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Self-Concept Clarity, Social Support, and Compulsive Internet Use:

A Study of the US and the UAE

Abstract

Compulsive Internet Use (CIU) has been mostly studied among adolescents, yet some studies reveal that this can be a problem for the adult population, too. The lack of agreement on diagnostic tools and cut-off points results in markedly different prevalence figures. Building on Charlton's (2002) distinction between core CIU and positive engagement dimensions, the first objective was to confirm that prevalence figures including the core dimensions of CIU were lower than those including the engagement dimensions as well. Second, building on Davis's (2001) diathesis-stress model, we tested the role that self-concept clarity (SCC) and social support play in predicting core CIU in US subjects (N_{US}=268). Finally, we expected that, because self-concept clarity is mostly linked to well-being in Western countries, the association between this variable and core CIU would be weak in the Eastern culture sample (N_{UAE}=270). Our findings confirmed that prevalence figures were 20% to 40% lower when including the core dimensions only, and that SCC is a key predictor of CIU at low levels of social support in the US. We also confirmed that this is not the case in the UAE. Future research opportunities to advance this study were discussed.

Keywords: Compulsive Internet Use, Social Support, Self-Concept Clarity, Cross-Cultural, Prevalence

1. Introduction

Stating that the Internet has transformed our lives is a rather self-evident claim nowadays. In the mid-1990s, some psychologists started to question whether this technological breakthrough could have a darker side, as some individuals seemed to be getting over-attached to the online world to the point of losing control over the use of the tool and experiencing conflict with other areas of their lives as a consequence (Young, 1998; Griffiths, 1995). These symptoms were, according to Young (1996, 1998), akin those of substance-based addictions; hence, she termed this phenomenon "Internet addiction". The author developed a diagnostic tool inspired by the *Diagnostic and Statistical Manual of Mental Disorders*, version IV (DSM IV), criteria of pathological gambling as a type of impulse-control disorder. Debates as to whether this maladaptive behavior should be called "addiction" are still on-going, as some argue that this can result in the trivialization of the devastating impact of substance-based dependencies. Moving from this debate, we prefer the term "Compulsive Internet Use" (CIU), since this encompasses what many have agreed as the (minimum) necessary defining factors: control loss over the use, and interpersonal conflict

without the other connotations of addiction (Orford, 1985; Buckner, Castille, & Sheets, 2012; Caplan, 2003; Meerkerk, van den Eijnden, Franken, & Garretsen, 2010; Young, 1998).

Much of the early evidence on this phenomenon was based on highly exploratory survey studies often using unrepresentative samples and diagnostic tools with unknown psychometric properties (Grohol, 2012). Whereas problems of under-representation are being increasingly overcome and more sophisticated theory-driven studies are being conducted, there still remains a lack of agreement regarding the key constitutive elements of CIU, which, in turn, affects the estimation of reliable prevalence figures (e.g. Charlton, 2002; Charlton & Danforth, 2009; Israelashvili, Kim, & Bukobza, 2012). Most of the diagnostic tools to identify CIU are inspired by the criteria of pathological gambling from the DSM IV, and therefore share the same key dimensions (i.e. withdrawal, conflict, mood change, tolerance, salience, and loss of control). However, methodological decisions regarding the estimation of thresholds (e.g. monothetic vs polithetic criteria; endorsement of half of the items vs average total score above a threshold) have resulted in a wide variety of prevalence figures, with the suspicion that the problem might have been overestimated (Grohol, 2012). A more fundamental conceptual matter is whether the aforementioned dimensions relate to actual maladaptive use or, instead, are measuring a form of healthy engagement with the tool from which positive consequences are derived (Charlton & Birckett, 1995; Shotton, 1991). In fact, studies conducted by Charlton (2002; Charlton & Danforth, 2007; Charlton & Danforth, 2009) suggest that items representing the aforementioned dimensions tap into two differentiated engagement and addiction factors, and that these have different correlates, since, in contrast to addiction factor[1], engagement was found to be associated with positive consequences (Charlton & Danforth, 2009). In view of this, the first objective of the study was to examine prevalence levels in our sample of adults from the US and the UAE applying Charlton's core criteria to a widely used and reliable measure of CIU (Meerkerk et al., 2010). These findings are expected to contribