-solving in depressed patients may indicate difficulties in re-engaging with the ongoing context given the new adverse scenario, for example, by the generation and commitment to a new goal.

As the action tendency instigated by emotions and their regulation is dependent upon the ongoing context and available repertoire of actions (Frijda, 2008), it is reasonable to surmise that the pattern of emotion regulation depicted above can also be influenced by the new technologically mediated context and its array of affordances, defined in this case as action possibilities offered by a particular object (Arciero & Bondolfi, 2009). However, if this indeed is the case, it is necessary to understand the specific role that information and communication technologies can play in emotional experience, regulation, and consequently, in psychopathology development and maintenance.

4.6. Situated Cognition: A technologically mediated context.

To understand the possible impact of information and communication technologies on human experience and cognitive processes, it is useful to extend the idea of cognition from intrapersonal processing of stimuli to an account that explicitly develops the relationship between cognition and surrounding contexts, namely, situated cognition theory.

According to Robbins and Aydede (2009), situated cognition theory proposes that human cognitive processes are shaped by sensory and motor capacities (usually called embodied cognition) which routinely exploit the structures in the natural and social environment (usually called embedded cognition). The exploitation of the environment can be exemplified by using a notepad to write down a shopping list. In this case, the memory processes that normally would be effortfully maintained (e.g., by repetition) are unloaded into the notepad and space is freed for other tasks. As with the previous accounts of emotions, the core aspect of situated cognition theory is that cognitive activity is embodied and shaped by the context in which it unfolds.

In fact, Smart, et al. (2017) used situated cognition theory as their basis to propose the Internet as a new and important ecological factor driving changes in an increasingly wider array of cognitive processes, an influence especially enhanced by the current mobility in which the Internet can be accessed by means of portable computers, smartphones, and other Internet-connected devices.

However, the fact that technology has shaped human experience and cognitive processes is not exclusive to information and communication technologies but a core aspect of human interaction with tools. Carr (2011) provided a brief historical account of the ways in which technological advances had historically influenced the way in which humans experienced the world, hence our cognitive processes. The author exemplified this point by mentioning that advances in mapmaking—a technology that made humans rely on smaller representations of physical cues for orientation—fostered the advancement of human abstract thinking. Further, following the massification of private reading propelled by the Guttenberg printing press in the fifteenth century—as opposed to reading out loud—and together with the subsequent miniaturization of books, people's ability to think abstractly was enhanced. Traced to the same source, a new form of deep thinking characterized by increased contemplation, reflection, and imagination was massified (Carr, 2011). Lastly, as with other technological advancements, the rapid and dynamic delivery of a virtually infinite amount of information associated with the rise of the Internet-connected era, the author argues, encouraged a new hurried and distracted mode of thinking more suitable for hastily arranged fragments of information from different sources rather than to follow a single argument for a long period of time (Carr, 2011).

Supporting this idea, a recent review from Loh and Kanai (2016) suggested that Internet penetration in daily life is associated with the adoption of a breadth-biased form of attention

control where individuals have more problems inhibiting distracting perceptual information. This seems to be partly involuntary and related to a higher degree of distractibility. An example of this in daily life is the case of "phubbing" explained as the action of looking at one's smartphone while having a face-to-face conversation with others (Robert & Davis, 2016). In industrialized societies, this behavior is particularly prevalent. A recent representative survey in the United States found that 89% of smartphone users reported using their phones during their most recent social activity (Rainie & Zickuhr, 2015). This poses a potential problem because it can disrupt the quality of face-to-face relationships. In fact, phubbing has been associated with decreased relationship satisfaction (Robert & Davis, 2016). This common action reflects the increased tendency for distractibility associated with the ubiquitous presence of devices with an Internet connection.

Beyond these processes, information and communication technologies have also shaped the way in which human emotions are experienced and enacted. Arciero and Bondolfi (2009) proposed, after considering insights from social constructionists' perspectives (see Gergen, 1991), that the blistering pace of changing contextual references afforded by these technologies has shaped human emotions to be more volatile and superficial. However, by superficial they refer to the ability to retune a particular emotional engagement with the hastily changing circumstances, thus being redeployed in a flexible manner in synchrony with the emerging contexts, a skill that would also require a less intense visceral engagement (Arciero & Bondolfi, 2009).

The new flexibility acquired in the emotional sphere is functional to the wider array of contexts in which people are now involved. However, it is important to note that context in this case is not only limited to the surrounding physical world but also extends to the one created by Internet-connected devices. In fact, one affordance of technology is to engage in a different

context of reference with a swift attentional shift toward the screen. While involved in a face-to-face conversation with a friend, it is also possible to converse with another person who is not physically present in the immediate surroundings. This action would also require a quick retuning of the emotional sphere to acquire a variable degree of synchrony with the new conversation partner.

Returning to the example of phubbing, it is interesting to note that the frequency of this behavior has been associated with proneness to boredom (Al-Saggaf, MacCulloch & Wiener, 2018), thereby giving smartphones an interesting emotional affordance. While in a face-to-face conversation with somebody who becomes temporarily uninteresting, an immediate action possibility is to tune out from the conversation and tune into another context afforded by technology. However, when doing this to endure boredom, finding an alternative method to overcome it (changing the topic, joking, or interacting in a different way) is hindered by disengagement from the ongoing situation.

In the following section, this distractive affordance of the Internet is proposed as an important aspect of uncontrolled use of technology to be considered as a modern tool for emotion regulation, and with this, as a new mechanism for the psychopathology of depression and Internet addiction.

4.7. The problem of Internet addiction and its definition.

More than twenty years ago, and before the massification of mobile media, Griffiths (1995) recognized what he called "technological addictions," defined as a class of behavioral addictions related to the interaction between human beings with machines. According to his components

model of behavioral addictions (Griffiths, 2005), this class of behaviors shares five main characteristics with substance addictions: salience, that is, the activity that dominates a person's life; mood modification, in other words, the experience of arousal and feelings of "escape" when engaged in the activity as a way of coping with life situations; tolerance, defined as the need to increasingly engage in the activity to reach the same effect; withdrawal symptoms, known as the unpleasant state directly after the activity is discontinued; and conflicts relative to the negative consequences of the compulsive engagement with the activity.

More specifically, Young (1998) recognized that uncontrolled use of the Internet was associated with psychosocial problems, leading her to establish the first set of criteria to define what she coined as Internet addiction. These criteria were a modified version of the DSM-IV (American Psychiatric Association, 1995) diagnosis for pathological gambling, for years considered an impulse control disorder, and at the time, the most akin to problematic use of the Internet. The original set of criteria for the diagnosis of Internet addiction was a preoccupation with Internet use and need for increased usage, unsuccessful efforts to control or cut back Internet use, emotional symptoms when not on the Internet, staying online longer than intended, jeopardization or risk of losing opportunities or relationships due to the Internet, concealment of the extent in which the Internet is used, and using the Internet as a way of escaping from problems or relieving a dysphoric mood.

It is noteworthy that both Griffiths' (2005) general and Young's (1998) specific conceptualizations of the phenomena of problematic use of technology share a salience component, uncontrolled use without regard for the possible negative consequences, discomfort when the activity is discontinued, and usage to relieve a negative affective state or to avoid

engagement with a problematic situation, thus linking the use of technology to negative life situations.

Also important is another line of thought that proposes—in an effort to address the high comorbidity between Internet addiction and other psychiatric disorders— that a problematic use of technology should not be explained by another Axis I disorder (Shapira, et al., 2003). This different conceptualization excludes, for example, a complex interrelationship between Internet addiction and affective disorders in favor of the notion of co-occurrence. This exclusion criterion was added by the authors under the assumption that Internet addiction cannot always be explained by other conditions (Shapira, et al., 2003).

The statement above highlights the core difference between the perspectives of Young (1998) and Shapira et al. (2003) toward uncontrolled use of the Internet. The first explicitly conceptualizes Internet addiction as a function of negative affectivity, and with this, opens the field to its functional relationship to mood disorders. The second rules out this option. This controversy reflects, as discussed by Mitchell (2000), the debate considering Internet addiction as a *sui generis* independent psychopathological entity or as the byproduct of pre-existing mental disorders or difficult life situations. Based on the previously announced concept of depression, emotions, and emotion regulation, an argument for the second option is developed in the subsequent section of this document, namely, Internet addiction as emerging from a coping mechanism to diminish the effects of negative emotions and difficult life situations.

4.8. The model of compensatory Internet use.

Based on the lack of theoretical development and agreement about the etiology of Internet addiction, Kardefelt-Winther (2014a) proposed the Compensatory Internet Use Model (CIU). The CIU model tries to explain why some people use the Internet in an uncontrolled way regardless of its possible negative consequences. He proposed that Internet use can be best described as a way of coping with difficult life situations, a common behavior grounded in understandable motivations that can become unhealthy in the long run (Kardefelt-Winther, 2014a; 2014b, 2017). It is this relationship between Internet use and unfulfilled real-life needs that the author posited as the guiding principle to interpret common associations, for example, between Internet addiction and depression (Ho, et al., 2014) or stressful life situations (Koenig, Fischer-Waldschmidt, Brunner, Resch, & Kaess, 2016). Therefore, the author proposed the addition of possible affordances of online activities and the motivations for going online when studying addictive Internet behaviors (Kardefelt-Winther, 2014a).

Beyond his recommendations to focus upon and enumerate a set of affordances of the Internet (Kardefelt-Winther, 2014a), the author paid less attention to developing an explanation for why the Internet is a suitable tool to deal with negative life situations. Given this, the following section further elaborates a set of possible explanations.

4.9. Affordances of the Internet as emotion regulation.

So far, the argument has considered emotions as phenomena that emerge in relationship to meaningful contexts, including the mobilization of the entire organism to prepare for actions that are dependent on the ongoing conditions and action repertoires with the goal of maintaining

or modifying the relationship to the environment (Scherer, 1984, 2005; Prinz, 2004; Gross & Thompson, 2007; Frijda, 2008). This environment, following situated cognition theory, is a constitutive part of every human cognitive and epistemic process because it is the concrete set of possibilities in which they unfold (Robbins & Aydede, 2009), while the Internet has been considered a particular environmental factor that is constantly and easily afforded (Smart, et al., 2017). This is summed as the Internet's ability to modify a vast array of human relationships toward the self, to others, and the world, including the way in which emotions are experienced and enacted (Arciero & Bondolfi, 2009). According to Greenfield (2012), a characteristic that makes the Internet so appealing—and potentially addictive—is that it offers a highly stimulating environment that includes social connections, videogames, and access to an unlimited amount of information that is available instantly on demand by means of mobile devices. In other words, there is always something to do, and with that, something to focus attention upon. There is always a different context with which to syntonize. This "attentional target" affordance of the Internet has been exemplified using phubbing as a common example in daily life in which an interaction that fails to maintain interest can be dealt with promptly by disconnection from the ongoing situation and attunement to another source of unlimited entertainment.

This particular movement of attention in emotion regulation literature is part of the family of processes called "attentional deployment," and it has the ability to modulate an emotional experience (Werner & Gross, 2010). For example, in the case of the Internet it is possible to expect a Facebook "like" or a response from a significant person on WhatsApp. It is also possible to watch cat videos which have been shown to produce mood enhancing effects (Myrick, 2015), to tune into an interesting plot of a new Netflix program, or to passively follow content on forums and social media without further interaction. It is safe to assume that all of

the listed experiences would have a particular emotional impact and capture viewer's attention while providing temporary distraction from ongoing offline situations. As stated before, this emotion regulation affordance of the Internet can be exacerbated by the new breadth-biased form of attention (Loh & Kanai, 2016) and the increasingly superficial mode of emotions (Arcier & Bondolfi, 2009) that emerged after the inclusion of digital technologies and their constant availability in daily life. In other words, while technology was created to improve our daily lives, we have also modified our ways of living to adapt to technology, this being the core idea behind the construction of an evolutive niche that will later create a new set of evolutive pressures (Laland, Matthews, & Feldman, 2016). This contextualization of the Internet as grounded in emotion regulation theory may help to better relate a problematic use of technology with daily life. It can also help to depathologize common behaviors that should not be problematic except when they are deployed in a context-independent and inflexible manner (Thompson & Calkin, 1996; Gross & Thompson, 2007; Werner & Gross, 2010; Aldao & Nolen-Hoeksema, 2012). To advance this, three mechanisms that may link depressive symptomatology to Internet addiction are briefly developed in the following section.

4.9.1. Experiences of Flow.

The Internet has been shown to offer a particular subjective state of complete involvement where time is distorted and all attentional resources are invested in the task at hand (Novak, Hoffman & Duhachek, 2003). This state is called a "flow experience" defined in the field of positive psychology as reflecting a proximal human motivation. This means that the activity is rewarding by itself and not as a function of a future goal (Csikszentmihalyi, 2014). For Csikszentmihalyi (2014), to experience flow there must be a balance between the perceived challenges of the task

and skills together with a clear set of goals to direct the behavior. However, according to Novak et al. (2003), it is also possible to experience flow while surfing the web without a clear goal. Of interest to the emotion regulation affordances of the Internet is an MRI study conducted by Ulrich, Keller, Hoenig, Waller, and Grön (2014) that found during a mental arithmetic task that flow experiences were associated with less activity in the medial prefrontal cortex and a negative arousal of the amygdala, thereby indicating a reduction in self-referential processing and negative affectivity, respectively. These results support the possible calming effect of an attentional shift and complete involvement in a task.

Even though the Internet can offer the possibility for emotion regulation, it is important to note that this is common behavior today. The question of when and how it may become problematic remains.

4.9.2. Back to depression: Usually disconnected from life situations.

In the case of depression, a particular pattern of emotion regulation strategies was discussed previously. When faced with a critical life event, a certain degree of passivity and avoidance together with a tendency to ruminate seemed to hinder the re-evaluation necessary for reorientation toward a new goal and the generation of a new engagement with the ongoing situation. Consequently, this would foster the prolongation of a depressed mood. It was also discussed that the Internet offers a constant and attractive "attentional target" to focus upon, a shift that is consistent with an "attentional deployment" emotion regulation strategy (Werner & Gross, 2010). Therefore, we can safely assume that when a significant negative event emerges, one new possibility to control its emotional impact is to shift the attentional focus toward screen

content to modify the emotional experience by engaging within a different context offered by the Internet. If done in an inflexible way, this can amplify the state of passivity toward the negative situation, thus reducing the attentional resources needed for its reappraisal, and in turn, fostering the negative affective state. In summary, this attentional shift can create a functional obstacle for a new engagement with the ongoing context. This can then amplify the need to use the Internet to self-regulate based on coping with a negative affective state from the beginning, thus creating a vicious circle. Consistent with emotion regulation theory (Gross & Thompson, 2007; Werner & Gross, 2010), a short-term goal of downregulating a negative state can create a problematic use of the Internet in the long term.

Rooted as attentional deployment emotion regulation strategies, one circumstance in which this mechanism may unfold is the possibility of experiencing flow on the Internet. Another possibility, following the CIU model, is to focus on an explicit intention (Kardefelt-Winther, 2014a) such as distracting oneself or disconnecting from life situations. Hence, flow is the possibility to achieve a state of complete absorption without a manifest intention while using the Internet to disconnect from life situations; this pertains to an explicit account of a motivation to use the Internet to become distracted from the ongoing context.

4.9.3. Situational Selection: The case of procrastination.

A possible consequence of diverting attention toward another source on a screen is that it can also foment procrastination. This can be defined as the delay of an intended course of action despite the possibility of negative consequences (Steel, 2007) and may be also be achieved by using the Internet for more pleasant purposes. In fact, studies have shown that procrastination

can be provoked by a bout of anxiety preceding the realization of a task (Schouwenburg, 2004); therefore, it can also act as a situational avoidance emotion regulation strategy (Werner & Gross, 2010) which can also increase the degree of passivity of an individual when confronted with a difficult situation.

By including the possibility of experiencing flow online—combined with the motivation to use the Internet to disconnect from life situations or procrastinate about unpleasant tasks—this project sought to explain the association of depressive symptomatology and Internet addiction, as well as to test for the affordances of the Internet as a tool for emotion regulation.

4.10. A note about the evolution of this doctoral dissertation and residual questions.

As discussed by Kardefelt-Winther (2014a), a theory to explain problematic use of technology has yet to be fully developed. Therefore, this dissertation originally proposed a broader approach to finding an explanation of the relationship between depressive symptomatology and Internet addiction by including a test for the influence of the quality of social relationships and perceived stress. The first variable was proposed because of "replacement hypothesis." This posits that contacts made through the Internet can replace good face-to-face social relationships and then, consequently, generate a source of stress (Kraut, Patterson, Lundmark, Kiesler, Mukophadhyay, & Scherlis, 1998). The second variable was included because of its recognized influence on the development of both depression (Kendler, et al., 1999) and Internet addiction (Yadav, et al., 2013; Kaess et al., 2017). However, following the first submission of this research project, the theoretical background sustaining its hypotheses evolved to include emotion regulation theory (Gross & Thompson, 2007; Werner & Gross, 2010) and the CIU model (Kardefelt-Winther,

2014a), thus making it more advisable to focus in a more explicit way on specific affordances of the Internet as a potential source for new ways of emotion regulation.

4.11. The focus of this dissertation.

Based on the information, data and theories presented to this point, this dissertation's primary focus was to explain of the relationship between depressive symptomatology and Internet addiction by considering specific intentions for using the Internet as an emotion regulation strategy. For this, the factor structure of the most psychometrically evaluated measure of Internet addiction was tested, followed by an account of the role of flow experiences online, procrastination, and using the Internet to disconnect from life situations. All are proxies for emotion regulation in the relationship between depressive symptomatology and Internet addiction. Even though this was not the original selection of variables proposed in the dissertation project submitted in 2016, it represents a more focused version of the original idea of the Internet as a means for emotion regulation.

5. Methods.

5.1. General aspects of the design.

Two different datasets were used for the purposes of this dissertation. The first was composed by a group of adults, collected in 2014, described in Hernández and Rivera (2018), and presented below. This dataset was utilized for the transcultural adaptation and validation of the Internet addiction test (Young, 2010).

The second dataset was collected to test the hypotheses regarding the Internet as an emotion regulation strategy in the context of depressive symptomatology. It was originally devised as a four-waves longitudinal design; however, it was later reduced to three waves when this was considered an adequate number for the test of a mediation model (Selig & Preacher, 2009), and no additional information was needed. Given that it was specifically collected for this dissertation, the sample procedure is further described below.

5.2. Sample.

A convenience sample of high school students was recruited from six schools in the metropolitan region of Chile. Authorization and informed consent letters were sent to parents of students between the ages of 13 and 19 to authorize their participation. Upon consent, an informed assent process was made with authorized adolescents by a member of the research team emphasizing the voluntary character of their participation. Adolescents who consented to participate in the study were entered into a raffle for a chance to win a pair of movie tickets for their inclusion in every wave. Only one school did not allow the use of incentives.

Participants completed written questionnaires in their classrooms at baseline from late September to early December 2017 (t0). The first follow-up was conducted between mid-March to mid-May 2018 (t1), while the second follow-up was conducted in August 2018 (t2). To reduce attrition rates, students were allowed to participate in their class-rooms or online. In both settings, the voluntary character of their participation was explicitly mentioned.

A total of 529 students completed the first sampling wave, 327 (61.2%) who responded at t1 while 343 (64.8%) responded at t2. Of these, 238 (44.9%) participants completed all three measurements. Independent samples t-tests showed no significant differences for baseline levels of all study variables between those who completed and those who dropped out, this an indication that attrition was missing at random (Dong & Peng, 2013). A detailed account can be found in Annex 1.

5.3. Ethical considerations within the sampling procedure.

Considering that adolescence is a possible window of time for the development of psychopathology (Cicchetti & Rogosch, 2002; Dahl & Gunnar, 2009), students potentially at risk for a clinically relevant depressive symptomatology were referred to their schools where their situations were further evaluated. Treatment was suggested in cases were intervention was deemed necessary. This procedure was clarified in the informed consent and assent forms, and it was also verbally explained to the participants at the beginning of the study. A student was considered at risk if he/she scored on or above the Chilean Beck Depression Inventory's cut-off score of 13 points (Valdés, Morales-Reyes, Pérez, Medellín, Rojas & Krause, 2017). As the instrument assessed suicidal ideation, a student was also considered at risk if he/she answered

with a 2 in the suicidal ideation question, this being an option that resembles the presence of passive suicidal ideation which has been shown to be a risk factor for suicidal behavior (Baca-Garcia et al., 2011). To ensure confidentiality, no additional information was shared with the school contact. The study was reviewed and approved by the ethics committee for social sciences of the Pontifical Catholic University of Chile.

5.4. Instruments.

Prior to the sampling procedure, instruments that were not available in Spanish were translated and adapted to the Chilean context following Guillemin, Bombardier and Beaton's (1993) suggestion for transcultural adaptation of measures. First, two translations into Spanish were performed by a bilingual member of the research team and by an external translator who was blind to the objectives of the study. Both translations were back translated to English by two bilingual translators who were also blind to the objectives of the study. The original, the four translations, and all back translations were used by an expert committee to assembly the final version of every instrument.

Demographics.

Gender, age, district of residence, Internet access, daily amount of Internet use, relationship status, preferred activities on the Internet, family status, and digital literacy were measured at baseline.

5.4.1. Central instruments of this dissertation.

The following instruments were used in the three articles comprising the present dissertation and were measured in the three sampling waves. Reliability measures are provided in the articles.

- *Internet Addiction Test* (Young, 2010). The Internet Addiction Test is a self-report measure that was comprised of twenty items using a 5-point Likert scale from "1 = rarely" to "5 = always" with an option of "0 = not applicable," that measures excessive and compulsive Internet use. The Chilean version of this instrument was used (Hernández & Rivera, 2018). It is the most psychometrically evaluated scale of IA (Laconi, et al., 2014) and has been adequately used in adolescent samples (Lam, Peng, Mai, & Jing, 2009).
- *BDI-I* (Beck, Ward, Mendelson, Mock & Erbaugh 1961). The Beck Depression Inventory is a self-report measure that evaluates the behavioral manifestations of depression. It was comprised of twenty-one items using a 4-point scale. It has also been adequately administered with adolescent samples (Beltrán, Freyre & Hernández-Guzmán, 2012). The Chilean version of the instrument was used (Valdés, et al., 2017). The BDI-I is usually computed in its one-dimensional form, and proposes a cut-off score of 13 points for a clinically relevant depressive symptomatology.
- *Flow Experiences Online* (Yang, et al, 2014). This is a composed scale to measure flow experiences online that adapted items from similar questionnaires measuring enjoyment, concentration, telepresence, and time distortion. It consisted of thirteen items using a 7-point Likert Scale. This scale was applied in the original study to high school students and was adapted to Spanish for this dissertation.

- *Internet Procrastination.* To directly measure the intention to procrastinate using the Internet, a single item was developed: “Do you use the Internet to postpone tasks that you find unpleasant?” The Likert scale used ranged from 1 (“never”) to 5 (“very often”). This item focused on the central aspects of procrastination, namely, the voluntary choice of postponing a task that competes with another (Steel, 2007) while including the aversive character of the task to be postponed (Pychyl, Lee, Thibodeau, & Blunt, 2000). The question was consistent with a “situational selection” emotion regulation strategy (Werner & Gross, 2010) and was built using a frequency scale as a proxy for flexibility in the deployment of this behavior.
- *Disconnection using the Internet.* The intention to use the Internet to disconnect from life situations was also measured with a single item: “Do you use the Internet to disconnect from day-to-day situations?” The Likert scale for this question ranged from 1 (“Never”) to 5 (“Very Often”). The question explicitly considered the use of the Internet to distract oneself from life situations; it was constructed using lay language to enhance familiarity for adolescents and was consistent with an “attentional deployment” emotion regulation strategy (Werner & Gross, 2010). It was built using a frequency scale as a proxy for flexibility in the deployment of this behavior.
- *PSS-14* (Cohen, Kamarck, & Mermelstein, 1983). The Perceived Stress Scale is a self-report measure that evaluates perceived stress and was designed for samples with at least junior high school education level. For this research, it consisted of fourteen items in a 5-point Likert scale that included a value of zero with a two-factor structure for positive and negative items. The Spanish version adapted in México (González & Landero, 2007) was used.

5.4.2. Secondary instruments of this dissertation.

The following instruments were only measured at baseline, based on the first project. Even though they provided valuable information, they were not used in the following measurement points because they deviated from the final focus of this dissertation. This also enhanced compliance of the study by means of a shorter questionnaire.

- *DERS* (Gratz & Roemer, 2004). The Difficulties in Emotion Regulation Scale is a self-report measure that evaluates control, awareness, understanding, and acceptance of emotions. The Chilean version (Guzmán, Trabucco, Urzúa, Garrido & Leiva, 2014) was used, consisting of twenty-eight items using a 5-point Likert scale with a Cronbach's α of .92. The instrument has been adequately used in adolescents (Weinberg & Klonsky, 2009).
- *EVOS* (Aguilar-Raab, Grevenstein & Schweitzer, 2015). The Evaluation of Social Systems Scale is a self-report measure that measures the quality of relationships and its applicability to different social systems, and it shows metric invariance across couple, family, and work contexts. For this research, it consisted of ten items using a 4-point Likert scale including a value of zero with a Cronbach's α of .87 and a two-factor structure: "relationship quality" and "collective efficacy." The English version was adapted to Spanish for this dissertation and used in reference to both parents and the group of friends.
- The *UCLA* Loneliness scale version 3 (UCLA-3; Russell, 1996). The UCLA-3 is a self-report measure of loneliness consisting of twenty items using a 4-point Likert Scale, with an original unidimensional structure of a single factor, and two uncorrelated method factors that captured the variance of positive and negative wording of items. It showed

a Cronbach's alpha that ranged from .89 to .94. This scale was adapted to Spanish for the purposes of this study.

6. **Objectives.**

6.1. General Objective.

The general objective was to estimate the role of flow experiences online, difficulties in emotion regulation, quality of social relationships, and perceived stress in the relationship between depressive symptomatology and Internet addiction in a sample of Chilean adolescents.

6.2. Specific Objectives.

> *Objective 1:* To estimate the role of online flow experiences in the relationship between depressive symptomatology and Internet addiction in a sample of Chilean adolescents.

This objective was directly addressed in the second article.

> *Objective 2:* To estimate the role of difficulties in emotion regulation in the relationship between depressive symptomatology and Internet addiction in a sample of Chilean adolescents.

This objective was addressed in the second and third articles when using the intentions to use the Internet to procrastinate or to disconnect as proxies for difficulties in emotion regulation.

> *Objective 3:* To estimate the impact of the quality of social relationships with family, romantic partners, and peer groups in the relationship between depressive symptomatology and Internet addiction in a sample of Chilean adolescents.

As stated previously, given the dissertation's revised focus, and for viability reasons, this objective was not addressed in the articles in this dissertation. Additionally, as there was no

hypothesis regarding the specific role of this variable, it is not discussed further in this document.

> *Objective 4:* To estimate the role of perceived stress in the relationship between depressive symptomatology and Internet addiction in a sample of Chilean adolescents.

This objective was addressed in the second article, where perceived stress was subordinated as a control variable to the moderation effects. It was also further explored in Annex 3.

7. Hypotheses.

Hypothesis 1: There will be a significant mutual and positive effect between depressive symptomatology and Internet addiction levels, perceived stress, and a negative quality of social relationships.

The mutual influence of depressive symptomatology and Internet addiction is addressed in Article 3. Its mutual influence with perceived stress is evaluated in Annex 3 and briefly discussed, while the mutual influence with the quality of social relationships was not evaluated. This exclusion was made because this variable is not central to the "vicious circle" proposed in the theoretical background.

Hypothesis 2: Online flow experiences will moderate the relationship between depressive symptomatology and Internet addiction.

This hypothesis was directly addressed in Article 2.

Hypothesis 3: Perceived stress will mediate the association between depressive symptomatology and Internet addiction.

This hypothesis is not addressed in any of the articles, however, it is evaluated in Annex 3 and briefly discussed.

Hypothesis 4: Difficulties in emotion regulation will mediate the association between depressive symptomatology and Internet addiction.

This hypothesis is tested in Article 3 by taking the intentions to use the Internet to disconnect as a proxy for difficulties in emotion regulation. Given its length, the difficulties in emotion

regulation scale (Gratz & Roemer, 2004) was not evaluated in the follow-ups. This decision was made to enhance compliance to the study protocol.

A summary of the changes:

- Dropped from the study was the evaluation of the role of the quality of social relationships with the group of friends, as well as both parents on the relationship between depressive symptomatology and Internet addiction.
- The role of perceived stress in the relationship between depressive symptomatology and Internet addiction was included only as a control variable in Article 2. However, given that there were explicit hypotheses regarding its influence in the aforementioned association and enough information for their contrast, they were evaluated in Annex 3 and briefly discussed.
- The test for the influence of difficulties in emotion regulation was operationalized following the CIU model's recommendations (Kardefelt-Winther, 2014a) of focusing on the evaluation of motivations behind Internet use. These motivations were hypothesized following emotion regulation theory (Werner & Gross, 2010) and reflected two families of processes: "situational avoidance" with procrastination, and "attentional deployment" by disconnection. Consequently, the difficulties in emotion regulation scale (Gratz & Roemer, 2004) was not further applied or used in the analyses in this document.

8. List of scientific publications.

To explain the association between depressive symptomatology and Internet addiction, this dissertation was comprised of three thematically related articles.

> **Article 1:** "Hernández, C., & Rivera Ottenberger, D. (2018). Adaptación Transcultural y Evaluación de las Estructuras Factoriales del Test de Adicción a Internet en Chile: Desarrollo de una Versión Abreviada. *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica*, 49(4). doi:10.21865/ridep49.4.12."

This article relied on a previously collected adult sample and offered the adaptation process of the Internet addiction test to the Chilean culture. It also proposed a two-factor structure of the instrument based on emotion regulation literature.

> **Article 2:** "Hernández, C., Rivera Ottenberger, D., Moessner, M., Crosby, R. D., & Ditzen, B. (2019). Depressed and swiping my problems for later: The moderation effect between procrastination and depressive symptomatology on Internet addiction. *Computers in Human Behavior*, 97, 1–9. doi:10.1016/j.chb.2019.02.027."

This article relied on the baseline measurement of the high school students' sample described above. It showed that the relationship between depressive symptomatology and Internet addiction is moderated by the degree in which the participants used the Internet to procrastinate. This was not the case for online flow experiences. The moderation effect of procrastination remained significant even when controlled by perceived stress levels.

Article 3: " Hernández, C., Rivera Ottenberger, D., Kaess, M., Moessner, M., Crosby, R.D., & Ditzen, B. (submitted) Disconnected from my life: A Longitudinal Explanation of the Relationship Between Depressive Symptomatology and Internet Addiction." Submitted to the *Journal of Affective Disorders.*

The final article analyzed the data generated by those who completed every follow-up from the adolescent sample study. It built on the findings from the second article by showing that using the Internet to disconnect from life situations mediated the relationship between depressive symptomatology and Internet addiction.

The author of this dossier (C.H.) participated in the design, data collection, data analysis, and writing process of every article composing this dissertation.

In summary, the first article provided the initial step toward the study of Internet addiction in Chile with the transcultural adaptation and validation of the Internet addiction test (Young, 2010). The second and third articles provided a test for the possible mechanisms linking depressive symptomatology and Internet addiction. The Internet addiction test (Young, 2010) has shown a high variability in its factorial structures between validation attempts (Hernández & Rivera, 2018). Because of this, and given that it is regularly used in unidimensional form based partly on its good reliability, a decision to use the complete scale for the second and third articles was made with the objective of fostering comparability of the results.

9. Scientific publications.

In the next pages, the three articles composing this dissertation will be presented. Because they were aimed to be published in different journals with diverse citation styles and structures, they were reformatted for the purposes of this presentation, however keeping their independent citation styles. No numbering was used for the sections inside each article to maintain the dossier's structure.

The first article was published in Spanish, so a translation to English is provided. The second and third articles are preprints (or "author's manuscripts"), so differences are expected to emerge with the published versions. To avoid duplicates, bibliographic references are presented together at the end of the dossier in a homogeneous style.

9.1. First Article.

Adaptación transcultural y evaluación de las estructuras factoriales del Test de Adicción a Internet en Chile: Desarrollo de una versión abreviada

A Chilean transcultural adaptation and assessment of the Internet Addiction Test factor structures: Development of a brief version

Short title: Validación Test de Adicción a Internet.

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Abstract

Internet addiction is a clinical phenomenon that has raised concerns about the addictive properties of the new information and communication technologies (ICTs). The study aimed to transculturally adapt Young's Internet Addiction Test (1998) and to assess its previously proposed factor structures. Given the test's antiquity, the study also aimed to develop a brief and valid version of it with good psychometric properties. The sample consisted of 425 participants between the ages of 18 and 68 years. Through a series of confirmatory factor analyses, none of the previously proposed factor structures achieved a good level of fitness to the data. A brief version of the instrument with two theoretically oriented dimensions was developed through a content analysis. The proposed structure achieved a good level of internal consistency and fitness to the data.

Keywords: Internet Addiction Test, psychometric properties

Introduction

Since its creation, the Internet has extended its scope and influence in society at an impressive rate. The Internet is accessed by 49.7% of the world's population, with rates reaching 88.1% in North America, 77.4% in Europe, 68.1% in Australia and Oceania, and 59.6% in South America and the Caribbean (Internet World Stats, 2017). In continental Latin America, Chile has the second-highest Internet access rate (79.9%), being surpassed by Ecuador (83.8%) and followed by Argentina (74.9%) (Internet World Stats, 2017).

Internet connectivity has been facilitated by the proliferation of portable devices (e.g. cell phones, tablets, computers) that have made it easier to access the net throughout the day and in a variety of contexts (e.g. home, workplace, street). Although this tool has evidently improved connectivity and quality of life, there is growing concern about negative behaviors and consequences associated with its use (Blumer, Hertlein, Smith, & Allen, 2014).

A variety of terms have been proposed to refer to problematic behaviors associated with Internet use, such as *problematic Internet use*, *Internet addiction*, *pathological Internet use*, *excessive Internet use*, and *Internet dependency* (Kelley & Gruber, 2010; Shapira et al., 2003; Young, 2010). What these terms have in common is that they refer to the person's inability to control his/her Internet use, which is accompanied by significant levels of distress and anxiety when offline and a deterioration in performance in several aspects of his/her life, such as studies, work, and/or social relationships (Shapira et al., 2003; Young, 2010).

Regardless of how the phenomenon is referred to as, several studies have established a link between excessive and compulsive Internet use and emotional problems, such as feelings of loneliness (Esen, Aktas, & Tuncer, 2013; Yao & Zhong, 2014), anxiety related to interactions

and audiences (Sahin, Korkmaz, & Usta, 2011), impulsiveness (Choi et al., 2014; Dalbudak et al., 2013), shyness and aggressiveness (Odaci & Çelik, 2013), depression (Orsal, Orsal, Unsal, & Ozalp, 2013; Yadav, Banwari, Parmar, & Maniar, 2013), anxiety and stress (Yadav et al., 2013), negative perceptions of one's social support (Gunuc & Dogan, 2013), poor academic performance (Stavropoulos, Alexandraki, & Motti-Stefanidi, 2013), and an evening chronotype, characterized by more anxiety and compensation for sleep deprivation during the weekend (Lin & Gau, 2013), which has been linked in adolescents to poorer academic performance in mathematics (Escribano-Barreno & Díaz-Morales, 2013). Internet addiction has also been found to correlate positively with the time spent online (Khazaal, Billieux, Thorens, Khan, Louati et al., 2008; Young, 2004) and negatively with age, as younger people display higher levels of vulnerability (Khazaal et al., 2008).

The Internet Addiction Test (IAT), developed by Young (1998), was the first instrument for evaluating problematic Internet use. It was constructed upon the basis of DSM-IV criteria for diagnosing pathological gambling, under the assumption that both these issues constitute addictions and have shared behavioral traits. The test assesses the impact of Internet use on a person's daily routine, social life, productivity (studies, work), sleep, and feelings. In South America, a Spanish translation of the IAT is available and researchers have tried to validate it in Colombia (Puerta-Cortés & Carbonell, 2013; Puerta-Cortés, Carbonell, & Chamarro, 2012). Later on, other questionnaires have been developed based on the original instrument, such as the Questionnaire of Internet-Related Experiences –Cuestionario de Experiencias Relacionadas con Internet, CERI– (Beranuy, Chamarro, Graner, & Carbonell-Sánchez, 2009) and the Problematic Internet Use Questionnaire –PIUQ– (Demetrovics, Szeredi, & Rózsa, 2008). These questionnaires share several questions with the original test.

The IAT is among the most popular instruments for to evaluating Internet addiction or problematic Internet use in clinical and research environments (Aboujaoude, 2010). Several attempts at validating this instrument have been conducted in a variety of cultural contexts and populations, generally finding it to be adequately reliable (Jelenchick, Becker, & Moreno, 2012; Karim & Nigar, 2013; Khazaal et al. 2008; Korkeila, Kaarlas, Jääskeläinen, Vahlberg, & Taiminen, 2010; Panayides & Walker, 2012; Puerta-Cortés, et al., 2012; Watters, Keefer, Kloosterman, Summerfeldt, & Parker, 2013; Widyanto, Griffiths, & Brunsden, 2011; Widyanto & McMurran, 2004), but with inconsistent factor structures.

The structure of the IAT was first evaluated in the United Kingdom, with a 6-factor structure being found (Widyanto & McMurran, 2004). Later validation studies conducted in other countries have found a variety of factor structures, such as a one-factor solution in France (Khazaal et al., 2008) and Portugal (Pontes, Patrão, & Griffiths, 2014); a two-factor solution in the USA (Jelenchick et al., 2012), Finland (Korkeila et al., 2010), and Canada (Watters et al., 2013); a three-factor solution in Colombia (Puerta-Cortés et al., 2013), China (Lai, Mak, Watanabe, Ang, Pang, & Ho, 2013; Chang & Man Law, 2008), and England (Widyanto et al., 2011), and a four-factor structure in Bangladesh (Karim & Nigar, 2014).

This inconsistency in the factor structures detected has been attributed to the diversity of the participants enrolled, technical differences among the reduction techniques used to perform exploratory factor analyses (Watters et al., 2013), and cultural differences that could affect the presentation of problematic behaviors associated with Internet use (Chen & Nath, 2016). However, less research has focused on the possible variability and poor fit caused by the characteristics of the items included in the IAT and their obsolescence after the instrument's creation in 1998.

Taking into account the growing concern about the problems associated with Internet use, the swift penetration of this technology in South America, specifically in Chile, and the cultural differences among countries in this region, it is necessary to develop a valid and reliable instrument for assessing Internet addiction and its impact on Chilean culture. Given the inconsistency among the factor structures presented in previous research, and given the factors discussed above, the study aims to translate the Internet Addiction Test (Young, 1998) into Spanish and adapt it to Chilean culture, evaluate the fit of the factor structures found in other studies, and propose an abbreviated and up-to-date version of the instrument with good psychometric indexes.

Methods

Participants.

The sample comprised 425 participants, 43.3% of them men and 56.7% women. Their age ranged from 18 to 68 years (M= 26.02, SD= 9.96). The mean value of the participants' Internet use was 35.54 hours per week (SD=26.02). With respect to their occupation, 2.4% of the participants were secondary education students, 50.6% were higher education students, 28.1% were dependent workers, 10.2% were independent workers, and 8.7% were unemployed. Nearly all the participants (96.2%) were able to access the Internet from their home, and 67.3% also used the net to work.

Instruments.

Demographic and Internet use questions.

The questionnaire included questions about the respondents' nationality, time living in Chile, sex, age, educational level, main occupation, time spent online per week, ability to access the Internet at home or at work, and the percentages of Internet use by purpose.

Internet Addiction Test.

The Internet Addiction Test (Young, 1998) comprises 20 items scored on a 5-point Likert scale (0= does not apply, 5= always). It is used to evaluate respondents' Internet addiction, along with issues related to time management, rejection of work or duties, fantasies about Internet use, and preference of Internet use over unmediated social contact (see Annex 5). The maximum possible score is 100 points. Higher scores reflect higher levels of associated problems. The Chilean version of the instrument was used in this study.

Procedure.

The participants were recruited online, through an invitation published in forums, blogs, and social networks such as Facebook and Twitter over a seven-week period in 2014. Inclusion criteria were being Chilean, having lived in Chile for at least two years, and being of legal age (18 years old in Chile). The questionnaire was administered online. Before being able to access it, the participants received an informed consent letter that outlined the study and its aims, notified them that they would be able to quit at any time and without any negative consequences, and ensured them that their anonymity would be guaranteed. The letter also included the contact details of the researchers for the participants to ask any questions they wished. The information

was collected using Survey Monkey, which boasts SSL encoding and guarantees that no IP numbers can be downloaded along with the data.

Translation and transcultural adaptation of the instrument.

Although there is a South American translation –produced in Colombia by Puerta-Cortés and Carbonell (2013)– we chose to conduct the whole process from the start to guarantee a direct adaptation, given the differences between Chile's and Colombia's colloquial language and considering that the Colombian version underwent some modifications (major in question three and minor in question six).

The instrument was translated into Spanish by two independent translators, following the recommendations made by Guillemin, Bombardier, and Beaton (1993) for the transcultural adaptation of instruments. One of the translators was part of the research team and was aware of the aims and underlying concepts of the material to be translated, in order to facilitate a more reliable translation (Guillemin et al., 1993). The other translator knew neither the aims nor the underlying concepts of the instrument, which was expected to elicit unexpected meanings conveyed by the original tool. Both translators were bilingual and translated into their mother tongue. Afterward, to reduce bias, two back-translations were produced by two independent bilingual translators, none of whom knew the instrument's aims or its underlying concepts. Even though their mother tongue is Spanish, both had lived in an English-speaking country for nearly five years and currently work for a variety of international service agencies thanks to their near-native command of the language. All translators and back-translators reported their comments, especially regarding words or concepts that could be hard to render into Spanish. Afterward, a

committee was formed to produce the final version of the instrument, composed of both members of the research team and a methodological advisor, all of them bilingual. Following the recommendations made by Guillemin et al. (1993), both the original version and all subsequent ones were regarded as equally important and open to modification. Semantic, idiomatic, experiential, and conceptual equivalences were evaluated for each item of the five versions (original, translations 1 and 2, back-translations 1 and 2). The final instrument included the opinions of the committee members and was piloted following the recommendations made by Gjersing, Caplehorn, and Clausen (2010) for the transcultural adaptation of research instruments. Thirty volunteers were recruited in several social networks to paraphrase each item, report their level of understanding, and mention if they felt that any words or concepts were ambiguous. A specific question about the word *intimacy* was added to the questionnaire because it was found to be problematic by the committee and the translators. With respect to semantic adjustments, based on the pilot study, the use of social networks and instant messaging applications was added to question 7. This was done to bring the terminology up to date and preserve its meaning, given that 19 years have passed since the creation of the test. Regarding item 3, results showed that people in Chile interpret the word intimacy as sexual intercourse, so it was specified that the intended meaning is physical and/or emotional intimacy (Annex 5). Apart from these differences, the piloted document was similar to the Colombian version (Puerta-Cortés & Carbonell, 2013) and included part of the changes made to question six (translating "schoolwork" as "deberes académicos" [academic duties]) since the panel of experts found it to be pertinent.

Analytic strategy.

Descriptive statistical analyses and correlations were performed using R (R Development Core Team, 2008). Given the existence of the multiple factor structures described, we chose to test them using a set of confirmatory factor analyses (CFA). In order to do this, we used the "Lavaan" library for R (Rosseel, 2012) and a weighted least squares—mean and variance adjusted (WLSMV) estimator due to the ordinal nature of the responses and its robustness in the absence of normality that usually emerges with ordinal or categorical questions with few response choices (DiStefano & Morgan, 2014). The model's fit was evaluated with χ^2 ($p>.05$), CFI and TLI (>.95), RMSEA (<.06), and RMSR (<.08), using the values in parentheses as indicators of good fit (Hu & Bentler, 1999). For RMSEA, the confidence interval was set at 90%. Although the CFI and TLI indicators are strongly correlated, both were reported because the latter tends to penalize more complex models (Klyne, 2016). Since the instrument was constructed in 1998 (Young, 1998), the research team performed a content analysis to detect potentially problematic or outdated items after the rapid changes undergone by technology-related behaviors. This process aimed to create an abbreviated version of the Internet Addiction Test (IAT) with good psychometric properties and up-to-date items. The items that remained after the elimination process were grouped into two theoretical factors.

The abbreviated version of the IAT was tested with a CFA in a cross-validation process with half of the sample, selected at random. This approach was used to detect any potential sources of poor fit and then confirm with the other half. In addition, a multigroup analysis was conducted with the solution selected and the full sample to estimate its factor invariance by sex, which was evaluated through a non-significant χ^2 difference test and a CFI difference lower than .01 (Cheung & Rensvold, 2002). Both indicators reflect the maintenance of the model's fit when

setting the parameters chosen for both groups at the same value. Lastly, the predictive power of age and sex regarding both latent variables was established using structural equation modeling. The reliability of the shortened scale was evaluated with Cronbach's Alpha, calculated with the "multilevel" library for R (Bliese, 2016).

Results

CFA - models described.

Ten CFAs were performed based on the factor structures reported in prior research, where none of them attained acceptable fit relative to the criteria proposed (table 1). This may be a sign of problems with the specification of the models and the characteristics of the items used (Clark & Watson, 1995; Hinkin, 1995). Then, a content analysis was conducted to attempt to overcome the inconsistency and the poor fit of the structures tested, which failed to reproduce the observed correlation matrix adequately.

Table 1.

Fit indexes of previously proposed confirmatory factor analyses

	x2	CFI	TLI	RMSEA	RMSR
One Factor					
France and Portugal (Khazaal et al., 2008; Pontes et al., 2014)	<.05	.802	.777	.064	.062
Two Factors					
USA (Jelenchick, et al., 2012)	<.05	.908	.896	.044	.047
Finland (Korleika, et al., 2010)	<.05	.836	.815	.058	.057
Canada (Watters et al., 2013)	<.05	.940	.918	.041	.037
Three Factors					
Colombia (Puerta Cortés et al., 2013)	<.05	.892	.877	.047	.050
China (Lai, et al., 2013)	<.05	.887	.867	.051	.050
China (Chang, et al., 2008)	<.05	.881	.863	.051	.051
England (Widyanto et al, 2011)	<.05	.826	.800	.060	.057
Four Factors					
Bangladesh (Karim, et al., 2013)	<.05	.844	.815	.057	.054
Six Factors.					
UK (Widyanto, et al., 2004)	<.05	.815	.773	.064	.059

Note: The Canadian versión (Watters, et al., 2013) used a bifactorial approximation, while Lai's, et al., (2013) Chinese version used a hierarchical approximation.

Content analysis and construction of the brief scale.

A content analysis was performed to eliminate any items that could cause issues or had become outdated. We sought to remove items that targeted specific populations, were found to be ambiguous, referred to two different phenomena, or reflected sources of variability not linked with addictive Internet use, since they could be a major source of interpretative heterogeneity (Clark & Watson, 1995). This could result in lower content validity due to evaluating domains other than the domain of interest (Hinkin, 1995).

With respect to the above, item 3 was eliminated because it depends on the respondent having a partner, while item 4 was removed because nowadays, due to the emergence of social networking applications, it is not pertinent to use meeting other people online as a sign of

Internet addiction (Khazaal et al., 2015). Items 6 and 8 were eliminated because they are applicable to other populations (students, workers, and students/workers), which are sometimes mutually exclusive. Questions 9 and 15 were removed because they refer to two different phenomena within the same item, thus increasing variability and rendering their interpretation ambiguous. Items 7 and 11 were eliminated because nowadays, when Internet access is widespread and required in work and educational contexts, early use of this tool can be strongly influenced by external requirements; also, since modern smartphones enable people to quickly check the net, their usage is not necessarily problematic. This point is reflected by recent etiological studies on the establishment of attachment behaviors linked to smartphones that resemble interpersonal attachment behaviors (Konok, Gigler, Bereczky, & Miklósi, 2016). Lastly, question 18 was omitted because it was considered that concealment can be related to other phenomena such as online infidelity and illegal activities, thus introducing more sources of variability and not necessarily indicating addictive behavior (Wisman, 2016).

The remaining 11 items were theoretically assigned to two factors. The first factor, labeled lack of control, grouped together the items that refer to the respondent's loss of control over his/her Internet use, either in terms of the time spent online or the consequences of this behavior. The second factor, labeled emotional dysregulation, grouped together the items that reflect a type of Internet use linked to emotional dysregulation, including irritation at interruptions, depressed mood when offline, and avoidance of social situations due to preferring to spend time online. The items included in the abbreviated version are presented in Annex 2.

CFA - brief scale.

In order to evaluate the factor structure of the proposed questionnaire, a CFA was conducted using a WLSMV estimation method on a random subsample of 212 cases. The resulting model displayed good fit, with χ^2 (43)=55.951, p>0.05, CFI=.969, TLI=.960, and RMSEA=.038[90% CI=.000 – .063], as well as SRMR=0.042. The analysis of the residuals revealed that item 5 displayed high values compared with 6 to 10 of the remaining items. In addition, modification indexes suggested its loading to the emotional dysregulation factor, a change with no theoretical basis. Therefore, item 5 was eliminated. The new model displayed improved fit, with χ^2 (34)=37.214, p>0.05, CFI=.992, TLI=.989, and RMSEA=.021[90% CI=.000 – .056], as well as SRMR=0.035. It also showed a better residuals pattern; therefore, it was not justifiable to remove any more items. The modified factor structure was tested with the remaining 213-case sample, which yielded good fit: χ^2 (34)=42.150, p>0.05, CFI=.978, TLI=.970, and RMSEA=.034[90% CI=.000 – .063], as well as SRMR=0.042. The factor loadings of both samples were high and significant, as was inter-factor correlation (Table 2).

Table 2.

Factor loadings and correlations in cross validation

		Loadings in sample 1	Loadings in sample 2	Loadings in total sample.
Lack of control.				
	P1	.621	.591	.601
	P2	.696	.707	.703
	P14	.732	.695	.712
	P16	.837	.794	.814
	P17	.730	.737	.734
Emotional dysregulation.				
	P10	.538	.521	.531
	P12	.672	.594	.636
	P13	.641	.617	.632
	P19	.775	.666	.723
	P20	.756	.686	.726
Correlation between factors.				
		.679	.723	.698

Note: Every factor loading, and correlation is significant at p<.001. Included items reflect the proposed abbreviated version.

Afterward, a multigroup model estimation was performed to assess the factor invariance of the model proposed for the full sample. To do this, parameter equality restrictions were added in the following successive steps: structure, factor loadings, intercepts, and residuals. Table 3 reveals no significant differences between χ^2 values or differences over .01 between CFI values in all steps, which indicates the presence of strict invariance: both groups can be compared using this instrument (Klyne, 2016) and the same meaning can be attributed to the constructs for men and women.

Table 3.
Factor invariance by sex

	x2	x2 Difference	Df. Difference	Sig. difference.	CFI	CFI Difference.
Structure	90.359				.985	
Factor loadings	103.65	13.291	8	>.05	.982	.002
Intercepts	111.203	7.553	8	>.05	.982	.000
Residuals	114.796	3.593	2	>.05	.981	.001

The following Cronbach's alpha values were found in the full sample: =.85 for the total abbreviated scale; =.83 for the lack of control subscale; and =.74 for the emotional dysregulation scale.

Scales' relationship with sex and age.

To evaluate the abbreviated scale's relationship with sex and age, structural equation modeling was used. Sex (dummy variable; 0= man, 1= woman) and age were added as predictors of the latent variables that both factors represent. The model displayed good fit: χ^2 (50)=63.495, p>0.05, CFI=.985, TLI=.980, and RMSEA=.025[90% CI=.000 – .043], as well as SRMR=0.029. Age was a negative and significant predictor of both *lack of control* (*β*=-.427, z(50)=-8.117, p<0.001) and *emotional dysregulation* (*β*=-.278, z(50)=-5.366, p<0.001). In contrast, sex was not found to have a significant effect, neither for the *lack of control* factor (*β*=.037, z(50)=.753, p>.05) nor for the *emotional dysregulation* factor (*β*=.040, z(50)=.766, p>.05). The beta values reported are expressed according to their standardized scale.

Discussion

Taking into account the lack of empirical evidence about Internet addiction in Chile and South America, and considering that this country has a comparatively high Internet access rate (Internet World Stats, 2017), the present study aimed to produce a transcultural adaptation of the Internet Addiction Test (Young, 1998). The evaluation of the fit of the solutions proposed before and the content analysis of the items led to the elimination of potentially problematic questions, which resulted in a shortened scale composed of two factors, with good psychometric properties.

Ten inconsistent factor structures proposed in the literature were tested using the same estimation method, which revealed that none of them attained good fit. These inconsistencies and lack of fit may be due to two major issues. First, the existence of items that may have become outdated as a result of the exponential progress and penetration of ICTs in people's everyday lives. Second, another set of items focused on specific populations (workers, students, and couples), apart from being interpretable in a variety of ways by the participants, either due to their ambiguity or because they referred to two phenomena in the same question (Clark & Watson, 1995; Hinkin, 1995). Based on the content analysis of the items and subsequent statistical analyses, a reduced scale was proposed comprising 10 items and 2 theoretical subscales: *lack of control*, consistent with the operational definition of problematic Internet use or Internet addiction advanced by Shapira et al. (2003), and *emotional dysregulation*, consistent with the mood modification component when participating in a given activity, part of the behavioral addictions model put forth by Griffiths (2005). This change in mood can be associated with, for example, psychopathological processes linked to generalized anxiety disorder such as the avoidance of threatening stimuli (González, Rovella, Barbenza, & Rausch,

2012). Indeed, problematic Internet use has been found to be positively related to procrastination (Thatcher, Wretschko, & Fridkhon, 2007), a form of avoidant behavior. The abbreviated version displayed good psychometric properties considering its fit, factor invariance by sex, and internal consistency.

Men and women did not differ significantly in terms of their subscale scores, a finding that is in line with other studies on IAT (Watters et al., 2013), PIUQ (Demetrovics et al., 2008), and CERI (Beranuy et al., 2009). This finding may be a sign that the digital gap between the sexes is being bridged.

The significant negative association found between age and IAT scores is consistent with similar studies (Widyanto et al., 2011, Pontes et al., 2014, Khazaal et al., 2008, Puerta-Cortés et al., 2013). In this context, being younger age can be regarded as a risk factor for the development of problematic or addictive Internet use. This can be partly attributed to young people's greater familiarity with digital technologies, their constant ability to access the net, the larger blocks of unstructured time that they enjoy, and the encouragement of Internet use by educational institutions (Young, 2004).

Nevertheless, this study is limited by its cross-sectional design and its online nature, as well as by its self-selected sample. These elements, along with the relatively small sample size used, indicate that results must be interpreted with caution. Also, given the diversity of possible online experiences, the Internet Addiction Test must be used as a general measure, which limits its potential for detecting differences in specific contexts. This means that it should be administered along with measures that capture differences related to various online activities, such as the use of video games and social networking websites/applications as well as their multiple subtypes.

Despite its limitations, the present study represents a contribution in that it provides a translation, transcultural adaptation, and evaluation of the fit of ten prior attempts to validate one of the most popular instruments for evaluating Internet addiction, a phenomenon that has become increasingly widespread across the world and has been linked to several psychosocial problems as well as to anxious and depressive psychopathology. In addition, the present study presents an abbreviated and theoretically-oriented version of the instrument, which has been found to have good psychometric properties and inter-sex factor invariance, added to the elimination of items that may have become outdated over the years. Considering this, and regarding the present study as the first step, further research is needed in order to explore the predictive value of the abbreviated version, establish empirically validated cutoff scores, and examine the multiple facets of this emergent construct as part of the diverse contexts of a country –and a continent– where Internet access and ICTs have become increasingly widespread. In addition, it is necessary to evaluate both the prevalence and etiopathogenesis of Internet addiction along with its possible role in the origin or maintenance of other psychopathological processes that significantly affect the quality of life of their sufferers.

9.2. Second Article.

DEPRESSED AND SWIPING MY PROBLEMS FOR LATER: THE MODERATION EFFECT BETWEEN PROCRASTINATION AND DEPRESSIVE SYMPTOMATOLOGY ON INTERNET ADDICTION.

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RUNNING TITLE: Procrastination, Flow, Depression and Internet Addiction.

Research Highlights

- Procrastination using the internet significantly moderated the relationship between depressive symptomatology and internet addiction in adolescents.
- The relationship between depressive symptomatology and internet addiction disappeared in the low procrastination group.
- Higher levels of internet use to procrastinate intensified the relationship between depressive symptomatology and internet addiction.
- Flow experiences online showed a significant direct effect on internet addiction, however, did not moderate its relationship with depressive symptomatology.

Abstract

Based on insights from the model of compensatory internet use and emotion regulation theory, this study aimed to explore two possible mechanisms explaining the reliable association between depressive symptomatology and internet addiction: procrastination on the internet and flow experiences online. Data were collected from 529 high school students, with a mean age of 15.2 years (SD = 1.30), enrolled in six schools in the metropolitan region of Chile. Voluntary participants completed self-reported measures of internet addiction, depressive symptomatology, procrastination on the internet, and flow experiences online. A three-level hierarchical linear model was calculated to evaluate the potential moderator effect of flow and procrastination on the relationship between depressive symptomatology and internet addiction. Results revealed that procrastination moderated this relationship while flow experiences online did not. The findings are discussed in terms of their implications for research and clinical practice, highlighting the importance of considering the intentions behind internet usage.

Keywords: Depression; Internet Addiction; Flow Experiences Online; Procrastination; Hierarchical Linear Models.

Introduction

The internet has become a ubiquitous tool for communication, coordination, and leisure time that has penetrated 55.1% of the world, an estimate that has risen by 1066% in the last eighteen years (Internet World Stats, 2018a). Chile, on the other hand, has an internet penetration rate of 77.5%, compared to the South American average of 71.5% (Internet World Stats, 2018b).

Currently, the internet is an integral part of the daily life of adolescents in countries highly permeated by it. For example, recent data from the U.S. show that 95% of the adolescents between 13 and 17 years old report that they own a smartphone or have access to one, while 89% use the internet "almost constantly" or "several times a day" (Pew Research Center, 2018).

During the past twenty years, there has been a developing interest in the study of the possible problematic consequences of internet-based technological use (Griffiths, 1995; Young 1998), which can now be exacerbated by the possibilities of accessing the internet "on the go" with smartphones, tablets, and personal computers. Different terms have been coined to describe the uncontrolled behaviors related to internet usage regardless of their possible negative consequences, such as internet addiction (Young, 1998), pathological internet use (Davis, 2001), and problematic internet use (Caplan, 2002). In fact, addiction to video games was recently included in the new version of the ICD diagnostic manual under the name "gaming disorder" (World Health Organization, 2018a), which includes an online subcategory. This inclusion of online activities underscores the increasing importance attributed to the study of the psychological impact of behaviors related to internet-based technology.

More broadly, internet addiction (IA) has been increasingly studied by scholars and clinicians, a factor that is reflected in the current existence of forty-five different self-report measures for

its assessment (Laconi, Rodgers, & Chabrol, 2014). IA has been associated with mental health problems, such as anxiety (Yadav, Banwari, Parmar, & Maniar, 2013; Kitazawa, et al., 2018), perceived stress, and stressful life events (Li, Wang, & Wang, 2008; Li, Zhang, Li, Zhen, & Wang, 2010; Yan, Li, & Sui, 2013; Yadav, et al., 2013).

Of particular interest is that IA is also reliably associated with depression in adolescents and college students (Orsal, Orsal, Unsal, & Ozalp, 2012, Yadav, et al., 2013, Strittmatter, et al., 2015a; Chen & Lin, 2016; Liang, Zhou, Yuan, Shao, & Bian, 2016; Fumero, Marrero, Voltes, & Peñate, 2018), a psychopathological entity considered as the third leading cause of illness and disability in adolescents (World Health Organization, 2018b). However, as discussed by Kardefelt-Winther (2014a), less attention has been put into explaining these associations.

Considering the issues above, it is relevant to explore how the problematic use of technology is related to depression. One possible explanation for the increased use of the internet in individuals vulnerable to develop depressive symptoms is the mood modification effect of behavioral addictions in general (Griffiths, 2005), a form of numbing or escaping feelings while engaging in the activity.

This can be achieved by entering an inherently enjoyable state of absorption, an experience facilitated by the internet (Hoffman & Novak, 1996; Novak, Hoffman, & Duhacheck, 2003) and referred to as states of flow (Csikszentmilhayi, 2014). In fact, several studies have empirically associated flow experiences online with IA (Thatcher, Wretschko, & Fridjohn, 2007; Kim & Davis, 2009; Stavropoulos, Alexandraki, & Motti-Stefanidi, 2013; Yang, Lu, Wang, & Zhao 2014; Stavropoulos, Griffiths, Burleigh, Kuss, Doh, & Gomez, 2018).

Another possible explanation for this relationship is that the internet can also be used to procrastinate, which is the delay of an intended course of action despite the possibility of negative consequences as a result of the procrastination (Steel, 2007). Procrastination is also associated with IA (Geng, Han, Gao, Jou, & Huang, 2018; Davis, Flett, & Besser, 2002, Thatcher, et al., 2007) and depression (Uzun Ozer, O'Callaghan, Bokszczanin, Ederer, & Essau, 2014).

With this study, we aimed to test whether experiencing flow on the internet and using the internet to procrastinate could explain the association between depressive symptomatology and IA, a question that, to our knowledge, has not been directly addressed before.

We focused on a large sample of adolescents from Chile, South America, as this country has become increasingly permeated by the internet. In Chile, 92% of households with children/adolescents who use the internet have a smartphone with an internet connection; 50% of them access the internet various times a day, while 38% access it every or almost every day (Cabello, Claro, Lazcano, Antezana, & Maldonado, 2017).

We hope that this study will shed light on the possible etiological mechanisms of both psychopathological entities in a population considered vulnerable to problems related to the use of technology.

Theoretical Background

Internet Addiction or Compensatory Internet Use.

IA can be operationally defined as a maladaptive preoccupation with internet use that causes significant distress or impairment, that does not occur during periods of hypomania or mania, and is not better accounted for by other mental disorders (Shapira, et al., 2003). From a components perspective, Griffiths (2005) proposed a model for the addictive engagement with activities that include salience (when the activity dominates a person's life), mood modification (using the activity as a coping strategy), tolerance (the need of increasing engagement in the activity to reach the same effect), withdrawal symptoms (unpleasant state or physical effects when the activity is discontinued), and conflict (related to the negative consequences of the uncontrolled engagement with it). Based on this model, it seems reasonable to assume that engagement with the internet can be used to cope with difficult situations or life experiences.

This is consistent with one of the original criteria proposed by Young (1998) and later by Tao, Huang, Wang, Zhang, Zhang, and Li (2010) for the diagnosis of IA, namely its use as a way of escaping from problems or to relieve mood. The same criterion is a central aspect of the compensatory internet use (CIU) model proposed by Karderfelt-Winther (2014a). This model presents IA as a coping mechanism used to deal with negative life situations or to relieve dysphoric moods. The model also places emphasis on the motivation for using the internet to explore why a person would persist with a problematic behavior (Kardefelt-Winther, 2014a; 2017).

These conceptualizations explicitly consider the potential affordances of the internet as a way of coping with life situations and to relieve negative emotions, which in their extreme forms

characterize many psychological disorders. This turns these models into a useful background for the study of the relationship between IA and depression; however, this does contradict Shapira et al.'s (2003) last exclusion criteria for IA of not being better accounted for by another psychopathological entity. The previously addressed discussion also reflects the current controversy of considering IA as a compulsive behavior and an independent mental disorder, as a part of the mechanism of generation and maintenance of other psychopathological entities, or as a (sometimes unhealthy) coping mechanism for real-life problems (Mitchell, 2000, Kardefelt-Winther, 2014a; 2017). Consequently, the remainder of this article will consider IA based on a CIU perspective (Kardefelt-Winther, 2014a), while in the following, we will describe two possible explanations of the aforementioned association.

Two Possible Explanations: Flow and Procrastination.

Flow experiences online and mood.

An experience of flow is defined as a subjective state of complete involvement in something, forgetting time, fatigue, and everything outside of the activity itself (Csikszentmilhayi, 2014). For Csikszentmilhayi (2014), in flow experiences, all attentional resources are invested in the task at hand, together with a loss of anxiety and a distorted perception of time. According to Hoffman and Novak (1996), it is possible to experience flow in online environments, which they describe as an inherently enjoyable experience (Hoffman & Novak, 1996; Novak, et al., 2003). These online experiences are composed of enjoyment, concentration, a distorted experience of time, and the experience of being present in the virtual environment, or a telepresence (Lee & Chen, 2010; Yang, et al., 2014).

Because of the enjoyment and decreased anxiety experienced during flow, it is reasonable to think that this could partially account for the mood alleviation while being online. Supporting this idea, Ulrich, Keller, Hoening, Waller, and Grön (2014) found a negative association between experiencing flow while doing an arithmetic task and the activity of the medial prefrontal cortex and amygdala, indicating a reduction in self-referential processing and negative affectivity. This effect can be more consistently achieved in online environments due to the easy accessibility of the internet (Hertlein & Stevenson, 2010).

Procrastination and mood.

Another possible mood modification effect of the internet is related to its use as a tool for procrastination. In fact, procrastination can be considered a failure in self-regulation (Dietz, Hofer, & Fries, 2007; Steel, 2007; Steel & Klingsieck, 2016) motivated by the experience of anxiety before the realization of a task (Schouwenburg, 2004), while at the same time, related to how aversive, difficult, or attractive that task is perceived (e.g., Ackerman & Gross, 2005; Pychyl, Lee, Thibodeau, & Blunt, 2000).

Supporting this idea, a recent resting-state fMRI study found that individuals who tend to procrastinate had an increased amygdala volume related to fear-motivated behavior and a lower connectivity between the same structure and the dorsal anterior cingulate cortex (dACC), which is related to self-regulatory processes (Schlüter, C., Fraenz, C., Pinnow, M., Friedrich, P., Güntürkün, O., & Genç, E., 2018). This suggests that procrastinators show a higher hesitation and concern for actions, associated with a decreased down-regulation from the dACC.

Procrastination can, thus, be thought of as the postponement of the resolution of a situation that causes concern.

Depression, sadness, and emotion regulation.

Depression is a mental disorder centrally characterized by the stable presence of a depressed mood (American Psychiatric Association, 2013). This, in turn, is related to the experience of sadness, an adequate emotion that emerges when an individual faces an adverse and unmodifiable event (Bondolfi, Mazolla, & Arciero, 2015). From an evolutionary perspective, sadness emerges as a way of detaching from the commitment to a goal that is now perceived as unreachable (Nesse, 2000). However, sadness can become maladaptive when the detachment from the goal is not possible (Bondolfi, et al., 2015; Nesse, 2000).

In fact, depressed individuals are characterized by a higher use of rumination, avoidance, and suppression of emotions, and by a lower extent of reappraisal, acceptance, and problem solving than those with remitted depression (Visted, Vøllestad, Nielsen & Schanche, 2018). This can imply that accepting emotions and reappraising the triggering events perceived as unmodifiable can lead to a different engagement with the ongoing life situation and a possible detachment from the unreachable goal.

Flow and procrastination between IA and depression.

Accordingly, it is possible that the mood-modification effect of flow on the internet can alleviate the negative affectivity that characterizes depression. However, if that effect is inflexibly sought as an emotional regulation strategy, it can also hinder the acceptance, re-evaluation, and

resolution of the triggering situations and their emotional impact by taking the attention away from them. This, as a condition, may amplify both the experience of discomfort and the intention to use the internet in a self-regulatory and problematic way.

Similarly, it is also possible to think about procrastination through the internet as a form of avoidant emotional regulation strategy that, when done repeatedly, could also hinder the possibility of directly coping with concerning or painful situations, which may also, in turn, amplify both the experience of discomfort and the intention to continue using the internet regardless of its consequences.

Based on this, the present study will address the following questions:

1. Do flow experiences online moderate the relationship between depressive symptoms and IA?
2. Does procrastination through the internet moderate the relationship between depressive symptoms and IA?

Material and methods

Design.

This study consisted of a cross-sectional design using self-report measures in a sample of high school students.

Participants.

A convenience sample of adolescents was recruited from six schools in a metropolitan region of Chile. First, the institutions were contacted, and a thorough explanation of the study was offered. If they were willing to participate, an institutional authorization was signed and invitations to participate were sent to every parent of students with an age range between 13 and 19 years to authorize and consent to their children's participation. Authorized students received an informed consent form, which a member of the research team explained to them. Those who were willing to participate received a paper-and-pencil questionnaire to complete in their classrooms. During the whole process, a member of the research team was present to answer possible questions or explain misunderstandings about the questionnaires. Participants of the schools that allowed study participation could opt for the chance to win a pair of movie tickets for their participation at a ratio of 1 to 10 (N = 419 students). Only one school did not accept the incentives (N = 110 students). Students with a possible indication of clinically significant depressive symptomatology according to the cut-off score of the questionnaire (see BDI below) were evaluated by a school's professional and derived to treatment if required, which was stated in the informed consent.

The final sample was composed of 529 students from 53 classrooms, with a mean age of 15.2 years (SD = 1.30). A total of 46.8% of participants were females, and 97% reported that they habitually accessed the internet through their smartphone. Table 4 shows the correlation matrix of the measures of this study with the means and standard deviations in the diagonal.

Table 4.
Correlation Matrix, Mean and Standard Deviations

	Internet Ad.	Age	Internet Use	Digital lit.	Procrast.	Stress	Dep. Sympt.	Flow
Internet Ad.	1.798 (.675)							
Age	-.001	15.20 (1.304)						
Internet Use	.331***	-.070	4.202 (2.578)					
Digital lit.	.148**	.067	.093*	4.168 (.769)				
Procrast.	.495***	-.012	.187***	.036	2.68 (1.072)			
Stress	.456***	-.046	.252***	-.099*	.412***	1.791 (.631)		
Dep. Sympt.	.420***	-.029	.246***	-.084	.278***	.699***	.501 (.396)	
Flow.	.594***	.013	.229***	.232***	.360***	.284***	.182***	4.123 (1.053)

Note: ***p<.001, **p<.01, *p<.05; Mean values and Standard Deviations (in parentheses) are exposed in the diagonal; Internet Ad. = Internet Addiction, Internet Use = Average Weekly Internet Use, Digital lit. = Digital Literacy, Procrast. = Procrastination, Stress = Perceived Stress, Dep. Sympt. = Depressive Symptomatology, Flow = Flow Experiences Online, Flow adjust. = Adjusted version of Flow Experiences Online.

Measures.

Demographics.

To control for possible confounding factors (Kardefelt-Winther, 2014a, 2014b), participants were characterized by known influencing variables, such as their age (Khzaal, et al., 2008; Widyanto, Griffiths, & Brunsden, 2011; Puerta-Cortés & Carbonell, 2013; Pontes, Patrão, & Griffiths, 2014), sex (Durkee, et al., 2012 ; Liang, et al., 2016; Watters, Keefer, Kloosterman, Summerfeldt, & Parker, 2013); average daily amount of internet usage (Chak, & Leung, 2004; Jang, Hwang, & Choi, 2008), measured with the question, “What is your average internet use for leisure time on a weekday?”; and digital literacy (Stodt, et al., 2018; Leung & Lee, 2012), measured with the question, “How skillful do you think you are using the internet?”

Internet addiction.

IA was measured using the Internet Addiction Test (IAT; Young, 2010), which is a self-report measure composed of 20 items using a 5-point Likert scale from 1 “rarely” to 5 “always,” with an option of zero for “not applicable.” The IAT measures excessive and compulsive internet usage based on the DSM-IV criteria for pathological gambling. This measure is the most psychometrically evaluated scale to assess IA (Laconi, et al., 2014); it has been adequately used in adolescent samples (Lam, Peng, Mai & Jing, 2009) and was recently adapted to Chile (Hernández & Rivera, 2018). In the present study, the scale showed a Cronbach's alpha of .847 with only a 0.93% rate of missing data.

Depressive symptomatology.

Depressive symptomatology was assessed using the Beck Depression Inventory I (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh 1961), which is a self-report measure that evaluates the behavioral manifestations of depression. The BDI is composed of 21 items on a 4-point scale. A version recently adapted in Chile was used (Valdés, Morales-Reyes, Pérez, Medellín, Rojas, & Krause, 2017), with a cut-off score of 13 points for a clinically significant level depressive symptomatology. The BDI has also been adequately used in adolescent samples (Beltrán, Freyre, & Hernández-Guzmán, 2012). In the present study, the scale’s Cronbach’s alpha was .871 with a 1.40% rate of missing data.

Flow experiences online.

To measure flow experiences online, a scale created by Yang, et al. (2014) was used, which adapted items from similar questionnaires (Hsu & Chiu, 2004; Novak, Hoffman & Yung, 2000; Koufaris, 2002) measuring enjoyment, concentration, telepresence, and time distortion. The questionnaire consists of 13 items using a 7-point Likert scale format ranging from "strongly disagree" to "strongly agree." The questionnaire was previously used with high school students and was adapted to Spanish for the present research based on two translations, two back-translations and the design of a final version with an expert committee following Guillemin, Bombardier, and Beaton's (1993) recommendations. In this study, the complete scale showed a Cronbach's alpha of .866. with a 1.45% rate of missing data.

Internet procrastination.

To directly measure the intention to procrastinate using the internet, a single item was used ("Do you use the internet to postpone tasks that you find unpleasant?"), using a Likert scale that ranged from 1 ("never") to 5 ("very often"). This item focuses on the central aspects of procrastination, namely, the voluntary choice of postponing a task that competes with another one (Steel, 2007), while including the aversive character of the task to be postponed (Pychyl et al., 2000). A 3.2% rate of missing data was found for this question.

Perceived stress.

Perceived stress was evaluated by the perceived stress scale-14 (Cohen, Kamarck, Mermelstein, 1983). The PSS-14 is a self-report measure designed to evaluate perceived stress and consists

of 14 items using a 5-point Likert scale format that includes a value of zero (from "never" to "very often"). A Spanish version adapted in México was used (González & Landero, 2007). A Cronbach's alpha of .865 was found in this study with a 1.28% rate of missing data.

Analytic Plan.

The data were analyzed with the statistical environment and language R (R Core Team, 2017), and all scales were entered using their mean value. Because the Internet Addiction Test (Young, 2010) shared a similar question about using the internet more than expected with the flow experiences online scale (Yang, et al., 2014), a Pearson's correlation coefficient was computed between them to test for a possible overlap. This analysis showed a small to moderate association ($r = .27$, $p < .001$) between both questions, which makes it reasonable to assume that they refer to different phenomena. Nevertheless, all the models were computed twice, once with the complete scales and once with the exclusion of the similar flow question. Because the results did not change using both strategies, the whole flow experiences online scale was used.

Based on the nested structure of the data (i.e., students within classrooms within schools), a hierarchical linear model was fitted using a restricted maximum likelihood (REML) method of estimation using the package "nmle" for R (Pinheiro, Bate, DebRoy, Sarkar and R Core Team, 2018). Missing cases were excluded listwise for every model. Intraclass correlation coefficients were calculated (Peugh, 2010) for classroom (ICC = .119) and school (ICC = .112) following Hox, Moerbeek, and van de Schoot's (2018) formula to identify the proportion of variance explained at each level, justifying the use of a three-level structure for all the analyses. Only the intercept was set as random to account for the effect of the upper levels.

Because the study is focused on the individual effects, and to help with the interpretation of the results, variables were group-centered around classroom means at level 2 (i.e., classroom; Brincks, Enders, Llabre, Bulotsky-Shearer, Prado, & Feaster, 2017). This centering strategy helps to disentangle the effects at level 1 from the effects at level 2 (Bell, Jones, & Fairbrother, 2017).

Following Preacher, Curran, and Bauer's (2006) notation, depressive symptomatology was taken as a focal predictor, and its moderation effect on IA was calculated separately for procrastination and flow experiences online. First, a model that only included the interactions of interest was computed. In a second step, sex, age, average weekly internet use, and digital literacy were added as demographic control variables. In the third step, stress was added into the equation because of its known effect on both IA (Li, Zhang, Li, Zhen, & Wang, 2010; Yan, Li, & Sui, 2013; Yadav, et al., 2013) and depressive symptomatology (Kendler, Karkowski, & Prescott 1999, Yang, et al., 2015).

Results

Formal Modeling.

All models presented below were visually inspected for heteroskedasticity and normality of the residuals. A clear pattern of heteroskedasticity was found for all the models where the residuals increased with the fitted values. Because of this, every model was weighted for the influence of the fitted values using the "power of the covariate" function of the "nmle" package (Pinheiro & Bates, 2000; Zuur, Ieno, Walker, Saveliev & Smith, 2009). A formal likelihood test of fitness with and without correction for heteroskedasticity indicated a better fit for the corrected models.

The first model included the interaction term between depressive symptomatology and flow experiences online and between the former and procrastination without control variables. The results for this model indicated a significant and positive effect of depressive symptomatology (b = .393, t (448) = 6.208, p < .001), flow experiences online (b = .289, t (448) = 13.403, p < .001), and procrastination (b = .164, t (448) = 7.282, p < .001) in IA scores. (See Table 5). Regarding the focus of the study, procrastination significantly moderated the effect of depressive symptomatology on IA (b = .177, t (448) = 2.609, p = .009), which was not the case for flow experiences (b = .003, t (448) = .054, p = .957).

The second model included the demographic variables of interest as controls. Sex (b = -.034, t (423) = -.744, p = .457), age (b = .010, t (423) = .265, p = .791), and digital literacy (b = .037, t (423) = 1.287, p = .199) did not show significant effects on IA, while average weekly internet usage did (b = .034, t (423) = 3.659, p < .001). The remainder of the effects did not change substantially with the inclusion of the control variables (See Table 5).

The third model added perceived stress into the equation, which showed a significant and positive effect on IA (b = .154, t (420) = 2.998, p = .003). As in the previous model, the remainder of the effects included in the model did not change substantially (see Table 5).

Table 5.
Three-level model comparison

Fixed Effects.	Model 1	Model 2	Model 3
(Intercept)	1.771 (.049)***	1.771 (.049) ***	1.768 (.049) ***
Dep. Sympt.	.393 (.063) ***	.394 (.065) ***	.237 (.084) **
Flow.	.289 (.022) ***	.262 (.023) ***	.251 (.023) ***
Procrast.	.164 (.023) ***	.159 (.023) ***	.147 (.023) ***
Dep*Procr	.177 (.068) **	.172 (.068) *	.188 (.067) **
Dep*Flow	.003 (.062)	-.021 (.061)	.007 (.061)
Sex		-.034 (.046)	-.045 (-.045)
Age		.010 (.038)	.011 (.038)
Internet Use		.034 (.009) ***	.030 (.009) **
Digital lit.		.037 (.029)	.047 (.029)
Stress.			.154 (.051) **
Random Effects (SD)			
Intercept School	.085	.083	.081
Intercept Class	.182	.182	.182
Residual	.334	.331	.322

Note: ***p<.001, **p<.01, *p<.05; Unstandardized beta coefficients are presented with their standard errors in parentheses. Dependent variable: Internet Addiction. Internet Use = Average Weekly Internet Use, Digital lit. = Digital Literacy, Procrast. = Procrastination, Stress = Perceived Stress, Dep. Sympt. = Depressive Symptomatology, Flow = Flow Experiences Online.

To further explore the two-way interaction term between procrastination and depressive symptomatology, a single slope analysis was calculated using the R package "reghelper" (Hughes, 2017). This was achieved by formally testing the effect of depressive symptomatology, at -1, 0, and 1 standard deviations of procrastination (Hayes, 2013). Depressive symptomatology showed a nonsignificant effect on IA scores at the low level of procrastination (b = .050, t (420) = .503, p = .615). However, at average (b = .237, t (420) = 2.809, p = .005) and high (b = .424, t (420) = 3.674, p < .001) levels of procrastination, depressive symptomatology showed a significant and positive effect on IA scores. This effect is depicted in figure 1, and was also incremental along the levels of procrastination, almost duplicating its size from the average to high level.

Figure 1: Interaction effect between procrastination and depressive symptomatology.

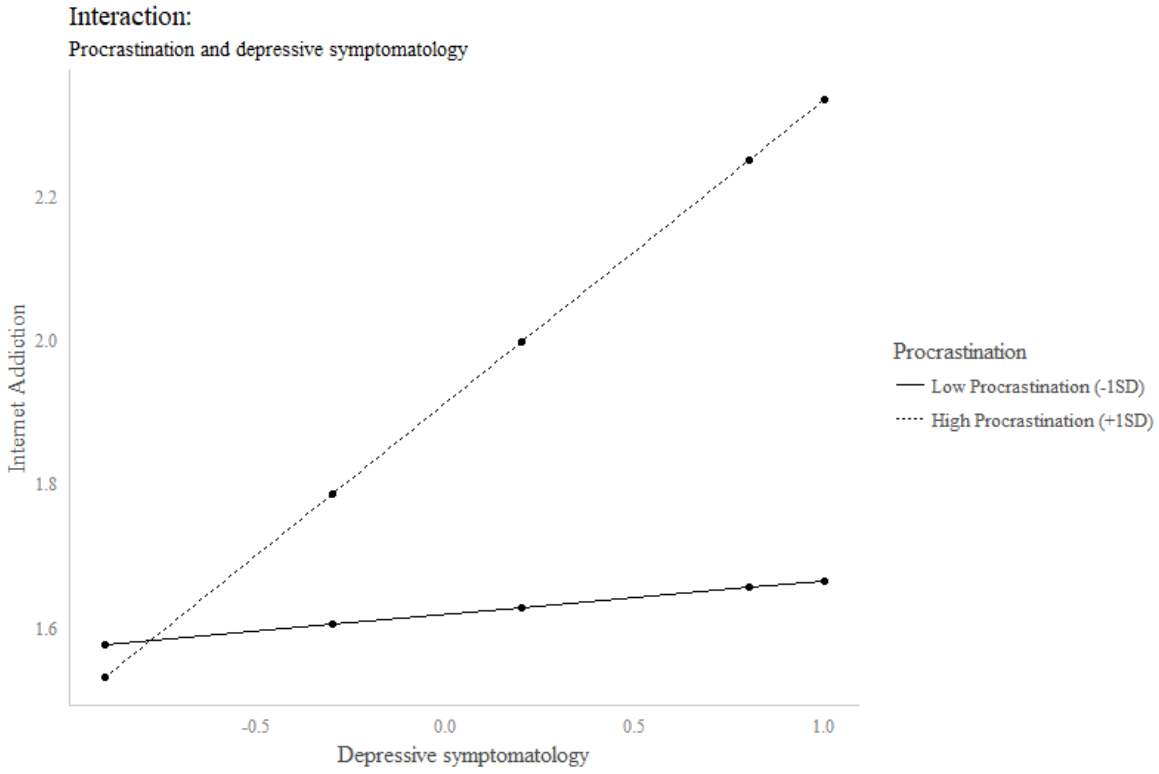

Figure 1 Caption: Comparison of low procrastination (-1SD) and High procrastination (+1SD) groups in the association between depressive symptomatology and internet addiction.

Effect Sizes.

In the case of hierarchical linear models, it is possible to calculate two global effect size measures; a marginal R^2 and a conditional R^2. The first one describes the variance explained by the fixed effects only, while the latter describes the explained variance by the fixed and random effects together (Nakagawa & Schieltzeth, 2012). These measures were calculated using the "piecewiseSEM" package for R (Lefcheck, 2015) on the third model. Fixed effects explained 58% of the overall variance ($R^2_{GLMM(m)}$=.584), while including the random intercept the model explained a 70% of the variance ($R^2_{GLMM(c)}$=.699).

Regarding the local effect size of the interaction term between depressive symptomatology and procrastination, the proportion of residual variance reduction was calculated (Peugh, 2010). The interaction term resulted in a 0.38% of residual variance reduction when the interaction term was added to the model. It is important to note that global and local effect sizes measures are not directly comparable (Peugh, 2010).

Discussion

We investigated two potential explanations for the relationship between depression and IA in a group of high school students: one based on flow experiences online and one based on procrastination through the internet.

In line with our expectations, depressive symptomatology, flow experiences online, and procrastination showed positive effects on IA scores, which is consistent with previous research (Orsal, et al., 2012; Yadav, et al., 2013; Strittmater, et al., 2016; Chen & Lin; 2016; Liang, et al., 2016; Fumero, et al., 2018; Thatcher, et al., 2007; Kim & Davis, 2009; Stavropoulos, et al., 2013, Yang, et al., 2014, Stavropoulos, 2018; Geng, et al., 2018; Davis, et al., 2002).

As hypothesized, procrastination through the internet did interact significantly with depressive symptomatology in the prediction of IA, even when controlled by age, sex, digital literacy, average time using the internet, and perceived stress. Even though moderation terms tend to show a small effect size (Aguinis & Beaty, 2005), their significance remains in their substantial interpretation, which can be done considering the CIU model, which proposes motivations for internet use as a central aspect (Kardefelt-Winther, 2014a; 2014b; 2017). Notably, the relationship between IA and depressive symptomatology disappeared in the low procrastination group, while it duplicated its size from the average to high groups.

Procrastination measured the intention to use the internet to leave unpleasant tasks for later, which is usually motivated by anxiety before their realization (Schouwenburg, 2004). In this context, internet usage can be interpreted as an avoidant emotional regulation strategy. In fact, improvement in emotional regulation skills has shown to decrease procrastination (Eckert, Ebert, Lehr, Sieland, & Berking, 2016). It is important to underline that the adaptability of an

emotional regulation strategy will depend on its context and flexibility (Gross & Thompson, 2007; Aldao & Nolen-Hoeksema, 2012).

This is relevant when taking into account that we measured how often the students used the internet to procrastinate (from never to very often), which can be understood as a measure of behavioral inflexibility.

With this in consideration, it is possible to theorize the emergence of a vicious cycle: based on a negative affective state (i.e., depressive symptomatology), using the internet to avoid unpleasant tasks—including the resolution of difficult situations—might further amplify the negative affect by creating an interference for the adequate resolution of these difficult situations. This can, in turn, foster the need to use the internet, generating in this way a problematic behavior. This idea is in line with the findings of a recent cross-sectional study suggesting that the association of trait procrastination and depression was mediated by the perceived negative consequences of internet use, while the relationship between procrastination and the negative consequences of the internet was mediated by an impaired control of its use (Reinecke, et al., 2018).

Interestingly, and in contrast to our expectations, flow experiences online did not moderate the association of depressive symptoms and IA. In this study, flow measured to what extent an individual can achieve an experience of complete absorption on the internet. Even though flow has shown a potentially calming and enjoyable effect (Ulrich, et al., 2014), it seems that the possibility to experience it does not equal an intention to use it with the goal of numbing a negative affective state. Being as this is the case, and in contrast to procrastination, no vicious cycle would be fostered between depressive symptomatology and IA, conditional on the extent to which an individual experience flow. However, based on flow's enjoyable effect, it is

reasonable to think of it as a desirable experience that can promote an uncontrolled use of the internet, explaining flow's significant direct effect on IA.

Limitations.

This study is limited by the self-reported characteristic of the measures, which can underestimate the effect of variables perceived as problematic by the students in the context of an evaluation within the school. The measurement of procrastination with one question can also be considered a limitation when considering the existence of instruments with multiple indicators (i.e., Lay, 1986). However, in this case, the question was made to explicitly measure procrastination using the internet and following a theoretical approach, which can be thought of as a more direct measure of a motivation to use the media. Finally, the cross-sectional nature of the data does not allow for a test of the directionality of the effects.

Conclusion.

Despite its limitations, this study explicitly tested under which conditions IA might be associated with depressive symptomatology based on modern theoretical accounts of problematic internet usage, a venue scarcely explored in the literature before (Kardefelt-Winther, 2014a), but with high relevance for the identification of the mechanisms under the relationship of the use of technology and mood psychopathology.

Thereby, these results have potential implications for research and clinical practice. In the first case, and following CIU, the results add empirical support in favor of considering IA, at least in part, as an emotional regulation or coping strategy. Future studies might explore in more detail

which conditions can result in a problematic use of the internet, while at the same time leading to negative affective consequences. Our results, together with previous findings and theory, can suggest the existence of a vicious cycle conditional on the intention to use the internet; however, longitudinal studies are needed to contrast this idea.

Given the high rates of internet access and use in combination with the present data, clinicians should pay more attention to the pattern of internet behaviors and motivations when treating depressed adolescents. At the same time, mood symptomatology should be addressed when treating problematic internet behaviors. It seems reasonable to think that inflexibly using the internet to delay the realization of unpleasant tasks, including daily life problems, could hinder the possibility for their resolution and acceptance, which are both factors associated with depression remission (Visted, et al., 2018). However, these ideas should also be subject to more empirical scrutiny, and thus, interpreted with caution. Taking this perspective into account can help mental health providers to deliver better treatment to both mood problems and problematic internet behaviors in a population where the internet is an integral part of their daily lives.

9.3. Third Article.

DISCONNECTED FROM MY LIFE: A LONGITUDINAL EXPLANATION OF THE RELATIONSHIP BETWEEN DEPRESSIVE SYMPTOMATOLOGY AND INTERNET ADDICTION.

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RUNNING TITLE: Depression, Disconnection and Internet Addiction.

Highlights

- Depressive symptomatology predicts internet addiction levels later in time.
- Depressive symptomatology predicts internet addiction levels through increasing the urge to use the internet to disconnect from daily life situations.
- There is a vicious cycle between problems due to internet use and using the internet to disconnect from daily life situations.
- The relationship between depressive symptomatology and internet addiction may be partly understood as resulting from maladaptive regulation of negative emotions.

Abstract

Background:

In the past, depression has been reliably associated with an uncontrolled use of the internet, usually called internet addiction. However, this relationship remains mostly unexplained. Based on the emotion regulation theory, the objective of this study was to investigate a potential explanation of the aforementioned association through the use of the internet as a tool for disconnection from life situations.

Methods:

Data were analyzed from a longitudinal three-waves study, with a final sample of 238 high school students from the metropolitan region of Chile, using a battery of self-report measures to assess their levels of depressive symptomatology, internet addiction, and the degree to which they used the internet to disconnect from life situations. A set of cross-lagged mediation models were tested.

Results:

The results indicated that depressive symptomatology predicted future internet addiction through using the internet to disconnect from life situations. However, this effect was part of a broader mechanism that included a vicious cycle between disconnection and internet addiction.

Limitations:

The study is limited by the self-report characteristics of the measurement tools and the use of a relatively small convenience sample with a high attrition rate. Thus, no causal inference may be concluded due to the correlational nature of this study.

Conclusions:

Depressive symptomatology predicts internet addiction by increasing the need to use the internet as a tool of distraction. Given the increasing ubiquity of the internet in daily life, clinicians should take into consideration the patterns of internet usage when assessing mood disorders and vice versa.

Keywords:

Depression; Internet Addiction; Longitudinal; Mediation, Emotion Regulation, Disconnection.

Introduction

Depression and Internet Addiction.

Depression is currently considered the third leading cause of disability in adolescents worldwide (World Health Organization, 2018b). The prevalence of any depressive disorder in children and adolescents ranges from 1.7% to 3.9% (Polanczyk, et al., 2015). In adolescence, depression and anxiety disorders have been associated with an increased probability of carrying over into young adulthood, a probability that is further increased when early manifestations are longer (Patton, et al., 2014), justifying the study of the mechanisms of maintenance for both depression and anxiety. Depression in this age group has also been associated with psychosocial maladjustment in young adulthood, including higher odds for unemployment and failure to complete secondary school (Clayborne, et al., 2018). However, studying depression—in particular among young individuals—has been challenging due to the inconsistency of the symptoms of depression, a characteristic often labeled phenotypic heterogeneity. In fact, Fried and Nesse (2015) noted that taking all nine DSM-5 criteria into account, at least 227 unique symptom profiles can be extracted that qualify for a diagnosis of major depressive disorder.

On the other hand, the current ubiquity of information and communication technologies (ICTs) made ICTs a constitutive part of human cognitive processes (Smart, et al., 2017), especially in countries highly permeated by ICTs. One way in which the ecological influence of ICTs has been addressed is by the study of uncontrolled use of the internet regardless of the possible negative consequences, a phenomenon usually referred to as internet addiction (IA; Young, 1998). Due to this widespread usage, the problematic use of video games was recently added to the DSM-5 section III under the name of "internet gaming disorder" (IGD; American Psychiatric Association, 2013) and to the last edition of the International Classification of Diseases (ICD-

11) diagnostic manual under the name “gaming disorder” (World Health Organization, 2018a), thereby underscoring the increased importance attributed to problems associated with ICTs. The prevalence of IA has been estimated as ranging from 5.1% to 6.9% worldwide (Cheng and Li, 2014). Adolescents in countries highly permeated by ICTs can be considered a particularly vulnerable population for this kind of behavior because, in these countries, the internet is an integral part of daily life (Pew Research Center, 2018).

Of central interest to this article is the reliable positive association that has been found between depression and IA (Carli, et al., 2013; Ho, et al., 2014). This relationship has been addressed, as discussed by Kardefelt-Winther (2014a, 2017), mostly in terms of IA as an impulse control disorder or addiction, while other psychopathological entities have been considered as vulnerability factors. However, the same author proposes that explanations of the association between IA and vulnerability factors, such as depression, can be better addressed by considering the internet as a possible tool to alleviate the negative emotions arising from difficult life situations and unmet real-life needs, a perspective labeled compensatory internet use model (CIU; Kardefelt-Winther, 2014a). As such, Elhai, et al. (2017) recently proposed the use of smartphones as a potential experiential avoidance strategy that is used to deal with negative emotional content, reflecting a similar process of influence from negative affect to technological use. In the following paragraphs, this account of IA and its relationship to depression will be further developed based on the Research Domain Criteria project initiative (RDoC; NIMH, 2018a) and emotion regulation theory (ER; Gross and Thompson, 2007; Werner and Gross, 2010).

From RDoC to Emotion Regulation.

One way of overcoming the difficulty in the study of depression, together with its relationship with other psychopathological entities, such as IA, is to consider the RDoC initiative of the National Institute of Mental Health (NIMH, 2018a). The RDoC proposal is focused on specific units of analysis: negative and positive valence, cognitive, social processing, and arousal/regulatory systems. For Woody and Gibb (2015) the loss construct of the negative valence system is particularly important for the study of depression, partly given that environmental characteristics, such as severe negative life events, have been found to be strong predictors of its onset (Kendler, et al., 1999; Monroe, et al., 2014). It is relevant to note that the units of analysis of the RDoC framework should be studied with regards to their interaction with environmental factors (NIMH, 2018b). We think that the new technologically mediated context should be addressed as one important environmental factor while studying psychopathology and, especially for this case, the influence of negative life events. To understand this, a useful background is ER theory.

Depression, IA and, Emotion Regulation.

The influence of the environment on the onset and maintenance of mental disorders is multifactorial by nature and includes, among other aspects, differential sensitivity to environmental pressures (Fox and Beevers, 2016) and the different strategies used to manage emotional responses, a series of processes labeled as emotion regulation (Werner and Gross, 2010). Depression has been associated with an increased use of rumination, avoidance of situations, and suppression of emotions, while its remission has been related to cognitive reappraisal, acceptance of emotions and situations, and problem-solving (Visted, et al., 2018).

This pattern of ER strategies across disease and remission indicates that the maintenance of depression is partly explained by the nonacceptance of emotions and a certain degree of inactivity when faced with difficult life situations, which may seem unmodifiable (Nesse, 2000; Bondolfi, et al., 2015). Regarding technology, previous research has shown that, as in the case of depression, IA has also been associated with the occurrence of critical life events (Koenig, et al., 2016) and a nonacceptance of emotions (Evren, et al., 2018).

A Possible Explanation of the Relationship between Depression and IA via ER.

The association between depression and IA can be understood if we consider one of the original criteria for the diagnosis of IA, namely the use of the internet to relieve a negative mood (Young, 1998), a shared characteristic with the DSM-5 IGD (American Psychiatric Association, 2013) and a central aspect of the previously described CIU model of IA (Kardefelt-Winther, 2014a). This particular affordance of the internet can be explained based on the modal model of ER (Gross and Thompson, 2007), which proposes that an emotional experience requires attention to a meaningful situation to occur in the first place, so a shift in the attentional process can also modify its intensity and duration, a set of ER processes labeled as attentional deployment (Werner and Gross, 2010).

We propose that the internet can afford a stable target for this set of behaviors by offering the possibility to, when presented with a difficult situation, redirect an individual's attentional focus toward a screen with relevant content (i.e., news, social media, or video games) and modify the negative emotional reaction. This form of disconnection from life situations can be used to partially explain the relationship between depression and IA by creating an obstacle for a more flexible engagement with the ongoing problem, and thus, hindering its resolution. However, the

adaptability of an ER process will depend both on the context and flexibility of its implementation (Thompson and Calkin, 1996; Gross and Thompson, 2007; Werner and Gross, 2010; Aldao and Nolen-Hoeksema, 2012). This implies that using the internet for this purpose, which can be thought of as a common behavior, should not always be problematic unless it is done in an inflexible manner.

This idea is supported by previous longitudinal studies that found that faster decreases in depression rates negatively predicted future IA scores (Chen and Lin, 2016), while previous emotional problems had a positive effect on IA in the future (Strittmatter, et al., 2015b). On the other hand, higher levels of hyperactivity/inattention and self-esteem problems in adolescents were found to predict future levels of IGD, while initial levels of IGD predicted future emotional distress (Wartberg, et al., 2018). These studies are illustrative of a relationship that is possibly based on the regulation of negative emotions and a complex bi-directional path of influences. However, there is a dearth of research studies that explicitly model possible mechanisms to explain these associations, while at the same time most findings are based on cross-sectional data.

Because of this, the objective of this study, based on a longitudinal setting, was to evaluate the potential mediation role of using the internet to disconnect from life situations as a proxy for an attentional deployment ER process in the relationship between depression and IA in a sample of high school students.

For this, the present study addressed the following questions:

1. Does depressive symptomatology longitudinally predict IA in a sample of adolescents or vice versa?

2. Does using the internet to disconnect from life situations mediate the longitudinal relationship between depressive symptomatology and IA?

Method

Design.

The study consisted of a longitudinal three-wave design, as the minimum recommended number for a longitudinal mediation analysis (Selig and Preacher, 2009), as a follow up to a previous cross-sectional study investigating the relationship between depressive symptomatology and IA (Hernández, et al., 2019) in a sample of high school students, using self-report measures.

Participants.

A convenience sample of high school students was obtained from six schools in the metropolitan region of Chile. The study was reviewed and approved by the ethics committee for social sciences of the Pontifical Catholic University of Chile. Authorization and informed consent letters were sent to every parent of the students who ranged in age from 13 to 19 years to authorize their participation. Upon consent, an informed assent process was made with the authorized adolescents by a member of the research team to emphasize the voluntary character of their participation. Because depressive symptomatology was measured in every wave, those students with an indication of a possible depression by the Chilean cut-off score (>13 points) of the Beck Depression Inventory were evaluated by a professional in their institutions who informed their parents and set up treatment if deemed necessary. This was also told to the students. Adolescents who participated in the study were entered into a raffle to win a pair of movie tickets in every wave. Only one out of six schools did not allow for the use of incentives. Participants received pen-and-paper questionnaires in their classrooms at baseline from the end of September to the beginning of December 2017 (t0). Follow-up questionnaires were administered both online and through pen-and-paper options.

The first follow-up was scheduled between mid-March and mid-May 2018 (t1; M = 5.04 months, SD = 1.20), while the second follow-up was scheduled in August 2018 (t2; M = 4.74 months, SD = .40).

The first sampling wave was completed by N = 529 students (251 girls, 278 boys) (t0); N = 327 (61.2%) of them responded at t1, and N = 343 (64.8%) responded at t2. A total of N = 238 (44.9%) participants completed all three measurements. Independent sample t-tests showed no significant differences for baseline levels of depressive symptomatology, disconnection or IA between completers and dropouts, which indicates that attrition was missing at random (Dong and Peng, 2013).

The final sample used in the study (N = 238) was nested in 41 classrooms, representing all six schools. The mean student age at entry was 14.98 years (SD = 1.21); 45.4% of the students were girls; while at baseline, students used the internet for an average of 4.22 (SD = 2.45) hours a day for leisure time and accessed it mostly on their smartphones (80.52%). An independent sample t-test showed that girls had higher levels of depressive symptomatology than boys at every time point. No differences were found for the remaining variables.

Measures.

Internet Addiction.

Internet addiction symptoms were assessed using the Internet Addiction Test (IAT; Young, 2010), which is a self-report measure composed of 20 items on a 5-point Likert scale from 1 “rarely” to 5 “always,” with an option of 0 for “not applicable.” The IAT measures excessive and compulsive internet usage based on the DSM-IV criteria for pathological gambling. This

measure is the most psychometrically evaluated scale used to capture IA (Laconi, et al., 2014) and was recently adapted for Chile (Hernández and Rivera, 2018). The full version of the scale was used to enable comparability of the results. In the present study, the scale showed a Cronbach's alpha that ranged from .851 to .901, while a range from 0.36% to 0.53% of missing data was found in the three waves.

Depressive symptomatology.

Depressive symptomatology was evaluated using the Beck Depression Inventory I (BDI; Beck, et al., 1961), a self-report measure that evaluates the behavioral manifestations of depression. It is composed of 21 items using a 4-point scale. A version adapted for Chile was used (Valdés, et al., 2017) with a cut-off score of 13 points for depression. In the present study, the scale showed a Cronbach's alpha that ranged from .848 to .890, while a range from 0.94 % to 2.50% of missing data was found.

Disconnection using the internet.

Following the theoretical background presented above, the intention to use the internet to disconnect from life situations was assessed with a single item ("Do you use the internet to disconnect from day-to-day situations?") on a Likert scale that ranged from 1 ("never") to 5 ("very often"). This question explicitly considered the use of the internet to get distracted from life situations, was phrased in lay language familiar to the adolescents, and is consistent with an attentional deployment ER strategy (Werner and Gross, 2010), as depicted above. It was built using a frequency scale as a proxy for flexibility in the deployment of this behavior. A range from 0.80% to 5.5% of missing data was found.

Analytic plan

Preliminary Analyses.

Exploratory analyses were done using the statistical package for the social sciences SPSS version 23 (IBM Corp., 2015), while all cross-lagged and mediation analyses were conducted using Mplus 8.2 (Muthén and Muthén, 2017). All scales were included in the equations using their mean values. We first provided a correlation matrix with means and standard deviations in the diagonal to describe the relationship of the variables across time.

Mediation models.

Baron and Kenny (1986) proposed that for a mediation effect to occur, the predictor variable (i.e., depressive symptomatology) should affect the mediator variable (i.e., disconnection), while the latter should influence the dependent variable (i.e., IA). The logic is that the effect of the predictor into the dependent variable is transmitted through the mediator.

Before the estimation of mediation effects, a cross-lagged model of depressive symptomatology predicting IA across time and vice-versa was estimated to examine the directionality of their relationship.

Next, another set of longitudinal models was computed following Cole and Maxwell's (2003) extension for mediation analyses. This model (figure 2) proposes that levels of IA at t2 are predicted by disconnection at t1 (path b), which is at the same time predicted by depressive symptomatology at t0 (path a). A direct effect from depressive symptomatology at t0 to IA at t2 is also estimated (path c); however, this is not a necessary condition for mediation to occur (MacKinnon, et al., 2000). Following figure 2, this will be called the "downstream" model. The core idea is to allow time to unfold the effect from depressive symptomatology on disconnection

and IA while controlling for their previous timepoints. The residuals at each wave were free to vary, and levels of depressive symptomatology were controlled for by the influence of sex.

Figure 2: Longitudinal Mediation Model.

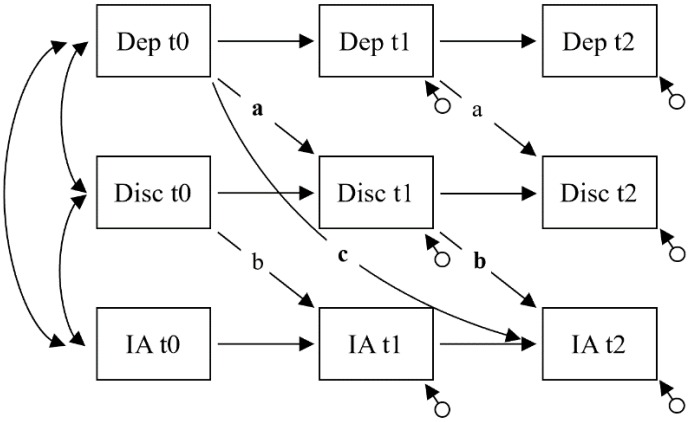

Figure 2 caption: Dep = Depressive symptomatology; Disc = Disconnection; IA = Internet addiction. Covariation of residuals at t1 and t2 were omitted for clarity of the diagram.

To explore for the existence of an opposite direction of influences, a reversed ("upstream") model from IA to disconnection and depressive symptomatology was also computed. If an upstream mediation effect was not present, this could be taken as evidence for the hypothesized directionality from depressive symptomatology to IA.

Finally, a model that included both directions simultaneously was computed to test for the influence of the omitted paths in the estimation of the mediation effect (Cole and Maxwell, 2003). This is useful to test the limits of the proposed mediation effect, especially if it exists in a system of mutual influences.

For every model, a maximum likelihood estimation method with robust standard errors and chi-square test statistic (MLR) was used to account for the non-normality of the data. Due to its nested structure, standard errors were adjusted using the TYPE = COMPLEX option available in Mplus (Preacher, 2015) with classroom as cluster. Little's (1998) missing completely at random (MCAR) test indicated that the data included in the equations were consistent with MCAR [x2 (104) = 109.413, p = .339]. Based on this, missing data were handled using a full information maximum likelihood method, which yields efficient estimates under this condition (Enders, 2011). The fit of the models was assessed using: RMSEA (<.06), SRMR (<.08), TLI (>.95) & CFI (>.95). Values in parentheses were considered as indicative of a good fit (Hu and Bentler, 1999).

To test for the mediation effect, the product of paths "a" and "b" (Figure 2, in bold) was computed (Preacher, 2015). Because the product of these two terms is usually non-normal and underpowered (MacKinnon, et al., 2004), we confirmed its effect by running another model with a maximum likelihood method of estimation and a bootstrapped 95% confidence interval (CI) based on 20,000 draws.[1] A percentile bootstrap was computed because it has shown to be more conservative than the bias-corrected version (Hayes and Scharkow, 2013; Valente, et al., 2016).

Results

All variables in the study were positively and significantly correlated between and within every time point. Mean values and standard errors are shown in the diagonal of table 6.

[1] It is currently not possible to compute a TYPE = COMPLEX standard error correction for the nested structure of the data and a bootstrapped confidence interval of the estimates at the same time. Because of this, we computed two separate models to test for the bootstrapped effects.

Table 6.

Correlation Matrix, Mean and Standard Deviations

	Depressive Sympt. T0	Depressive Sympt. T1	Depressive Sympt. T2	Disconnection T0	Disconnection T1	Disconnection T2	Internet Add. T0	Internet Add. T1	Internet Add. T3
Depressive Sympt. T0	.492 (.353)								
Depressive Sympt. T1	.685***	.401 (.363)							
Depressive Sympt. T2	.626***	.727***	.381 (.359)						
Disconnection T0	.392***	.346***	.284***	2.900 (1.066)					
Disconnection T1	.365***	.378***	.300***	.475***	2.840 (1.075)				
Disconnection T2	.318***	.310***	.293***	.430***	.569***	2.910 (1.088)			
Internet Add. T0	.338***	.263***	.193***	.434***	.375***	.392***	1.845 (.647)		
Internet Add. T1	.378***	.321***	.255***	.326***	.470***	.422***	.686***	1.658 (.714)	
Internet Add. T3	.230***	.229***	.270***	.239***	.449***	.511***	.693***	.675***	1.644 (.701)

Note: ***p<.001, **p<.01, *p<.05; Mean values and Standard Deviations (in parentheses) are exposed in the diagonal; Internet Add. = Internet Addiction; Disconnection = Disconnection using the internet; Depressive Sympt. = Depressive Symptomatology, T0 = Baseline; T1 = Time 1; T2 = Time 2.

Cross-Lagged Mediation Models.

Test of time structure.

Prior to the interpretation of regression parameters, two different auto-correlation structures were tested. The first one, as depicted in figure 2, had each time point controlled by its previous value, called AR(1). The second structure adds an additional path from t0 to t2, called AR(2). For every model, only the AR(2) structure showed a good fit to the data (table 7), which is an indication of a more complex nonlinear time structure (Cole and Maxwell, 2003). Based on this, the AR(2) model was used for the following analyses.

Table 7.

Fit indexes for the cross-lagged and mediation models

		x2	CFI	TLI	RMSEA	RMSR
Basic Cross-Lagged Model						
	AR(1)	< .001	.873	.493	.227 [90%CI = .180 - .277]	.041
	AR(2)	.913	1.000	1.034	.000 [90%CI = .000 - .042]	.006
Downstream Model						
	AR(1)	< .001	.915	.837	.113 [90%CI = .089 - .138]	.078
	AR(2)	.037	.984	.965	.052 [90%CI = .013 - .084]	.055
Upstream Model						
	AR(1)	< .001	.915	.838	.112 [90%CI = .089 - .138]	.068
	AR(2)	.031	.983	.963	.054 [90%CI = .016 - .085]	.048
Bi-Directional Model						
	AR(1)	< .001	.934	.837	.113 [90%CI = .086 - .142]	.053
	AR(2)	.359	.998	.995	.020 [90%CI = .000 - .067]	.032

Note: All models were estimated using MLR; AR(1) = Each datapoint predicted by its previous point in time; AR(2) Each datapoint predicted by its previous time point, and the timepoint before.

Cross-lagged relationships between depressive symptomatology and IA.

In the case of the cross-lagged model between depressive symptomatology and IA (Figure 3), a significant and positive relationship was found from depressive symptomatology at t0 to IA at t1 (b = .335, z (3) = 3.085, p = .002), while the opposite was not the case. Interestingly, once the auto-correlation of IA was considered, the sign of the effect of depressive symptomatology at t0 to IA at t2 changed from positive to negative; however, it was statistically nonsignificant (b = -.188, z (3) = -1.908, p = .056). The rest of the estimates can be seen in table 8.

Figure 3: Cross-lagged relationships between depressive symptomatology and IA.

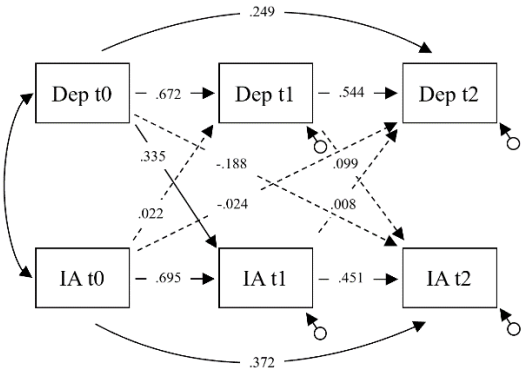

Figure 3 Caption: Dep = Depressive symptomatology; IA = Internet addiction. Unstandardized estimates are reported; dashed arrows indicate nonsignificant effects. Correlation of residuals at t1, t2, and the effect of sex on depressive symptomatology were omitted for clarity of the diagram.

Table 8.

Cross-Lagged and Mediation Models

	Basic Cross-Lagged Model		Downstream Model		Upstream Model		Bi-Directional Model	
	Estimate (S.E.)	P-Value	Estimate (S.E.)	P-Value	Estimate (S.E.)	P-Value	Estimate (S.E.)	P-Value
IA t2								
IA t1	.451 (.108)	>. 001	.369 (.121)	.002	.445 (.108)	> .001	.406 (.127)	.001
IA t0	.372 (.083)	> .001	.356 (.087)	> .001	.346 (.084)	> .001	.343 (.088)	> .001
Disc t1			.118 (0.28)	> .001	--	--	.111 (.029)	> .001
Dep t1	.099 (.120)	.411	--	--	--	--	--	--
Dep t0	-.188 (.098)	.056	-.185 (.085)	.030	--	--	-.192 (.083)	.021
Dep t2								
Dep t1	.544 (.079)	> .001	.540 (.081)	> .001	.539 (.077)	> .001	.539 (.077)	> .001
Dep t0	.249 (.073)	.001	.242 (.070)	.001	.274 (.076)	> .001	.252 (.072)	>.001
Sex	.044 (.035)	.200	.043 (.034)	.204	.042 (.034)	.217	.042 (.034)	.217
Disc t1	--	--	--	--	-.007 (.014)	.631	.005 (.015)	.726
IA t1	.008 (.036)	.822	--	--	--	--	--	--
IA t0	-.024 (.028)	.397	--	--	--	--	-.023 (.026)	.376
Disc t2								
Disc t1	--	--	.426 (.056)	> .001	.330 (.069)	> .001	.374 (.059)	> .001
Disc t0	--	--	.256 (.079)	.001	.238 (.075)	.002	.226 (.076)	.003
Dep t1	--	--	.172 (.131)	.189	--	--	.095 (.124)	.444
IA t1	--	--	--	--	.284 (.118)	.016	.224 (121)	.044
IA t1								
IA t0	.695 (.038)	> .001	.683 (.050)	> .001	.755 (.038)	> .001	.729 (.046)	> .001
Dep t0	.335 (.109)	.002	--	--	--	--	--	--
Disc t0	--	--	.047 (.043)	.272	--	--	.035 (.043)	.416
Dep t1								
Dep t0	.672 (.067)	> .001	.672 (.059)	> .001	.628 (.063)	> .001	.644 (.063)	>.001
IA t0	.022 (.042)	.605	--	--	--	--	--	--
Sex	.088 (.040)	.027	.087 (.039)	.027	.090 (.040)	.023	.090 (.039)	.022
Disc t0	--	--	--	--	.025 (.021)	.240	.023 (.021)	.283
Disc t1								
Disc t0	--	--	.395 (.057)	> .001	.358 (.059)	> .001	.341 (.063)	> .001
Dep t0	--	--	.436 (.199)	.028	--	--	.337 (.185)	.069
IA t0	--	--	--	--	.335 (.078)	> .001	.287 (.071)	> .001
Dep t0								
Sex	.095 (.034)	.005	.102 (.034)	.003	.100 (.034)	.003	.101 (.034)	.003
Mediation								
Dep to IA	--	--	.052 (.026)	.044	--	--	.037 (.022)	.093
IA to Dep	--	--	--	--	-.002 (.005)	.637	.002 (.004)	.725

Note: IA = Internet Addiction; Dep = Depressive Symptomatology; Disc = Using the internet to disconnect from life situations.
Models were estimated using a MLR method.

Mediation from depressive symptomatology to IA.

The AR(2) downstream mediation model (Figure 4) showed a positive and statistically significant effect of disconnection at t1 on internet addiction at t2 (b = .118, z (19) = 4.174, p <

.001). Depressive symptomatology at t0 was also a statistically significant and positive predictor of internet disconnection at t1 (b = .436, z (19) = 2.192, p = .028). The direct effect of depressive symptomatology at t0 on internet addiction at t2 remained negative and became statistically significant with the inclusion of disconnection into the equation (b = -.185, z (19) = -2.172, p = .030). The mediation effect of depressive symptomatology (T0) to internet addiction (T2) through disconnection (T1) was positive and significant (b = .052, 95% CI = .005 - .112, z (19) = 2.014, p = .044). Results of the rest of the parameters can be seen in table 8.

Figure 4: Downstream and upstream mediation models.

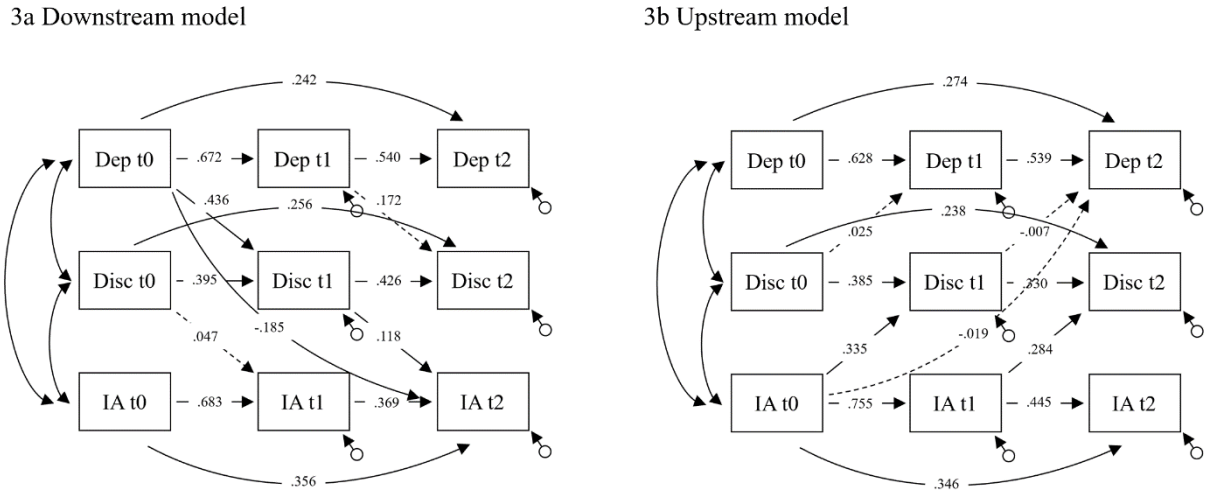

Figure 4 Caption: Dep = Depressive symptomatology; Disc = Disconnection; IA = Internet addiction. Unstandardized estimates are reported; dashed arrows indicate nonsignificant effects. Correlation of residuals at t1, t2, and the effect of sex on depressive symptomatology were omitted for clarity of the diagram.

from IA to depressive symptomatology.

In the AR(2) upstream model (Figure 4), IA at t0 significantly predicted disconnection at t1 (b = .335, z (19) = 4.291, p < .001); however, the latter did not significantly predict depressive symptomatology at T2 (b = -.007, z (19) = -.480, p = .631). Consequently, the mediation effect was found to be nonsignificant (b = -.002, 95% CI = -.015 - .009, z (19) = -.471, p = .637). Results of the rest of the parameters are shown in table 8.

Bidirectional relationships mediation model.

In this case, the effect from depressive symptomatology at t0 to disconnection at t1 was reduced and became statistically nonsignificant (b = .337, z (14) = 1.821, p = .069), which may be explained because the positive effect of IA at t0 on disconnection at t1 was reduced but remained significant (b = .287, z (14) = 4.030, p <.001). The effect of disconnection at t1 on IA at t2 remained significant (b = .111, z (14) = 3.820, p <.001), as did the negative direct effect from depressive symptomatology at t0 on IA at t2 (b = -.192, z (14) = -2.313, p = .021). The mediation effect from depressive symptomatology to IA was reduced and was no longer statistically significant (b = .37, 95% CI = -.004 - .090, z (14) = 1.680, p = .093). Interestingly, disconnection at t2 was also positively predicted by IA at t1 (b = .244, z (14) = 2.010, p = .044). Results of the rest of the parameters are shown in table 8.

Discussion

Discussion.

In the present study, we examined a possible mechanism to explain the association between depression and IA through the intention to use the internet to disconnect from daily life situations, a proxy for an attentional deployment ER strategy, in a sample of high school students from Chile.

Depressive symptomatology showed a significant effect on posterior levels of IA, which was mediated by using the internet to disconnect from life situations: higher scores on depressive symptomatology at baseline predicted increased scores of disconnection later at t1 which, on the other hand, predicted higher scores of IA at t2. Supporting the proposed directionality of the effects from depressive symptomatology to IA, the reversed relationship from IA to depressive symptomatology revealed no significant upstream mediation.

Interestingly, when all previous time points were controlled for, the sign of the relationship between depressive symptomatology at baseline to internet addiction at t2 turned negative, a possible indication of a residual depressive state that leans toward inactivity or an ER strategy unrelated to internet usage. In fact, inactivity has been proposed before as the action tendency resulting from sadness (Nesse, 2000; Bondolfi, et al., 2015).

The mediation effect of disconnection in the relationship from depression to IA lost its statistical significance when the reversed paths of influence were entered simultaneously into the equation. Even though this is not a theoretically proposed mediation model but an empirical test of its

limits, it is informative because it indicates that the mediation effect of disconnection exists in a system of mutual influences between disconnection and IA.

Taken together, the previously exposed theory and findings of this study support the conceptualization of the following process: A negative affect, such as the ones that characterize depressive symptomatology, arises when an individual is confronted with a difficult situation. One possible way to deal with said situation and its emotional impact is to get distracted from the event by shifting the attentional focus. In this context, the internet can afford an easily accessible method of distraction by offering a myriad of different activities to focus on instead. However, this form of distraction can also interfere with the adequate resolution of the problem, which, in turn, can lead to an increased desire to use the internet regardless of its negative consequences. This effect is obscured, however, when an ongoing vicious circle between disconnection and IA is accounted for. It seems that ongoing problems due to internet usage increases the need to get online to disconnect, which also predicts more problems due to internet usage over time. This can be taken as an indication of two parallel mechanisms: a condition of emergence of the problem based on the regulation of a negative affect using the internet as a tool to disconnect from life situations, and, on the other hand, a mechanism of mutual maintenance between IA and using the internet as an attentional deployment ER strategy.

Supporting this idea, a meta-analysis across 31 nations found that IA prevalence was higher in countries with a lower objective quality of life, including higher commute time consumption and pollution (Cheng and Li, 2014). IA is also associated with the occurrence of critical life events (Koenig, et al., 2016), higher levels of distress intolerance (Akbari, 2017), and increased stress vulnerability in experimental settings (Kaess et al., 2017), thus suggesting the use of the

internet as an ER strategy based on difficulties when dealing with problematic life situations and underscoring the role of ER in the complex relationship between mood disorders and internet usage.

On the other hand, a previous study across 11 European countries found that 89% of adolescents diagnosed with IA presented multiple risk behaviors, including tobacco use, going to dangerous streets or alleys at night time, and unhealthy lifestyles, including poor sleeping habits and nutrition (Durkee, et al., 2016). These risk behaviors can also impact the presentation of mood symptomatology in adolescence, highlighting the importance of the study of the technologically mediated context when assessing mental and physical health.

Limitations.

This study is limited by the use of self-reported measurement tools and by using a relatively small convenience sample with a high attrition rate, which may not be representative of the population. However, the absence of a relationship between the study variables and attrition does not suggest a known source of bias. As such, these ideas require further empirical testing in different methodological settings and samples, so they must be interpreted with caution. Special attention must be placed on the fact that the correlational nature of the study does not allow for the establishment of causal inference.

Beyond its limitations, we believe that the explicit and theoretically driven inclusion of an intention to use the internet as an ER strategy to explain the relationship between depressive symptomatology and IA, together with the longitudinal nature of the study and the evaluation

of different directions of influence can have potential implications for both research and clinical practice.

Implications for research.

The focus on specific affordances of the internet as a tool for ER may prove to be a useful venue for the test of possible explanations of the relationship between IA, depressive symptomatology, and negative mood in general, which may seem characterized by a vicious circle of amplification. The inclusion of IA as ER, for example, in studies focused on intra-individual trajectories of change, and in experimental settings may contribute in the future to disentangle individual trajectories of change and the directionality of these effects.

Implications for clinical practice.

Given the increasing ubiquity of the internet in adolescents' daily lives, together with the results from this study, clinicians should evaluate the impact of the use of ICTs in the development and maintenance of mood disorders, while at the same time evaluate the presence of mood disorders when confronted with IA. More specifically, given the case of co-occurrence between depressive symptomatology and IA, clinicians can focus on the specific intention behind internet usage as an ER strategy, together with an evaluation of its degree of flexibility and impact as a potential target for the development of interventions designed to deal with the vicious circle of amplification between negative emotions and technological use, fostering a more flexible and adaptive engagement with the triggering problematic situations.

10. Conclusions and Discussion.

10.1. Step One: Validation of the Internet addiction test.

The main objective of this study was to explain the association consistently found between depressive symptomatology and Internet addiction (Orsal, et al., 2012, Yadav, et al., 2013, Strittmatter, et al., 2015a; Chen & Lin, 2016; Liang, et al., 2016; Fumero, et al., 2018). To accomplish this, first we needed to transculturally adapt and validate a measure of Internet addiction to the Chilean culture. For this, Young's Internet addiction test (Young, 2010) was selected as it is the most psychometrically evaluated instrument to measure Internet addiction (Laconi, et al., 2014). It is important to note that even though the instrument has consistently shown good reliability, previous validation attempts have been limited by a large number of varied factor structures in the different contexts in which it was evaluated (Hernández & Rivera, 2018). To overcome this problem, a content analysis was made on the Internet addiction test's items to search for problems in their formulation, where after a brief version was proposed. Its factor structure was also derived from the content analysis and from Griffith's (2005) "mood modification" component of behavioral addictions. Given the lack of theoretical development in the field (Kardefelt-Winther, 2014a), the proposed short version was also an attempt to explicitly frame the concept of Internet addiction into the emotion regulation literature. This is reflected by the inclusion of a factor named "emotional dysregulation" that included the items that better reflected the mood modification effects of Internet use. The remaining factor was named "lack of control" and reflected the problems to reduce Internet use regarding its negative consequences, a central aspect of Internet addiction.

The reader may already be aware that this validation attempt was made with an adult sample; however, the following studies were made with a group of adolescents and may not be directly

comparable. To address this concern, the same factor structure was evaluated in the sample from the second study which provided a good fit to the data despite a lower than expected reliability index for the emotional dysregulation factor. Results from these analyses can be seen in Annex 2. Nevertheless, as it was described in Articles 2 and 3, the complete scale showed good reliability, both cross-sectionally and across time.

Taken together, results from the first article of this dissertation marked the initial step toward the understanding of Internet addiction, at least in part, as a way to deal with emotional problems. However, more research was needed to test this idea, leading to the development of Articles 2 and 3 that focused on explaining the relationship between depressive symptomatology and Internet addiction.

10.2. How and when is Internet addiction related to depressive symptomatology? An account of the proposed hypotheses representing the objectives of this dissertation.

For narrative purposes, the hypotheses that were not included in the articles are presented and discussed first, after which the focus is directed to the main topic of this doctoral dissertation, that is, an explanation of the relationship between depression and Internet addiction using the Internet as an emotion regulation strategy.

10.2.1. First set of hypotheses: About perceived stress.

The second statement of Hypothesis 1 proposed that there would be a significant mutual and positive relationship between perceived stress and depressive symptomatology. Indeed, higher levels of perceived stress were shown to predict depressive symptomatology and vice versa later

in time by means of a cross-lagged panel model. These results are seen in more detail in Annex 3 and support the statement about a bidirectional relationship of these variables in the expected direction. This result supports the idea that depressive symptomatology is positively predicted by stress (Kendler, et al., 1999), and given depression's characteristic cognitive biases (Beck & Alford, 2009) and emotion regulation pattern (Visted, et al., 2018), may also predispose individuals to experience more stress.

The third hypothesis of this dissertation proposed that perceived stress would mediate the association between depressive symptomatology and Internet addiction. The idea behind this hypothesis was that depressive symptomatology would be associated with higher Internet addiction levels later in time because it increased the experience of stress that would later lead to a maladaptive coping behavior using the Internet. However, this hypothesis was not supported by the data as seen in Annex 3. This can be explained by the fact that perceived stress may operate as a general measure of a negative affective state associated with both depressive symptomatology and its corresponding difficult situations, but this does not reflect a specific motivation to use the Internet. Given its association with both depressive symptomatology (Kendler, et al., 1999) and Internet addiction (Koenig, et al., 2016), it seems that stress can best be expressed as a common cause and consequence of both phenomena, hence its use as a control variable on Article 2.

10.2.2. Second set of hypotheses: Affordances.

10.2.2.1. Directionality of the effects.

After proposing that an account of more specific affordances of the Internet as emotion regulation was going to provide a better explanation of the relationship between depressive symptomatology and Internet addiction, the following section discusses the results from the second and third articles that were focused on this core idea.

The first statement of Hypothesis 1 proposed that there would be a significant mutual and positive relationship between depressive symptomatology and Internet addiction. This idea was rooted in the conceptualization of this relationship as a vicious circle in which a negative affective state such as those characterizing depression would increase the urge to use the Internet as an emotion regulation strategy, which at the same time would take attention away from the resolution of problematic situations and consequently increase the experience of depressive symptomatology. However, this hypothesis was not supported by the findings from Article 3 where the relationship was found to be unidirectional from depressive symptomatology to Internet addiction later in time. Options to discuss the absence of an effect from Internet addiction to depressive symptomatology are provided after accounting for the rest of the hypotheses. With an established path of influences, the next step was to search for an explanation of the relationship.

10.2.2.2 The possibility to enhance my mood: Online flow experiences.

The second hypothesis of this dissertation focused on a possible path to explain the relationship between depressive symptomatology and Internet addiction. If adolescents were more prone to

experience flow online, it was proposed that they would use the Internet to enhance their mood. By seeking this mood-enhancing effect, the Internet would become more salient as a method to cope with problematic situations, thereby increasing a negative affective state in the long term and the urge to use the Internet. In other words, it was hypothesized that online flow experiences would moderate that relationship.

This hypothesis did not receive empirical support from the findings from Article 2 that showed a statistically nonsignificant moderation effect. An explanation of this nonsignificant moderation effect can be found in the same logic that led to the formulation of this hypothesis in the first place. It was assumed that when the participants were able to experience flow, they would use the Internet to achieve this effect. The questionnaire regarding online flow experiences (Yang, et al., 2014) measured a general proneness for individuals to be cognitively absorbed on the Internet with no direct intention to use it with this goal in mind. It is possible that this lack of an explicit account of a motivation behind Internet use gave flow a low explanatory power given its more distant impact on the regulation of a negative emotional state. In other words, having the possibility to do something should not be directly translated as being an actual behavior in itself, and it is by a behavioral tendency that Internet use may influence emotional processes. This idea was further tested with the inclusion of procrastination and disconnection as explicit accounts of motivation to use the Internet.

10.2.2.3. Instead of flow: Leaving uncomfortable things for later.

An alternative to the inclination to experience flow online was the use of the Internet as a tool for procrastination and as a possible mechanism to explain the association between depressive

symptomatology and Internet addiction. Framed in emotion regulation theory, procrastination was considered a situational avoidance strategy (Werner & Gross, 2010) which exploits the attention grapping characteristic of the Internet. This question was also formulated in a frequency scale to reflect how flexibly this behavior was deployed.

Interestingly, results from the second article showed that there was no association between depressive symptomatology and Internet addiction in adolescents who did not tend to use the Internet to leave unpleasant tasks for later. This association was statistically significant on the average and high procrastination group, the latter representing the students who behaved in an inflexible manner. It seems that leaving the resolution of anxiety inducing situations and tasks (Schouwenburg, 2004) for later creates a condition in which depressive symptomatology may influence the development of a problematic use of the Internet. Theoretically, this may occur because the postponement of tasks could delay the timely resolution of a conflict leading to an increase in negative emotions, with this in turn increasing the urge to use the Internet. However, the conceptualization of procrastination using the Internet was also thought to originate from the potentially distractive nature of technology which could drag the attention away from the aversive task. However, this implied a more focused approach which was the topic of Article 3.

10.2.2.4. Attentional shifts: Disconnecting from life situations.

The fourth hypothesis of this study proposed that difficulties in emotion regulation would mediate the association between depressive symptomatology and Internet addiction. Even though this hypothesis was thought to be answered by using the difficulties in emotion regulation scale and its subscales (Gratz & Roemer, 2004), the extent in which participants used

the Internet to procrastinate or disconnect were taken as proxies for difficulties in emotion regulation that are more specifically associated to Internet use. A decision on their role in the structure of this dissertation was required. As procrastination is usually considered a more stable trait-like measure (Svartdal, et al., 2016), it was construed as a condition for the mechanism linking depressive symptomatology and Internet addiction, hence its role as a moderator in Article 2. As stated in the previous paragraph, more attention was required regarding the process of attentional shifts that support the utility of the Internet as a tool for procrastination. Article 3 assumed this role by proposing that using the Internet to disconnect from life situations would mediate the relationship between depressive symptomatology and Internet addiction. This is a more explicit account of the core idea regarding the attentional capturing affordances of the Internet presented in the theoretical background, thereby representing an attentional deployment emotion regulation strategy (Werner & Gross, 2010).

The "disconnection" mediation variable of Article 3 sought to represent, in familiar terms, the behavior of shifting attentional focus from a particular life situation to a screen displaying relevant or entertaining content. As with procrastination, this variable was measured with a frequency scale to reflect the flexibility of the deployment of this behavior. Therefore, it was thought that depressive symptomatology would transfer its effect to Internet addiction by increasing the intention to use the Internet to disconnect from life situations. This was confirmed by a statistically significant longitudinal mediation effect as found in Article 3.

However, as with every potential explanatory model, this effect exists as part of a complex system in which other sources of influence may play a role. Because of this, the limits of the proposed mediation effect were tested by simultaneously entering the reversed paths from Internet addiction to depressive symptomatology into the equations (Maxwell & Cole, 2003). In

so doing, the previously described mediation effect lost its statistical significance because disconnection was also predicted by Internet addiction. This finding revealed an unexpected characteristic of the proposed mechanism; in fact, there was also a bidirectional relationship between disconnection and Internet addiction that was sufficiently relevant to discuss in greater detail.

The mediation model indicated that a higher degree of depressive symptomatology at baseline predicted a higher urge to use the Internet to disconnect from life situations, and that this was later translated into higher levels of uncontrolled Internet use together with its negative consequences. However, uncontrolled use of the Internet and its negative consequences at baseline also predicted more profound urges to use the Internet to disconnect from life situations and vice versa at a later date. Given that one of the characteristics of Internet addiction is the emergence of negative consequences due to Internet use, it is reasonable to conclude that, as depressive symptomatology, it will foster a maladaptive use of technology to cope with the same problems it was meant to assuage.

It is important to note that a cross-lagged panel model like the one applied to the data in Article 3 can only capture "between-individual" differences and not individual trajectories of change (Selig & Preacher, 2009). As thus, it is difficult to establish a starting point with this kind of phenomena further confounding the directionality of the predictions. This raises the possibility that both models—mediation and simultaneously including the opposite direction—represent different aspects of the mechanism under scrutiny. It is possible that the mediation effect from depressive symptomatology to Internet addiction through disconnection captures the emergence of a problematic use of the Internet based on a negative affective state, thus explaining the association between depressive symptomatology and Internet addiction. Beyond this, the

reciprocal relationship between disconnection and Internet addiction may capture, as a vicious circle, part of the mechanism of maintenance of Internet addiction in the following form: “I use the Internet to cope with my problems, which in turn creates a problem for which I use the Internet to cope.”

It is therefore reasonable to surmise that, for an uncontrolled use of the Internet to emerge, the latter at least to some extent must be considered a more attractive experience than the real situation outside of the online context. Specifically, if this situation is perceived by the individual as adverse and unmodifiable—as is the case with sadness (Nesse, 2000, Bondolfi, et al., 2015)—a screen with a virtually unlimited array of distracting activities may acquire a particular salience; that is, when the situation is perceived as not modifiable, a possible option is to modify the painful sensation through distraction. This may be useful to decrease a negative emotional experience on a momentary basis, but it may also have a negative effect over time as stated by emotion regulation theory (Gross & Thompson, 2007). This negative consequence may be related to the emergence of a passive attitude toward the problem and the lack of resources allocated for a new engagement with the situation.

Based on this, results from Articles 2 and 3 support the idea proposed by Kardefelt-Winther (2014a; 2014b, 2017) that problematic use of the Internet can sometimes emerge from unhealthy methods of dealing with difficult life situations.

10.3. Regarding the vicious circle: What about the influence of Internet addiction on depressive symptomatology?

To this point, the influence of depressive symptomatology—and negative affectivity in general—on the development of an uncontrolled use of the Internet was discussed. However, the theoretical background also proposed the idea of a vicious circle in which an uncontrolled use of the Internet would worsen the problematic situations that led to the depressive state from the beginning. However, no longitudinal direct or mediated effect was found from Internet addiction to depressive symptomatology that might indicate the presence of such influence. Nevertheless, this absence is unlikely given the theoretical background previously presented.

In fact, a previous and larger three-wave longitudinal study using the same data analytic strategy showed a moderation effect of gender whereby male adolescents' depressive symptomatology predicted future Internet addiction while the opposite was found for female adolescents (Liang, et al., 2016). It is important to note that the cited study evaluated 1,715 students on three occasions. It is possible that the relatively small sample size of Article 3 was unable to capture the path from Internet addiction to depressive symptomatology, while at the same time, it did not adequately test for a moderation effect such as the one made in Liang, et al. (2016). Conversely, a previous 5-wave longitudinal study using a latent growth curve modeling strategy found that the faster the decrease in depression was, the lower the last measurement of Internet addiction became, thereby supporting the direction originating from depressive symptomatology (Chen & Lin, 2016). However, it is curious that they also found that the initial level of Internet addiction predicted a slightly faster decrease in depressive symptomatology in later years (Chen & Lin, 2016). This may be reflected in the opinion of the authors that the individuals who had more problems due to Internet use also engaged from the beginning of their

study—conducted at the beginning of their college years—in Internet activities that may have facilitated their adjustment. Further, it is also possible that some positive aspects of the Internet may have been confounded with the negative consequences, thus rendering the effect originating from Internet addiction too small to be detected in smaller samples.

These findings reflect the complex relationship between Internet use and emotional experiences that may be neither virtuous nor vicious in nature, rather the relationship could be dependent on a vast number of conditional variables that should be the focus for future studies. However, before discussing future research possibilities, a critical assessment of the present study is needed.

10.4. Limitations of this dissertation and its results.

As with any scientific endeavor, results of this study should be taken with caution given the limitations of the study design, sample, and statistical analyses performed. The following section explains the limitations that were briefly described in the three articles comprising this document.

First, the present study design was longitudinal and correlational in nature. By measuring the same individuals three times and by modeling the different paths of influences between the variables, it was possible to offer information to build an argument toward a specific directionality (Selig & Preacher, 2009). However, it was not possible with this design to establish a causal relationship. The study did not account for experimental manipulation and randomization to control for the influence of any confounding and unmeasured variables. However, given that the phenomena depicted in this dissertation was thought to evolve over a

longer period of time, an experimental design was inadequate to answer its main question. To address this, future studies should able to take multiple intensive measurements following an ecological momentary assessment procedure (See, Bolger & Laurenceau, 2013). Based on the quality of the design, this may add more information about occurrences such as possible antecedents that may lead to an Internet urge based on the intensity of a previous affective state or negative life event. This kind of sampling procedure may also facilitate the statistical modeling of intraindividual trajectories of change (Bolger & Laurenceau, 2013) while bearing in mind the limitations of the lack of experimental manipulation and control.

Second, the present study was based solely on self-report measures of clinically sensitive information in a school setting. Participants were informed that any indication of significant emotional problems found in their responses would trigger a debriefing session with their school and parents to provide timely and adequate consultation. This initial disclosure may well have had the undesired effect of underestimating the students' responses associated with depressive symptomatology or stress in order to avoid exposure of their problems. Still, 27.4% of the participants scored above the Chilean cut-off mark for clinically relevant depressive symptomatology. According to the Chilean national health survey, 25.7% of women and 8.5% of men aged 15 or over suffer from depressive symptomatology (MINSAL, 2011). Comparatively speaking, the prevalence of depressive symptomatology in this study was slightly higher, thereby making it unlikely that students underestimated their responses.

Based on this, it would also be possible to assume that scores regarding emotional problems would be overestimated given the convenience nature of the sample. Parents were also informed of the debriefing procedure, and it is conceivable that the parents who consented for their pupil's participation were either more aware or worried about potential problems, thus creating a

potential selection bias. However, the information available for the study did not allow for the test of this idea.

Third, despite the possibility of over or underestimation in the responses, this study measured a non-clinical sample of adolescents and no diagnosis of depression was made. It is important to note that in order for a major depressive disorder to be diagnosed, its duration and exclusion criteria should be assessed (American Psychiatric Association, 2013), This is not measured on the BDI-I (Beck, et al., 1961). Therefore, this study may not have fully reflected the psychological dynamics of depressed patients; instead, it may have shown primarily associations with variations of depressive symptomatology on the lower and middle spectrums. Nonetheless, levels of depressive symptomatology that register below the threshold for a major depressive disorder in adolescents, as represented by subsyndromal symptomatic depression (Judd, Rapaport, Paulus, & Brown, 1994), have been associated with increased risk of mental health problems later in life (Forsell, 2006; Da Silva Lima & De Almeida Fleck, 2007; Balázs et al., 2013). In sum, this highlights the relevance of its study.

Fourth, Articles 2 and 3 used single-item questions to evaluate procrastination and the use of the Internet to disconnect from life situations. It is normally assumed that multiple-item measures are better for capturing their underlying phenomena based on the possibility to model measurement errors—such as the case of latent variable modeling (see Brown, 2015)—or by the assumption that any test is comprised of a random sample of all items of a domain that comprises the construct of interest, thus implying that "more is better" is an adequate option (Gardner, Cummings, Dunham, & Pierce, 1998). However, in this study, a decision was made to focus on specific behavioral tendencies and motivations for using the Internet for which no instrument had been previously developed. Two options remained, namely, the development of

a new scale for motivations for Internet use as a form of emotion regulation without knowing their predictive value, or to test specific theoretically derived items for their influence in the proposed relationships. The second option was taken as the initial step, and it was limited by the possibility of multiple sources of unmodeled variability adding uncertainty to the estimations. However, their predictive value proved to be useful for further exploration and validation.

Fifth, the present study showed a high attrition rate in the follow-up measurements after almost half of the participants did not complete all sampling points. Even though there was no known source of bias arising from attrition, it resulted in a considerable decrease in statistical power. This was reflected in the previously discussed nonsignificant path from Internet addiction to depressive symptomatology. The decrease added another source of uncertainty to the results. When taken together with the other limitations mentioned, the reader should interpret the findings described with caution.

Notwithstanding its limitations, this study provided an explicit test of a theoretically derived explanation of the relationship between depressive symptomatology and Internet addiction. Thus, it overcomes the dearth of both theoretical and empirical knowledge with possible implications for research and clinical practice.

10.5. Clinical implications: A hint toward practice.

Approximately thirty years ago, Nolen-Hoeksema (1991) proposed that depression was characterized by increased rumination as an emotion regulation strategy, that is, focusing attention toward depressive symptoms and their implications which she believed gave rise to negative thoughts. This cognitive process was conceived to be counteracted by distraction from

the depressive symptoms and their consequences that may help patients disengage from the vicious circle of negative thoughts and emotions. Nevertheless, the same author proposed that some distractive activities could alleviate a depressed mood in the short term but increase depressive symptomatology in the future because of their consequences. This conditional approach to distraction resembled precursors that were later developed fully in the emotion regulation literature, that is, that an emotion regulation strategy was neither good nor bad on its own but became so when applied in an inflexible manner. In fact, this idea was explicitly endorsed by the author years later (Aldao & Nolen-Hoeksema, 2012). Supporting this, a recent study by McGreevy, Bonano and D'Andrea (2015) showed that certain individuals who tend to suppress thoughts do not benefit from distraction in terms of effective emotion regulation. It is reasonable to think that those who tend to suppress their thoughts and experiences would not benefit from distraction given their already present tendency toward emotional avoidance.

Contrary to distraction, as specified in the theoretical background, it seems that acceptance of emotions and situations, their resolution, and reappraisal are all important factors for depression remission (Visted, et al., 2018). Special attention must be paid to the way in which individuals deal with their life situations and emotional experiences. Regarding reappraisal, Cognitive Behavioral Therapy (CBT) is a well-documented and validated treatment for depression that focuses on the modification of negative and maladaptive beliefs about the self, the world, and the future (a form of reappraisal) together with the introduction of new coping skills and the resolution of problematic situations (Beck & Dozois, 2011). It is important for CBT patients to pay special attention to triggering situations, emotions, and symptoms arising from said situations and associated thoughts, for example, by using a Daily Record of Thoughts (DRT;

Beck & Dozois, 2011) which is used later to challenge maladaptive automatic thoughts, core beliefs, and cognitive schemas.

On the other hand, from a constructivist approach, emotion focused therapy (EFT) proposes that depressed clients usually react with withdrawal, emotional suppression, and self-recrimination or blame passing when confronted with a negative affect evoked by a situation. These reactions cause more harm than good given that they hinder the possibility to utilize emotions as a tool to satisfy emotionally based needs (Greenberg & Watson, 2006). EFT works in session by increasing acceptance and awareness of emotions as the basis for emotion regulation and problem solving. This increase in awareness does not imply a complete detachment from a particular emotional experience in order to articulate it into a narrative, rather a dual process of observation and participation (Greenberg & Watson, 2006). Clients participating in EFT for depression are consequently required to pay close attention to their emotional experiences as the basis for recovery.

It is within these attentional processes required for both CBT and EFT that the Internet may factor. As stated by Greenfield (2012), the Internet is appealing because it offers a highly stimulating environment that includes social connections, entertainment, and access to a virtually unlimited amount of personally-relevant information. With the increased availability of Internet-connected mobile devices, the possibilities of being distracted from ongoing situations, surroundings, thoughts, and emotional experiences are immediate and ever-present, thereby influencing the way in which people experience and manage their emotional experiences (Arciero & Bondolfi, 2009) together with the processes associated with psychopathological development and treatment.

Two action possibilities afforded by the Internet were central to this work, namely, the possibility to use it as a distraction or to postpone something else.

10.5.1. Tools for distraction, postponement and psychotherapy of depression.

One underlying idea of this dissertation was that the Internet could be used to distract the user from life situations. In emotion regulation literature, this is framed as an "attentional deployment" strategy (Werner & Gross, 2010). This particular use of the Internet may prove harmful for a psychotherapeutic process via the same proposed mechanism to explain the relationship between depressive symptomatology and Internet addiction, that is, by decreasing the attentional resources allocated to the identification of triggering situations, emotional experiences, and thought processes. Based on this, it is reasonable to explore in a psychotherapeutic setting whether Internet usage becomes an obstacle for depression remission even without the presence of addictive Internet behavior. If an addictive Internet behavior is present, from a theoretical perspective it is likely that Internet use will be associated with a decreased acceptance of emotions, something that a therapist can employ to modify the problematic behavior. In fact, a recent study found that the "nonacceptance of emotions" dimension of the difficulties in emotion regulation scale (Gratz & Roemer, 2004) was associated with the severity of Internet addiction in young adults (Evren, Evren, Dalbudak, Topcu, & Kutlu, 2018).

Given that the Internet can be used as a tool for distraction, it can also be used as a tool for postponement of unpleasant tasks or procrastination, a phenomenon framed under the "situational selection" family of emotion regulation processes (Werner & Gross, 2010).

Following the same approach as disconnection, a client with a tendency to procrastinate by using the Internet may also use it to postpone psychotherapy assignments such as the DRT (Beck & Dozois, 2011), especially if they involve attention to unacceptable emotional experiences. Such tendencies can also be explored and discussed with a therapist as a potential obstacle for symptomatic improvement and well-being.

As discussed in relation to the psychopathological mechanism linking depressive symptomatology and Internet addiction, it is important to note that the isolated action of using the Internet to disconnect from life situations or to postpone the resolution of unpleasant tasks should not be considered as an obstacle for psychotherapy of depression (or any other kind of psychopathology) but rather as a relatively normal behavior (Kardefelt-Winther, 2014a). It is the lack of flexibility and contextual inadequacy of these behaviors that should be evaluated as a potential problem (Thompson & Calkin, 1996; Gross & Thompson, 2007; Werner & Gross, 2010; Aldao & Nolen-Hoeksema, 2012), thereby avoiding this overpathologizing of daily life.

Clinicians should therefore pay special attention to the patterns and motivations of Internet usage when treating mood psychopathology, while at the same time, to a potentially underlying mood disorder when dealing with an addictive Internet behavior. For example, a problematic use of the Internet may work as an obstacle for the remission of depressive symptomatology, while at the same time, an untreated depression may work as an impediment to the treatment of addictive Internet use.

10.6. Future research paths.

The results of this dissertation indicated that the relationship between depressive symptomatology and Internet addiction may be explained by the use of the Internet as a tool for emotion regulation that can alleviate a negative affective state in the short term but foment the development of larger long-term problems. Three future research possibilities are discussed in the following paragraphs, namely, the operationalization of affordances, the inclusion of biological and experimental measures, and the focus on intraindividual models of change.

10.6.1. Internet Content: Operationalizing affordances or focusing on specific applications?

This study did not differentiate between activities or contents sought through the Internet but did take a stance whereby Internet use was considered a global activity. It is possible to assume that other Internet applications may offer different sets of affordances that may be confounded in the present study. To further develop this idea, a more explicit definition of "affordances" is needed. The term was coined by Gibson (1979) to describe the complementarity between an animal—in this case a human—and its environment. The author (Gibson, 1979) emphasized that characteristics that are directly perceived about an object are not its qualities in isolation, such as shape, color pattern, weight, and dimensions, rather a particular action possibility offered by the object based on the different contexts in which it appears (Arciero & Bondolfi, 2009). For example, an individual may be writing a doctoral dissertation with a mug filled with coffee placed near the right side of the computer screen. In the context of a regular writing session, this coffee mug will appear as the possibility to stay awake and to improve

concentration given the caffeine content of the beverage. However, in the context in which a thief breaks into the place with the intention of stealing something, the same coffee mug may appear, given its weight, hardness, and hot content, as a potential weapon with which to defend oneself. Considering Gibson's (1979) proposal, both activities would not be contained in the coffee mug itself, but rather on the interaction between the agent of the action and the object in a given context.

As accessed by smartphones or personal computers, the Internet can be considered a different kind of object; however, it is constantly and collectively modified by design to offer as many action possibilities as someone can imagine. Therefore, Kardefelt-Winther's (2014a) proposition of focusing on motivations that stimulate Internet use and its affordances may be a suitable option to study the influence of information and communication technologies on emotional processes. Given the ever-changing number and types of internet applications, it seems that it would be more fruitful to study what they could offer to an individual, starting with the possibilities for distraction and postponement as described in this document as well as opportunities to enhance self-efficacy or mingle with groups of people with similar interests, between others. Enhanced self-efficacy, for example, can be sought in different degrees through mastering a difficult technique on a videogame or by receiving favorable feedback and "likes" through a social media platform. Thus, different applications may work toward a similar goal. A group of affordances may also cluster into higher-order categories such as "ways to decrease a negative affective state" as in the case of disconnection and procrastination. Further theoretical and empirical studies are needed to operationalize relevant affordances for selected groups of individuals in specific circumstances such as the case of this dissertation that focused upon emotion regulation in high school students in the context of a negative affective state.

10.6.2. The inclusion of the biological level: Questions about Internet-related problems and their substratum.

Framed on the negative valence system of the RDoCs matrix (NIMH, 2018a), this dissertation aimed to study the potential role of Internet usage as an emotion regulation strategy. However, it took only self-reporting into account from the proposed levels of analysis, thereby leaving aside genes, molecules, cells, circuits, physiology, observed behavior, and experimental paradigms. Given the relationship between Internet addiction, negative emotions (Ho, et al., 2014), and stress (Koenig, et al., 2016), it is possible to study Internet addictive behaviors within the framework of the biology of stress. By doing this, a recent study found that problematic gamers showed higher expressions of a chronic-stress-induced inflammatory genetic profile called "conserved transcriptional response to adversity" (CTRA; Cole, 2014) compared to non-problematic gamers (Snodgrass, et al., 2018). However, this heightened expression in problematic gamers became statistically nonsignificant when offline social support, a known influencing variable for CTRA expression, was added into the equation (Snodgrass, et al., 2018). The authors of the study took this as evidence to conceptualize a problematic use of videogames as a manifestation of a broader pattern of biopsychosocial distress (Snodgrass, et al., 2018). It is possible that participants who played videogames in a problematic way used videogames to cope with a lower degree of offline social support, thus explaining this association. It is also possible that the same group, by playing videogames in a problematic way, decreased their levels of offline social support and generated a stressful environment that heightened their CTRA expression over time.

Therefore, beyond problematic behaviors with technology, the inclusion of biological measures would also require the assessment of possible affective contexts and motivations such as loneliness and the will to meet new people, or perhaps a depressed mood and the motivation to alleviate it, both of which may be closer in the causal chain to biological changes than the manifestation of Internet-related behaviors. This may switch the focus of inquiry from the biological substratum of problematic behaviors with technology to whether and how technology might modify biological affective processes.

The same approach may be taken, for example, when applying studies of the influence of viewing relevant Internet content to peripheral or central physiological responses of stress.

10.6.3. Changes from within: Intraindividual models of change.

As briefly discussed in the limitations section, the present study was able to model interpersonal change. This means that the relationships reported in Article 3 were at the variable or group level; however, they did not reflect individual trajectories of change (Selig & Preacher, 2009) by not considering, for example, the effect of initial levels of psychopathology on future rates of change. To overcome this, it is possible to use the current high penetration of smartphones to implement studies using an intensive longitudinal design (Bolger & Laurenceau, 2013), collecting data multiple times per day regarding motivations to use the Internet and affective correlates, while at the same time, for example, gathering objective measures of technological use such as the amount of time that the smartphone's screen is turned on. A focus on intraindividual change models with intensive data about mood, motivations for Internet use, and

objective measures of technological activity may help to further disentangle the complex relationship between emotional experiences and Internet use.

10.7. Conclusion: A starting point.

From its inception, the title of this dissertation has been *"Emotion regulation strategies on depression through a problematic use of technology: toward an explanation of the association between depressive symptomatology and Internet addiction,"* thereby reflecting the core idea of this research program, that is, the problematic use of the Internet as a method to deal with difficult situations and negative emotions. However, during the development of this dissertation, different conceptualizations of Internet usage as an emotion regulation strategy were proposed. This was reflected in the removal of certain measurement instruments and changes to the approach toward the research hypotheses and objectives. At the beginning, it was thought that global differences in emotion regulation and online flow experiences would provide viable explanations of the relationship between depressive symptomatology and Internet addiction. However, together with the development of a theoretical background rooted in emotion regulation theory (Gross & Thompson, 2007; Werner & Gross, 2010) and the compensatory Internet-use model (Kardefelt-Winther, 2014a), a more focused approach was favored toward specific affordances of the Internet as emotion regulation strategies. This focus was accompanied by the disconfirmation of one of the central hypotheses of the study, namely, that online flow experiences would moderate the relationship between depressive symptomatology and Internet addiction. In fact, the possibility to be absorbed on the Internet was probably not translated into the intention to use it to decrease a negative affective state, thus affording flow only a low explanatory power in the aforementioned relationship. The explicit focus on

intentions allowed for the model of a mechanism linking depressive symptomatology and Internet addiction based on attentional shifts and postponement of unpleasant tasks, thereby supporting the main proposition of the CIU model (Kardefelt-Winther, 2014a) of understanding a problematic use of technology as the consequence of a method to deal with difficult life situations. However, they also expanded the CIU model's scope (Kardefelt-Winther, 2014a) with the inclusion of emotion regulation theory (Gross & Thompson, 2007; Werner & Gross, 2010). By doing this, it was possible to answer the general objective of this dissertation by stating that online flow experiences and perceived stress by themselves did not have a role in the relationship between depressive symptomatology and Internet addiction, while a focus on explicit affordances of the Internet for emotion regulation did.

This shift of perspective proved to be useful by providing viable explanations of the relationship between depressive symptomatology and Internet addiction. This may be of particular importance in adolescence because it is considered a critical window of time for the development of psychopathology (Cicchetti & Rogosch, 2002; Dahl & Gunnar, 2009). Therefore, this study can be considered as significant background support to further study the complex interrelationship between the technologically mediated context and the experience and management of emotions in an increasingly changing world.

11. References.

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12. Annexes.

12.1. Annex 1 - Missing at random independent sample t-tests.

Independent sample t-test were conducted for completers and dropouts from the three-wave study described in section 4.2 using R (R Core Team, 2017). No significant differences were found for levels of depressive symptomatology [t(516.13) = .104, p = .917], Internet addiction [t(506.95) = -.195, p = .845], perceived stress [t(509.69) = 1.099, p = .272], disconnection [t(486.33) = -.033, p = .974], procrastination [t(501.01) = 1.744, p = .082], online flow experiences [t(501.84) = .432, p = .666], difficulties in emotion regulation [t(490.21) = .552, p = .581], relationship quality with father [t(476.21) = .548, p = .584], relationship quality with mother [t(490.59) = .481, p = .631], relationship quality with friends [t(503.80) = 1.029, p = .304], age [t(504.96) = 1.785, p = .075], weekly internet use [t(461.64) = -1.218, p = .224], perceived health [t(487.12) = .601, p = .548], and digital literacy [t(483.39) = -.796, p = .426]. This can be taken as an indication that attrition is consistent with missing at random.

12.2. Annex 2 - Confirmatory Factor Analysis replication: Adolescent sample.

Using the sample of 529 adolescents described in section 4.2, and by means of a Confirmatory Factor Analysis with a WLSMV estimation method, a replication analysis of the theoretically derived short version of Young's Internet Addiction Test (2010) was estimated. The library Lavaan (Rosseel, 2012) for R (R Core Team, 2017) was used. Overall, good fit indexes were found for the adolescent's sample (χ^2 (45)=67.388, p=0.001, CFI=.955, TLI=.940, and RMSEA=.044[90% CI=.028 – .059], SRMR=0.040), with positive and high factor loadings (Table 9). The total scale showed a Cronbach's alpha of .77, while the first factor "Lack of control" showed a Cronbach's alpha of .77, both indicating a good reliability. The "Emotional dysregulation" factor showed a Cronbach's alpha of .68, indicating a slightly lower than expected reliability.

These results partly support the replicability of the proposed instrument and structure in the adolescent sample.

Table 9.
Factor loadings and correlations adolescent's sample replication

	Loadings total sample
Lack of control.	
Q1: How often do you find that you stay online longer than you intended?	.530
Q2: How often do you neglect household chores to spend more time online?	.682
Q14: How often do you lose sleep due to being online?	.588
Q16: How often do you find yourself saying "just a few more minutes" when online?	.658
Q17: How often do you try to cut down the amount of time you spend online and fail?	.619
Emotional dysregulation.	
Q10: How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?	.529
Q12: How often do you fear that life without the Internet would be boring, empty, and joyless?	.594
Q13: How often do you snap, yell, or act annoyed if someone bothers you while you are online?	.491
Q19: How often do you choose to spend more time online over going out with others?	.535
Q20: How often do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back online?	.608
Correlation between the factors.	
	.624

Note: Every factor loading is significant at the p < .001 level.

12.3. Annex 3 - Cross-Lagged Panel Models for Depressive Symptomatology, Perceived Stress and Internet Addiction.

To test for the hypotheses pertaining the role of perceived stress in the relationship between depressive symptomatology and internet addiction, a set of cross-lagged panel models were calculated using the same methodology and sample from article 3.

In summary, the sample of 238 high school students who completed all three measurement points was used. The analyses were conducted using Mplus 8.2. (Muthén & Muthén, 2017), following the mediation models pictured in figure 4, using a robust MLR method of estimation. As with article 3, given the nested structure of the sample a TYPE = COMPLEX correction for standard errors was applied (Preacher, 2015). First, a cross-lagged panel model between depressive symptomatology and perceived stress was computed. Second, a downstream mediation model from depressive symptomatology to internet addiction mediated through perceived stress was calculated, followed by a reversed or upstream model from internet addiction to depressive symptomatology mediated through perceived stress. Mediation estimates were confirmed by means of a percentile bootstrap with 20.000 draws (Hayes and Scharkow, 2013; Valente, et al., 2016).

As in article 3, an AR(2) time structure was imposed for all models. Given that independent sample t-tests indicated that girls had higher levels of perceived stress than boys at t0 [$t(217.37) = -2.588$, $p = .011$], t1 [$t(202.22) = -2.473$, $p = .014$] and t2 [$t(205.91) = -2.665$, $p = .008$], sex was entered into the equations as a control variable. The same measure was taken for depressive symptomatology, as reported in article 3.

Table 10 shows that all models fitted the data well, granting the possibility to continue further analyses.

Table 10.

Fit indexes for the cross-lagged and mediation models perceived stress

		sig x2	CFI	TLI	RMSEA	RMSR
Basic Cross-Lagged Model						
	AR(2)	.000	1.000	1.000	.000 [90%CI = .000 - .000]	.000
Downstream Model						
	AR(2)	.163	.995	.986	.038 [90%CI = .000 - .075]	.039
Upstream Model						
	AR(2)	.132	.994	.983	.041 [90%CI = .000 - .078]	.042

Note: All models were estimated using MLR; AR(2) Each datapoint predicted by its previous time point, and the timepoint before.

Table 11

Cross-Lagged model perceived stress

	Basic Cross-Lagged Model	
	Estimate (S.E.)	P-Value
Dep t2		
Dep t1	.497 (.093)	< .001
Dep t0	.245 (.085)	.004
Stress t1	.045 (.040)	.269
Stress t0	-.002 (.034)	.951
Sex	.038 (.033)	.256
Dep t1		
Dep t0	.585 (.079)	< .001
Stress t0	.083 (.040)	.038
Sex	.076 (.039)	.053
Dep t0		
Sex	.099 (.036)	.006
Stress t2		
Stress t1	.465 (.077)	< .001
Stress t0	.235 (.077)	.002
Dep t1	-.052 (.139)	.708
Dep t0	.285 (.151)	.059
Sex	.047 (.052)	.364
Stress t1		
Stress t0	.428 (.073)	< .001
Dep t0	.261 (.096)	.007
Sex	.079 (.048)	.102
Stress t0		
Sex	.218 (.084)	.009

Note: Dep = Depressive Symptomatology; Stress = Perceived Stress. Models were estimated using a MLR method.

Regarding the bi-directional relationship between depressive symptomatology and perceived stress, it is possible to appreciate in table 11 that depressive symptomatology at baseline (t0) significantly and positively predicted subsequent scores of perceived stress at t1 (b = .118, z (19) = 4.174, p < .001) and vice-versa (b = .118, z (19) = 4.174, p < .001). This grants support to the hypothesis stating that depressive symptomatology and internet addiction would show a mutual and positive influence over time.

Regarding the mediation hypothesis, it is possible to observe in table 12 that neither the downstream mediation effect (b = .020, 95% CI = -.023 - .069, z (16) = .843, p = .399) nor the upstream mediation effect (b = .002, 95% CI = -.003 - .011, z (16) = .808, p = .419) were statistically significant, thus granting support against the hypothesis about a potentially mediating role of perceived stress in the relationship between depressive symptomatology and internet addiction. Because of the absence of statistically significant mediation effects, no further analyses were conducted.

Table 12.

Mediation Models Perceived Stress

	Downstream Model		Upstream Model	
	Estimate (S.E.)	P-Value	Estimate (S.E.)	P-Value
IA t2				
IA t1	.435 (.126)	.001	.436 (.110)	< .001
IA t0	.387 (.092)	< .001	.361 (.092)	< .001
Stress t1	.069 (.082)	.403	--	--
Dep t0	-.186 (.088)	.035	--	--
Dep t2				
Dep t1	.575 (.073)	< .001	.499 (.071)	< .001
Dep t0	.188 (.063)	.003	.220 (.062)	< .001
Sex	.044 (.034)	.194	.043 (.035)	.219
Stress t1	--	--	.053 (.029)	.069
IA t0			-.023 (.020)	.255
Stress t2				
Stress t1	.404 (.061)	< .001	.458 (.067)	< .001
Stress t0	.303 (.064)	< .001	.301 (.064)	< .001
Dep t1	.134 (.092)	.143	--	--
Sex	.048 (.051)	.348	.056 (.050)	.265
IA t1	--	--	.047 (.044)	.281
IA t1				
IA t0	.695 (.035)	< .001	.755 (.039)	< .001
Dep t0	--	--	--	--
Stress t0	.131 (.058)	.025	--	--
Dep t1				
Dep t0	.679 (.061)	< .001	.521 (.074)	< .001
IA t0	--	--	--	--
Sex	.087 (.040)	.029	.079 (.039)	.044
Stress t0	--	--	.103 (.037)	.005
Stress t1				
Stress t0	.376 (.059)	< .001	.484 (.049)	< .001
Dep t0	.285 (.076)	< .001	--	--
Sex	.091 (.049)	.062	.090 (.052)	.083
IA t0	--	--	.045 (.049)	.360
Dep t0				
Sex	.096 (.034)	.005	.096 (.034)	.005
Stress t0				
Sex	.212 (.081)	.008	.212 (.081)	.009
Mediation				
Dep to IA	.020 (.023)	.399	--	--
IA to Dep	--	--	.002 (.003)	.419

Note: IA = Internet Addiction; Dep = Depressive Symptomatology; Stress = Perceived Stress. Models were estimated using a MLR method.

12.4. Annex 4 - Informed consent and assent letters.

12.4.1. Adult study: Informed consent.

Carta de consentimiento informado.

validación de la versión Chilena del Test de Adicción a Internet.

Nombre Investigador Responsable: Cristóbal Hernández Contreras.

Queremos invitarlo a participar en el estudio "Validación de la versión Chilena del Test de Adicción a Internet", a cargo del Psicólogo Cristóbal Hernández Contreras, perteneciente al Centro de Terapia Posracionalista de Santiago en conjunto con la psicóloga Ph.D Diana Rivera Ottenberger, perteneciente a la Pontificia Universidad Católica de Chile. La presente investigación tiene como objetivo validar el Test de Adicción a Internet (IAT) de K.S. Young (1998), en su versión adaptada (TAI-C) para su utilización en la población Chilena, analizando sus propiedades psicométricas. El test de Adicción a Internet es un cuestionario ampliamente utilizado a nivel mundial para evaluar las características de la dependencia a internet tanto en adultos como en adolescentes.

Su participación en el estudio implicaría responder una encuesta que incluye la versión adaptada del Test de Adicción a Internet (TAI-C). Responder el cuestionario tomará entre 5 y 10 minutos de su tiempo.

La información recolectada será confidencial y no se utilizará para ningún otro propósito fuera de los de esta investigación. Sus respuestas al cuestionario serán codificadas utilizando un número de identificación para así garantizar su anonimato. Ninguna persona ajena a la investigación tendrá acceso a información que permita individualizar a los participantes, y

cualquier publicación o presentación de los datos se hará en base a resultados grupales, sin incluir información individual o personal alguna.

La participación en este estudio es estrictamente voluntaria y en caso que acceda a participar, puede dejar de hacerlo en cualquier momento sin repercusión alguna.

Si tiene alguna duda sobre este proyecto, puede contactar al investigador principal, Cristóbal Hernández, al correo electrónico c.hernandez@ctps.cl o al teléfono +569 92992929

Al pinchar en el botón “siguiente” usted indica que ha leído el consentimiento informado antes expuesto y desea participar voluntariamente del presente estudio.

Si usted no desea participar de este estudio, puede cerrar la presente ventana con el botón “x” en la parte superior de su navegador.

12.4.2. Adolescent Study: Parent's Informed consent.

CARTA DE CONSENTIMIENTO INFORMADO

Estrategias de regulación emocional en depresión a través de un uso problemático de la tecnología: hacia una explicación de la asociación entre sintomatología depresiva y uso problemático de internet.
CONICYT-Beca Doctorado Nacional 2015.
Investigador Responsable: Cristóbal Eduardo Hernández Contreras.

Afiliación: Doctorado en Psicoterapia. Escuela de Psicología Pontificia Universidad Católica de Chile.

Su hijo(a) ha sido invitado(a) a participar en el estudio "Estrategias de regulación emocional en depresión a través de un uso problemático de la tecnología: hacia una explicación de la asociación entre sintomatología depresiva y uso problemático de internet" a cargo del investigador Cristóbal Hernández Contreras, estudiante del programa de Doctorado en Psicoterapia de la Pontificia Universidad Católica de Chile; y de la investigadora Diana Rivera Ottenberger, Profesora Asistente de la Escuela de Psicología de la Pontificia Universidad Católica de Chile. El objeto de esta carta es ayudarlo a tomar la decisión de autorizar a su hijo(a) a participar en la presente investigación.

¿Cuál es el propósito de esta investigación?
El propósito de esta investigación es evaluar la influencia del uso de internet, que a veces se puede volver problemático, en el desarrollo de problemas emocionales en adolescentes de octavo a cuarto medio.

¿En qué consiste su participación?
La colaboración en el estudio contempla que su hijo(a) de octavo a cuarto medio participe contestando un grupo de preguntas en forma de encuesta, relacionadas a la presencia de problemas emocionales, sus sentimientos, la manera en que los maneja, sus relaciones interpersonales y cómo utiliza internet.

¿Cuánto durará su participación?
Las preguntas tomarán alrededor de 30 a 45 minutos en ser contestados y serán aplicados en cuatro ocasiones: Una primera ocasión en su establecimiento educacional en papel y lápiz o digitalmente, mientras que las siguientes tres serán enviadas a través de un sistema de encuestas en línea. Las cuatro ocasiones se encontrarán separadas por espacios de tiempo de alrededor de tres meses cada una, comenzando el mes de septiembre de 2017.

¿Qué riesgos corre al participar?
El inconveniente que su hijo(a) podría enfrentar es sentirse incómodo(a) con algunas preguntas personales o íntimas, sin embargo tiene la opción de no responder o retirarse en cualquier momento sin que existan consecuencias negativas por parte del colegio o el equipo de investigación.

¿Qué beneficios puede tener su participación?
Su hijo(a) no recibirá un beneficio directo con su participación. Sin embargo, con su participación estará aportando al desarrollo de un estudio que pretende encontrar resultados en un área poco explorada en Chile, como lo es la relación entre el uso de tecnologías y los problemas emocionales de los adolescentes. Estos resultados pueden ser importantes como base para apoyar el desarrollo de nuevas intervenciones para fomentar el uso saludable de tecnologías de la información, además de aportar a su colegio con información sobre la salud mental de los estudiantes, lo que puede ser utilizado para futuras intervenciones. Como compensación su hijo(a) participará del sorteo de pares de entradas al cine en cada ocasión en la que responda la encuesta. No se le entregarán sumas adicionales de dinero o regalos por participar de esta investigación.

¿Qué pasa con la información y datos que usted entregue?
Los investigadores mantendrán CONFIDENCIALIDAD con respecto a cualquier información obtenida en este estudio. La información que permita identificarle a usted o a su hijo(a) será conocida exclusivamente por el equipo del estudio, previa firma de un acuerdo de confidencialidad. Los nombres serán reemplazados por un código para asegurar la confidencialidad y la asociación de las distintas encuestas a través del tiempo. Por otro lado, su colegio recibirá un informe general con los resultados del estudio, además de una orientación sobre éstos, para apoyar el desarrollo de futuras intervenciones en salud mental.
Más allá de esto, los datos serán utilizados únicamente con motivos de investigación y académicos, y serán tratados de manera grupal. En consecuencia, la información a publicar (tanto en artículos, como congresos y presentaciones en clases universitarias, entre otros) será anónima.
Las encuestas en papel y lápiz serán digitados para posteriormente ser destruidos. Las encuestas en línea serán manejados a través de un software especializado seguro. Todos los datos serán almacenados en un computador y un disco duro con clave, en dependencias del investigador principal.
En el caso de detectar que su hijo presente un problema emocional que requiera de atención, se activará un protocolo en conjunto con su colegio y se les informará.

¿Es obligación participar? ¿Puede arrepentirse después de participar?
Usted NO está obligado de ninguna manera a autorizar a su hijo (a) participar en este estudio. Si usted accede a autorizar a su hijo a participar, él o ella pueden dejar de hacerlo en cualquier momento sin que haya consecuencias negativas, aunque el director de la institución o la autoridad que corresponda haya autorizado la realización de la investigación.

¿A quién puede contactar para saber más de este estudio o si le surgen dudas?
Si tiene cualquier pregunta acerca de esta investigación, puede contactar a Cristóbal Hernández Contreras, estudiante del Programa de Doctorado en Psicoterapia de la Pontificia Universidad Católica de Chile. Su teléfono es el +569 92992929 y su email es cuhernandez@uc.cl. También podrá contactar a Diana Rivera Ottenberger, profesora Asistente de la escuela de Psicología de la Pontificia Universidad Católica de Chile. Su teléfono es el +562 2354 4606 y su email es dvrivera@uc.cl. Si usted tiene alguna consulta o preocupación respecto a sus derechos como participante de este estudio, puede contactar a la presidenta del Comité de Ética de Ciencias sociales, artes y humanidades de la Pontificia Universidad Católica de Chile, profesora María Elena Gronemeyer F., al siguiente email: eticadeinvestigacion@uc.cl.

HE TENIDO LA OPORTUNIDAD DE LEER ESTA DECLARACIÓN DE CONSENTIMIENTO INFORMADO, HACER PREGUNTAS ACERCA DEL PROYECTO DE INVESTIGACIÓN, Y ACEPTO QUE MI HIJO/A PARTICIPE EN ESTE PROYECTO SIENDO CONSCIENTE DE QUE NO ESTÁ OBLIGADO/A HACERLO, AUNQUE EL DIRECTOR O LA DIRECTORA DE SU COLEGIO HAYA AUTORIZADO LA REALIZACIÓN DE LA INVESTIGACIÓN.

NOMBRE DE SU HIJO/A PARTICIPANTE DE LA INVESTIGACIÓN _____

CURSO DE SU HIJO/A PARTICIPANTE DE LA INVESTIGACIÓN_____

_____ _____
Firma del/la apoderado/a Fecha

_____
Nombre del/la apoderado/a

_____ _____
Firma del la Investigador/Investigadora Fecha

(Firmas en duplicado: una copia para el participante y otra para el investigador)

12.4.3. Adolescent Study: Adolescent's informed assent.

CARTA DE ASENTIMIENTO INFORMADO

Estrategias de regulación emocional en depresión a través de un uso problemático de la tecnología: hacia una explicación de la asociación entre sintomatología depresiva y uso problemático de internet.
CONICYT-Beca Doctorado Nacional 2015.
Investigador Responsable: Cristóbal Eduardo Hernández Contreras.

Afiliación: Doctorado en Psicoterapia. Escuela de Psicología Pontificia Universidad Católica de Chile.

Vamos a realizar un estudio para tratar de aprender sobre cómo influyen la vida emocional y las relaciones en cómo usan internet los adolescentes. El motivo de esta carta es para ayudarte a tomar la decisión de si participas o no.

¿Cuál es el propósito de esta investigación?
El propósito de esta investigación es evaluar la relación del uso de internet, que a veces se puede volver problemático, con los problemas emocionales en adolescentes de octavo a cuarto medio.

¿En qué consiste tu participación?
Si aceptas participar de nuestro estudio te haremos algunas preguntas sobre tus emociones, tus relaciones y cómo usas internet.

¿Cuánto durará tu participación?
Estas preguntas te las haremos cuatro veces, la primera ahora y las tres siguientes cada tres meses, pero la diferencia es que las siguientes serán hechas por internet. Todas las preguntas te las haremos en la forma de una encuesta que puede tomarte entre 30 y 45 minutos en ser respondidas.

¿Qué riesgos corres al participar?
Como inconveniente podrías sentirte incómodo(a) con algunas de las preguntas personales, sin embargo puedes no responder o retirarte cuando quieras y nadie se va a enojar.

¿Qué beneficios puede tener tu participación?
No recibirás un beneficio directo con tu participación. Sin embargo, al participar estarás ayudando al desarrollo de un estudio que busca encontrar resultados en un área que en la que hay poca información, ya que vivimos en un mundo cada vez más rodeado por la tecnología. Por otro lado, tu colegio podrá contar con información general que le puede ayudar a mejorar la salud mental de los estudiantes. Además, al contestar la encuesta tendrás el espacio de pensar algunas cosas sobre ti. Como compensación participarás en el sorteo de entradas al cine dobles en cada ocasión en que respondas la encuesta (en las cuatro). Estas entradas están separadas por curso, por lo que siempre alguien del curso las va a ganar. No se entregarán sumas adicionales de dinero o regalos por participar de esta investigación.

¿Qué pasa con la información y datos que nos entregues?
Las respuestas que nos entregues serán confidenciales, eso quiere decir que nadie más que el equipo de investigación podrá saber quién la contesto y los resultados siempre se trabajarán de manera grupal para que nadie pueda identificar quién dijo qué. De hecho, los datos van a ser identificados a través de un código. Tu colegio va a recibir un informe general, sin identificar a ningún estudiante ni curso. Las publicaciones

científicas o para la universidad van usar siempre los datos de manera grupal, es decir, no se va a identificar a nadie.
Sin embargo, si nos damos cuenta de que necesitas ayuda porque estás pasando por problemas emocionales que requieren atención le vamos a informar al colegio que le informará en caso de ser necesario a tus papás para que así puedan ayudarte.

¿Es obligación participar? ¿Puedes arrepentirte después de participar?
No es obligación participar del estudio. Además, si quieres dejar de contestar puedes hacerlo cuando quieras. Nadie puede enojarse o enfadarse contigo por eso. Además, no tendrá ninguna consecuencia con tu colegio o tus papás.

¿Puedo hacer preguntas durante la investigación?
Puedes hacer preguntas durante toda la investigación.

Si firmas este papel quiere decir que lo leíste, o alguien te lo leyó y que quieres estar en el estudio. Si no quieres estar en el estudio, no lo firmes. Recuerda que tú decides estar en el estudio y nadie se puede enojar contigo si no firmas el papel o si cambias de idea y después de empezar el estudio, te quieres retirar.

_____ _____
Firma del/la Participante Fecha

_____
Nombre del/la Participante

_____ _____
Firma del la Investigador/Investigadora Fecha

(Firmas en duplicado: una copia para el participante y otra para el investigador)

12.5. Annex 5 - Questionnaire.

1. El presente cuestionario consiste de 20 enunciados. Luego de leer cada enunciado cuidadosamente, basado en la escala de 5 puntos presentada, por favor **encierra en un círculo** la respuesta (0, 1, 2, 3, 4 o 5) que te describa mejor. Si dos opciones parecen igualmente válidas, selecciona la que represente cómo has estado la mayor parte del tiempo durante el último mes. Asegúrate de leer todos los enunciados cuidadosamente antes de elegir una opción. Los enunciados se refieren a situaciones u acciones "offline" a no ser que se especifique lo contrario.

	No aplica	Raramente	Ocasional-mente	Frecuente-mente	A menudo	Siempre
1. ¿Con qué frecuencia te das cuenta que te quedas conectado/a en Internet más tiempo de lo que tenías previsto?	0	1	2	3	4	5
2. ¿Con qué frecuencia descuidas los quehaceres de la casa para pasar más tiempo en línea?	0	1	2	3	4	5
3. ¿Con qué frecuencia prefieres la emoción de estar conectado a internet antes que la intimidad física y/o emocional con tu pareja (pololo/a)?	0	1	2	3	4	5
4. ¿Con qué frecuencia formas nuevas relaciones con otros usuarios de internet?	0	1	2	3	4	5
5. ¿Con qué frecuencia quienes te rodean se quejan por el tiempo que pasas en línea?	0	1	2	3	4	5
6. ¿Con qué frecuencia ves afectadas tus notas o deberes académicos debido al tiempo que pasas en línea?	0	1	2	3	4	5
7. ¿Con qué frecuencia revisas tu correo electrónico, Mensajería Instantánea (como Whatsapp) o redes sociales antes de realizar otra cosa que necesites hacer?	0	1	2	3	4	5
8. ¿Con qué frecuencia el tiempo que pasas en internet afecta negativamente tu desempeño o productividad en el trabajo?	0	1	2	3	4	5
9. ¿Con qué frecuencia te pones a la defensiva o tiendes a ocultar información cuando alguien te pregunta qué haces cuando estás en línea?	0	1	2	3	4	5
10. ¿Con qué frecuencia bloqueas pensamientos desagradables sobre tu vida con pensamientos tranquilizadores o agradables relacionados con internet?	0	1	2	3	4	5

	No aplica	Raramente	Ocasional-mente	Frecuente-mente	A menudo	Siempre
11. ¿Con qué frecuencia te encuentras a ti mismo/a anticipando cuándo te conectarás nuevamente a internet?	0	1	2	3	4	5
12. ¿Con qué frecuencia temes que la vida sin internet sería aburrida, vacía y triste?	0	1	2	3	4	5
13. ¿Con qué frecuencia te enojas, gritas, o te irritas si alguien te interrumpe mientras está en línea?	0	1	2	3	4	5
14. ¿Con qué frecuencia pierdes horas de sueño por estar conectado/a hasta tarde en la noche?	0	1	2	3	4	5
15. ¿Con qué frecuencia te sientes preocupado/a al estar desconectado/a de Internet, o fantaseas con estar conectado/a?	0	1	2	3	4	5
16. ¿Con qué frecuencia te encuentras a ti mismo/a diciendo “solo un par de minutos más” cuando estás conectado/a?	0	1	2	3	4	5
17. ¿Con qué frecuencia tratas de disminuir el tiempo que pasas en Internet y no lo logras?	0	1	2	3	4	5
18. ¿Con qué frecuencia intentas ocultar cuánto tiempo has estado en línea?	0	1	2	3	4	5
19. ¿Con qué frecuencia eliges pasar más tiempo en línea en lugar de salir con otras personas?	0	1	2	3	4	5
20. ¿Con qué frecuencia te sientes deprimido/a, de mal humor o nervioso/a cuando no estás conectado/a a Internet, y se te sientes mejor cuando te conectas nuevamente?	0	1	2	3	4	5

2.

NÚCLEO MILENIO
INTERVENCIÓN PSICOLÓGICA
Y CAMBIO EN DEPRESIÓN

ID Participante	
Fecha	

BDI-I[1]

En este cuestionario aparecen varios grupos de afirmaciones. Por favor, lea con atención cada una. A continuación, señale cuál de las afirmaciones de cada grupo describe mejor cómo se ha sentido **DURANTE ESTA ÚLTIMA SEMANA, INCLUIDO EL DIA DE HOY.** Encierre en un círculo el número que está a la izquierda de la afirmación que haya elegido. Si dentro de un mismo grupo hay más de una afirmación que considere aplicable a su caso puede marcarla también. **Asegúrese de leer todas las afirmaciones dentro de cada grupo antes de efectuar la elección.**

A	F
0. No me siento triste 1. Me siento triste 2. Me siento triste continuamente y no puedo dejar de estarlo 3. Ya no puedo soportar esta pena	0. No siento que esté siendo castigado/a 1. Me siento como si fuese a ser castigado/o 2. Siento que me están castigando o que me castigarán 3. Siento que merezco ser castigado/a
B	**G**
0. No me siento pesimista, ni creo que las cosas me vayan a salir mal 1. Me siento desanimado/a cuando pienso en el futuro 2. Creo que nunca me recuperaré de mis penas 3. Ya no espero nada bueno de la vida, esto no tiene remedio	0. No estoy decepcionado de mí mismo/a 1. Estoy decepcionado de mí mismo/a 2. Estoy muy descontento/a conmigo mismo/a 3. Me odio, me desprecio
C	**H**
0. No me considero fracasado/a 1. Creo que he tenido más fracasos que la mayoría de la gente 2. Cuando miro hacia atrás, sólo veo fracaso tras fracaso 3. Me siento una persona totalmente fracasada	0. No creo ser peor que otras personas 1. Me critico mucho por mis debilidades y errores 2. Continuamente me culpo de todo lo que va mal 3. Siento que tengo muchos y muy graves defectos
D	**I**
0. Las cosas me satisfacen tanto como antes 1. No disfruto de las cosas tanto como antes 2. Ya nada me llena 3. Estoy harto/a de todo	0. No tengo pensamientos de hacerme daño 1. Tengo pensamientos de hacerme daño, pero no llegaría a hacerlo 2. Siento que estaría mejor muerto/a o que mi familia estaría mejor si yo me muriera 3. Me mataría si pudiera
E	**J**
0. No me siento culpable 1. Me siento culpable en bastantes ocasiones 2. Me siento culpable en la mayoría de las ocasiones 3. Todo el tiempo me siento una persona mala y despreciable	0. No lloro más de lo habitual 1. Ahora lloro más de lo normal 2. Ahora lloro continuamente, no puedo evitarlo 3. Antes podía llorar, ahora no lloro aunque quisiera

K	Q
0. No estoy más irritable de lo normal 1. Me irrito o enojo con más facilidad que antes 2. Me siento irritado/a todo el tiempo 3. Las cosas que antes me irritaban ya ni siquiera me importan	0. No me canso más de lo normal 1. Me canso más fácilmente que antes 2. Cualquier cosa que hago me cansa 3. Estoy demasiado cansado/a para hacer nada
L	**R**
0. No he perdido el interés por los demás 1. Me intereso por la gente menos que antes 2. He perdido casi todo mi interés por los demás 3. Los demás no me importan en absoluto	0. Tengo el mismo apetito de siempre 1. No tengo tan buen apetito como antes 2. Ahora tengo mucho menos apetito 3. He perdido totalmente el apetito
M	**S**
0. Tomo mis decisiones como siempre 1. Estoy inseguro/a de mí mismo/a y evito tomar decisiones 2. Ya no puedo tomar decisiones sin ayuda 3. Ya no puedo tomar decisiones en absoluto	0. No he perdido peso últimamente 1. He perdido más de 2 kilos 2. He perdido más de 5 kilos 3. He perdido más de 8 kilos Estoy bajo dieta para adelgazar: SI NO
N	**T**
0. No me siento con peor aspecto que antes 1. Me preocupa que ahora parezco más viejo/a o poco atractivo/a 2. Creo que se han producido cambios permanentes en mi aspecto que me hacen parecer poco atractivo/a 3. Creo que tengo un aspecto horrible	0. No estoy más preocupado/a por mi estado de salud que lo habitual 1. Estoy preocupado/a por problemas físicos como dolores, molestias, malestar de estómago o estreñimiento 2. Estoy preocupado/a por mi salud y me es difícil pensar en otra cosa 3. Estoy tan preocupado/a por mis problemas de salud que soy incapaz de pensar en otra cosa
O	**U**
0. Puedo trabajar tan bien como siempre 1. Tengo que hacer un esfuerzo especial para iniciar algo 2. Tengo que obligarme mucho para hacer algo 3. Soy incapaz de hacer algún trabajo	0. No he notado ningún cambio en mi atracción por el sexo 1. Estoy menos interesado/a en el sexo que antes 2. Actualmente me siento mucho menos interesado/a en el sexo 3. He perdido todo mi interés por el sexo
P	
0. Duermo tan bien como siempre 1. Me despierto más cansado/a por la mañana 2. Me estoy despertando una o dos horas más temprano de lo habitual y no puedo volver a quedarme dormido/a 3. Me despierto varias horas más temprano todas las mañanas y no logro dormir más de 5 horas	Subtotal Página 1 ____ Subtotal Página 2 ____ Total ____

3. Marca **con un círculo** la opción que refleje con qué frecuencia se te pueden aplicar las siguientes afirmaciones según la escala que aparece a continuación.

	Casi Nunca	Algunas veces	La mitad de las veces	La mayoría de las veces	Casi Siempre
1. Percibo con claridad mis sentimientos	1	2	3	4	5
2. Presto atención a como me siento	1	2	3	4	5
3. Vivo mis emociones como algo desbordante y fuera de control	1	2	3	4	5
4. No tengo ni idea de cómo me siento	1	2	3	4	5
5. Tengo dificultades para comprender mis sentimientos	1	2	3	4	5
6. Estoy atento a mis sentimientos	1	2	3	4	5
7. Se exactamente cómo me estoy sintiendo.	1	2	3	4	5
8. Doy importancia a lo que estoy sintiendo	1	2	3	4	5
9. Estoy confuso sobre lo que siento	1	2	3	4	5
10. Cuando me encuentro mal, reconozco mis emociones	1	2	3	4	5
11. Cuando me encuentro mal, me enfado conmigo mismo por sentirme de esa manera	1	2	3	4	5
12. Cuando me encuentro mal, me da vergüenza sentirme de esa manera	1	2	3	4	5

	Casi Nunca	Algunas veces	La mitad de las veces	La mayoría de las veces	Casi Siempre
13. Cuando me siento mal, tengo dificultades para completar trabajos.	1	2	3	4	5
14. cuando me encuentro mal, pierdo el control	1	2	3	4	5
15. Cuando me encuentro mal, creo que estaré así durante mucho tiempo	1	2	3	4	5
16. Cuando me encuentro mal, creo que acabaré sintiéndome muy deprimido	1	2	3	4	5
17. Cuando me encuentro mal, creo que mis sentimientos son válidos e importantes.	1	2	3	4	5
18. cuando me encuentro mal, me resulta difícil centrarme en otras cosas	1	2	3	4	5
19. Cuando me encuentro mal, me siento fuera de control	1	2	3	4	5
20. Cuando me encuentro mal, igual puedo terminar las cosas.	1	2	3	4	5
21. Cuando me encuentro mal, me siento avergonzado conmigo mismo por sentirme de esa manera	1	2	3	4	5
22. Cuando me encuentro mal, sé que puedo encontrar una forma sentirme mejor.	1	2	3	4	5
23. Cuando me encuentro mal, me siento como si fuera una persona débil	1	2	3	4	5
24. Cuando me encuentro mal, siento que puedo mantener el control sobre mi comportamiento.	1	2	3	4	5

	Casi Nunca	Algunas veces	La mitad de las veces	La mayoría de las veces	Casi Siempre
25. Cuando me encuentro mal, me siento culpable por sentirme de esa manera	1	2	3	4	5
26. Cuando me encuentro mal, tengo dificultades para concentrarme	1	2	3	4	5
27. Cuando me encuentro mal, tengo dificultades para controlar mi comportamiento	1	2	3	4	5
28. Cuando me encuentro mal, creo que no hay nada que pueda hacer para sentirme mejor.	1	2	3	4	5
29. Cuando me encuentro mal, me irrito conmigo mismo por sentirme de esa manera	1	2	3	4	5
30. Cuando me encuentro mal, empiezo a sentirme muy mal sobre mí mismo	1	2	3	4	5
31. Cuando me encuentro mal, creo que darme vueltas en ello es todo lo que puedo hacer	1	2	3	4	5
32. Cuando me encuentro mal, pierdo el control sobre mi comportamiento	1	2	3	4	5
33. Cuando me encuentro mal, tengo dificultades para pensar sobre cualquier otra cosa	1	2	3	4	5
34. Cuando me encuentro mal, me doy tiempo para descubrir qué es lo que realmente siento.	1	2	3	4	5
35. Cuando me encuentro mal, me toma un largo tiempo sentirme mejor.	1	2	3	4	5
36. Cuando me encuentro mal, mis emociones parecen desbordarse	1	2	3	4	5

4.

Marca la opción que mejor se adecúe a tu situación actual, teniendo en cuenta *el último mes*. *Durante el último mes*:	Nunca	Casi nunca	De vez en cuando	A menudo	Muy a menudo
E1. ¿Con qué frecuencia has estado afectado/a por algo que ha ocurrido inesperadamente?	0	1	2	3	4
E2. ¿Con qué frecuencia te has sentido incapaz de controlar las cosas importantes de tu vida?	0	1	2	3	4
E3. ¿Con qué frecuencia te has sentido nervioso/a o estresado/a (lleno de tensión)?	0	1	2	3	4
E4. ¿Con qué frecuencia has manejado con éxito los pequeños problemas irritantes de la vida?	0	1	2	3	4
E5. ¿Con qué frecuencia has sentido que has afrontado efectivamente los cambios importantes que han estado ocurriendo en tu vida?	0	1	2	3	4
E6. ¿Con qué frecuencia has estado seguro/a sobre tu capacidad de manejar tus problemas personales?	0	1	2	3	4
E7. ¿Con qué frecuencia has sentido que las cosas te van bien?	0	1	2	3	4
E8. ¿Con qué frecuencia has sentido que no podías afrontar todas las cosas que tenías que hacer?	0	1	2	3	4
E9. ¿Con qué frecuencia has podido controlar las dificultades de tu vida?	0	1	2	3	4
E10. ¿Con qué frecuencia has sentido que tienes el control de todo?	0	1	2	3	4
E11. ¿Con qué frecuencia has estado enfadado/a porque las cosas que te han ocurrido estaban fuera de tu control?	0	1	2	3	4
E12. ¿Con qué frecuencia has pensado sobre las cosas que no has terminado (pendientes de hacer)?	0	1	2	3	4
E13. ¿Con qué frecuencia has podido controlar la forma de pasar el tiempo (organizar)?	0	1	2	3	4
E14. ¿Con qué frecuencia has sentido que las dificultades se acumulan tanto que no puedes superarlas?	0	1	2	3	4

5.1. Por favor considera las últimas dos semanas cuando respondas a estas preguntas. Para cada afirmación **marca con un círculo** la respuesta que más se acerca a tu experiencia. Si tienes dudas, sigue tu primera impresión. Al final date un momento para asegurarte que respondiste todas las preguntas.

Responde estas preguntas pensando en tu **PAPÁ.**

	Muy Pobre	Pobre	Bueno/a	Muy Bueno/a
1. Para mí, la manera en la que conversamos es …	0	1	2	3
2. Para mí, la manera en la que nos mantenemos juntos es …	0	1	2	3
3. Para mí, lo que hacemos el uno por el otro es …	0	1	2	3
4. Para mí, el sentimiento entre nosotros es …	0	1	2	3
5. Para mí, la manera en la que decidimos lo que se debe hacer es …	0	1	2	3
6. Para mí, la manera en la que identificamos las cosas que nos van a ayudar a alcanzar nuestras metas es …	0	1	2	3
7. Para mí, la manera en la que tomamos decisiones es …	0	1	2	3
8. Para mí, la manera en la que encontramos soluciones a los problemas es …	0	1	2	3
9. Para mí, la manera en la que nos adaptamos al cambio es …	0	1	2	3
10. Pienso que daremos respuestas similares a estas preguntas.	Totalmente en desacuerdo	En desacuerdo	De acuerdo	Totalmente de acuerdo

5.2. Responde estas preguntas pensando en tu **MAMÁ.**

	Muy Pobre	Pobre	Bueno/a	Muy Bueno/a
1. Para mí, la manera en la que conversamos es …	0	1	2	3
2. Para mí, la manera en la que nos mantenemos juntos es …	0	1	2	3
3. Para mí, lo que hacemos el uno por el otro es …	0	1	2	3
4. Para mí, el sentimiento entre nosotros es …	0	1	2	3
5. Para mí, la manera en la que decidimos lo que se debe hacer es …	0	1	2	3
6. Para mí, la manera en la que identificamos las cosas que nos van a ayudar a alcanzar nuestras metas es …	0	1	2	3
7. Para mí, la manera en la que tomamos decisiones es …	0	1	2	3
8. Para mí, la manera en la que encontramos soluciones a los problemas es …	0	1	2	3
9. Para mí, la manera en la que nos adaptamos al cambio es …	0	1	2	3
10. Pienso que daremos respuestas similares a estas preguntas.	Totalmente en desacuerdo	En desacuerdo	De acuerdo	Totalmente de acuerdo

5.3. Responde estas preguntas pensando en tu **GRUPO MÁS CERCANO DE AMIGOS.**

	Muy Pobre	Pobre	Bueno/a	Muy Bueno/a
1. Para mí, la manera en la que conversamos es …	0	1	2	3
2. Para mí, la manera en la que nos mantenemos juntos es …	0	1	2	3
3. Para mí, lo que hacemos el uno por el otro es …	0	1	2	3
4. Para mí, el sentimiento entre nosotros es …	0	1	2	3
5. Para mí, la manera en la que decidimos lo que se debe hacer es …	0	1	2	3
6. Para mí, la manera en la que identificamos las cosas que nos van a ayudar a alcanzar nuestras metas es …	0	1	2	3
7. Para mí, la manera en la que tomamos decisiones es …	0	1	2	3
8. Para mí, la manera en la que encontramos soluciones a los problemas es …	0	1	2	3
9. Para mí, la manera en la que nos adaptamos al cambio es …	0	1	2	3
10. Pienso que daremos respuestas similares a estas preguntas.	Totalmente en desacuerdo	En desacuerdo	De acuerdo	Totalmente de acuerdo

6. Los siguientes enunciados describen cómo las personas se sienten a veces. Para cada enunciado, por favor indica con un **círculo** cuán seguido te sientes de la manera descrita, escribiendo un número en el espacio asignado.

	Nunca	Raramente	A veces	Siempre
1. ¿Qué tan seguido te sientes en sintonía con la gente a tu alrededor?	1	2	3	4
2. ¿Qué tan seguido sientes que te falta compañía?	1	2	3	4
3. ¿Qué tan seguido sientes que no hay nadie a quién puedas recurrir?	1	2	3	4
4. ¿Qué tan seguido te sientes solo(a)?	1	2	3	4
5. ¿Qué tan seguido te sientes parte de un grupo de amigos(as)?	1	2	3	4
6. ¿Qué tan seguido sientes que tienes harto en común con la gente a tu alrededor?	1	2	3	4
7. ¿Qué tan seguido sientes que ya no eres cercano(a) a nadie?	1	2	3	4
8. ¿Qué tan seguido sientes que tus intereses e ideas no son compartidos por la gente a tu alrededor?	1	2	3	4
9. ¿Qué tan seguido te sientes extrovertido(a) y amigable?	1	2	3	4
10. ¿Qué tan seguido te sientes cercano(a) a la gente?	1	2	3	4
11. ¿Qué tan seguido te sientes dejado(a) de lado?	1	2	3	4
12. ¿Qué tan seguido sientes que tus relaciones con otros no son significativas?	1	2	3	4

	Nunca	Raramente	A veces	Siempre
13. ¿Qué tan seguido sientes que nadie te conoce bien?	1	2	3	4
14. ¿Qué tan seguido te sientes aislado(a) de los otros?	1	2	3	4
15. ¿Qué tan seguido sientes que puedes encontrar compañía cuando quieres tenerla?	1	2	3	4
16. ¿Qué tan seguido sientes que hay personas que realmente te entienden?	1	2	3	4
17. ¿Qué tan seguido te sientes tímido(a)?	1	2	3	4
18. ¿Qué tan seguido sientes que la gente está alrededor tuyo pero no contigo?	1	2	3	4
19. ¿Qué tan seguido sientes que hay personas con las que puedes hablar?	1	2	3	4
20. ¿Qué tan seguido sientes que hay personas a las que puedes recurrir?	1	2	3	4

7. Por favor responde según tu grado de acuerdo con los enunciados sobre sus experiencias en línea presentados a continuación. Un puntaje de 1 significa que estás fuertemente en desacuerdo, mientras que un puntaje de 7 significa que estás fuertemente de acuerdo.

	Fuertemente en desacuerdo						Fuertemente de acuerdo
1. Pienso que estar en Internet es interesante.	1	2	3	4	5	6	7
2. Pienso que estar en internet es agradable.	1	2	3	4	5	6	7
3. Pienso que estar en internet es emocionante.	1	2	3	4	5	6	7
4. Pienso que estar en internet es entretenido.	1	2	3	4	5	6	7
5. Cuando estoy en Internet, me concentro completamente en la actividad.	1	2	3	4	5	6	7
6. Cuando estoy en Internet, estoy profundamente inmerso(a) en la actividad.	1	2	3	4	5	6	7
7. Cuando estoy en la web, estoy totalmente absorto(a) en lo que estoy haciendo.	1	2	3	4	5	6	7
8. Me olvido de mi entorno inmediato cuando estoy en Internet.	1	2	3	4	5	6	7
9. Estar en internet hace que a menudo olvide dónde estoy.	1	2	3	4	5	6	7
10. Cuando estoy en Internet, mi cuerpo está en la habitación, pero mi mente está dentro del mundo creado por los sitios web que visito.	1	2	3	4	5	6	7
11. Pareciera que el tiempo pasa muy rápido cuando estoy en Internet.	1	2	3	4	5	6	7
12. Cuando estoy en Internet tiendo a perder la noción del tiempo.	1	2	3	4	5	6	7
13. Pasaría más tiempo en Internet del que he planeado	1	2	3	4	5	6	7

Preguntas generales.

8. ¿Cuál es tu sexo?

a) Hombre, b) Mujer, c) Otro.

9. ¿Qué edad tienes? _____

10. ¿En qué comuna vives? _____

11. ¿Cuál es tu país de origen? _____

12. ¿Están tus padres juntos actualmente?

a) sí. b) no.

13. ¿Con quién vives?

a) Con mis dos padres. b) Con mi padre. c) Con mi madre. d) Con otro cuidador.

14. ¿Tienes una relación de pareja o pololeo actualmente?

a) sí. b) no.

15. De tener una relación de pareja ¿cómo la clasificarías?

a) andante o pinche. b) pololeo c) otro (describe) _____

16. ¿Cuántas relaciones de pareja (o pololeo) de ese tipo has tenido? _____

17. En general ¿cómo evaluarías tu salud en este momento?

a) pobre. b) suficiente. c) bien. d) muy bien. e) excelente.

18. ¿Cuál fue tu promedio final del año pasado? ____

19. ¿Cuál fue tu último promedio general de notas? ____

20. ¿Tienes conexión a internet en tu casa?

a) sí. b) no.

21. ¿Tienes conexión a internet en el colegio?

a) sí. b) no.

22. ¿Tienes un teléfono inteligente (Smartphone)?

a) sí. b) no.

23. En una escala de 1 a 5, siendo 1 muy poco hábil y 5 muy hábil: ¿cuán hábil te sientes para manejarte en internet? _____

24. ¿Cuál es tu herramienta de acceso a internet preferida?

a) Computador. b) Smartphone. c) Tablet. d) Otro (describa)_____

25. ¿Cuál es la herramienta que más utilizas para acceder a Internet?

a) Computador. b) Smartphone. c) Tablet. d) Otro (describa)_____

26. Por favor nombra en orden de **mayor a menor** las tres actividades que **más te gusta hacer en internet.**

1._____ 2._____
3._____

27. Por favor nombra en orden de mayor a menor las tres actividades que **más tiempo realizas en internet.**

1._____ 2._____
3._____

28. En promedio ¿Cuánto tiempo en horas pasas en Internet recreacionalmente (jugar, chatear y otras actividades) un **día de semana**? _____

29. En promedio ¿Cuánto tiempo en horas pasas en Internet recreacionalmente (jugar, chatear y otras actividades) un día de **fin de semana**? _____

	Nunca	Casi Nunca	De vez en cuando	A menudo	Muy a menudo
30. ¿Usas Internet para desconectarte de las situaciones del día a día?	1	2	3	4	5
31. ¿Te conectas a Internet para dejar para después tareas que encuentras desagradables?	1	2	3	4	5

32. ¿Cuántos amigos tienes actualmente? Indica el número de amigos/as con los cuáles te relacionas **personalmente** (no virtualmente): _____

33. ¿Cuántos amigos **"virtuales"** tienes que consideras "cercanos" ?: _____ (si es un amigo personal y virtual al mismo tiempo, no lo cuentes para esta pregunta).

34. Imagínate cuando estás haciendo **tu actividad favorita** en internet, ¿**cuán a menudo** te ocurren las siguientes experiencias?

	Nunca	Casi Nunca	De vez en cuando	A menudo	Muy a menudo
1. Tengo una experiencia emocionante o activante.	1	2	3	4	5
2. Tengo una experiencia tranquila.	1	2	3	4	5
3. Mi cuerpo se hace presente (Por ejemplo: se me acelera la respiración o siento mi corazón latiendo).	1	2	3	4	5
4. Dejo de estar consciente de mi cuerpo.	1	2	3	4	5

35. En la escala siguiente de cero a 10 responde ¿Te has notado más "bajoneado" de lo normal durante el último tiempo?

No me he notado más bajoneado										Me he notado mucho más bajoneado
0	1	2	3	4	5	6	7	8	9	10

36. Si te has notado más bajoneado de lo normal ¿hace cuánto tiempo? _____

¡Muchas gracias por participar de esta investigación!

Por favor escribe abajo tu correo electrónico, con letra imprenta y clara, para que puedas participar nuevamente del estudio en unos meses más.

Tu correo electrónico: _____

12.6. Annex 6 - Articles acceptance and reception letters.

12.6.1. Article 1: Published.

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE

CRISTOBAL HERNANDEZ CONTRERAS <cuhernandez@uc.cl>

Artículo RIDEP

9 mensajes

AIDAP Associação <associacaoaidap@gmail.com> 16 de septiembre de 2018, 8:42
Para: cuhernandez@uc.cl

Estimado Cristóbal Hernández Contreras,

El artículo titulado "**Adaptación Transcultural y Evaluación de las Estructuras Factoriales del Test de Adicción a Internet en Chile: Desarrollo de una Versión Abreviada**" se incluirá en el próximo número (Nº 49) de la *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica* (RIDEP).

Recordamos que la publicación de un artículo en la RIDEP depende de un pago:

> *Cuando el primer autor no sea miembro de la AIDAP, deberá abonar el valor de una membresía anual para que el artículo pueda ser publicado. Además, para cada artículo, deberá entregarse una "ayuda a la publicación" de un importe igual al de la membresía anual. Esta ayuda a la publicación no es necesaria cuando, además del primer autor, uno de los coautores abonó una membresía anual y no ha publicado otro artículo en la RIDEP en el mismo año* (http://www.aidep.org/es/normas-autores)

El valor de la membresía es de acuerdo con el país de residencia (EUROPA y USA - 70 EURO; AMÉRICA LATINA - 50US).
Además, para cada artículo, deberá entregarse una "ayuda a la publicación" de un importe igual al de la membresía anual.
Así, el pago total deberá ser de 140 euros o 100 dólares dependiendo de su país de residencia.

En cuanto recibamos el pago, le enviaremos las correspondientes pruebas de impresión.

Puede encontrar información sobre formas de pago en:
https://www.aidep.org/es/cotas-formas-pago

Saludos cordiales,

Luís Querido, Ph. D.

Asistente Editorial de la *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica*

AIDAP - Associação IberoAmericana de Diagnóstico e Avaliação Psicológica
associacaoaidap@gmail.com

12.6.2. Article 2: Published.

Gmail

Cristobal Hernandez <cristobal.ehc@gmail.com>

Your Submission CHB-D-18-03071R1

1 mensaje

Bu Zhong <eesserver@eesmail.elsevier.com> 26 de febrero de 2019, 22:44
Responder a: Bu Zhong <zhongbu@psu.edu>
Para: cuhernandez@uc.cl, cristobal.ehc@gmail.com

Ms. Ref. No.: CHB-D-18-03071R1
Title: DEPRESSED AND SWIPING MY PROBLEMS FOR LATER: THE MODERATION EFFECT BETWEEN PROCRASTINATION AND DEPRESSIVE SYMPTOMATOLOGY ON INTERNET ADDICTION.
Computers in Human Behavior

Dear Cristóbal,

I am very pleased to inform you that your paper "DEPRESSED AND SWIPING MY PROBLEMS FOR LATER: THE MODERATION EFFECT BETWEEN PROCRASTINATION AND DEPRESSIVE SYMPTOMATOLOGY ON INTERNET ADDICTION." has now been fully accepted for publication in Computers in Human Behavior. Congratulations!

Below are comments from the editor and reviewers. Once your manuscript has been assigned its volume and issue number, we will let you know. The formal permission release form will be sent to you from Elsevier once the publication date nears.

Your accepted manuscript will now be transferred to our production department and work will begin on creation of the proof. If we need any additional information to create the proof, we will let you know. If not, you will be contacted again in the next few days with a request to approve the proof and to complete a number of online forms that are required for publication

Many thanks for submitting your work to this journal.

With kind regards,

Min Jou, Ph.D
Associate Editor
Computers in Human Behavior

Comments from the editors and reviewers *Please note that to view any attachments you will have to log in to your EES author account for viewing*:

Reviewer #1: I would like to thank the authors for their responsiveness! This is a solid revisions and all of my raised issues have been addressed by the authors. Very well done.

As a final remark I recommend to change this sentence in the discussion "However, given the inclusion of moderation parameters, the fixed effects are not directly interpretable as "main effects" because of their
dependence on the moderation effects" into "However, given the inclusion of interaction terms, the fixed effects are not directly interpretable as "main effects" because of their
dependence on the the level of the moderator (i.e., here the average of the moderator due to the applied centering)."

This last suggestion should be followed, but I think no further rounds of reviewing are required.

12.6.3. *Article.3: Submitted.*

Gmail

Cristobal Hernandez <cristobal.ehc@gmail.com>

Successfully received: submission DISCONNECTED FROM MY LIFE: A LONGITUDINAL EXPLANATION OF THE RELATIONSHIP BETWEEN DEPRESSIVE SYMPTOMATOLOGY AND INTERNET ADDICTION. for Journal of Affective Disorders

1 mensaje

Journal of Affective Disorders <EviseSupport@elsevier.com> 5 de abril de 2019, 16:58
Responder a: p.kamaraj@elsevier.com
Para: cristobal.ehc@gmail.com

This message was sent automatically.

Ref: JAD_2019_812
Title: DISCONNECTED FROM MY LIFE: A LONGITUDINAL EXPLANATION OF THE RELATIONSHIP BETWEEN DEPRESSIVE SYMPTOMATOLOGY AND INTERNET ADDICTION.
Journal: Journal of Affective Disorders

Dear Mr. Hernández,

Thank you for submitting your manuscript for consideration for publication in Journal of Affective Disorders. Your submission was received in good order.

To track the status of your manuscript, please log into EVISE® at: http://www.evise.com/evise/faces/pages/navigation/NavController.jspx?JRNL_ACR=JAD and locate your submission under the header 'My Submissions with Journal' on your 'My Author Tasks' view.

Thank you for submitting your work to this journal.

Kind regards,

Journal of Affective Disorders

Have questions or need assistance?
For further assistance, please visit our Customer Support site. Here you can search for solutions on a range of topics, find answers to frequently asked questions, and learn more about EVISE® via interactive tutorials. You can also talk 24/5 to our customer support team by phone and 24/7 by live chat and email.
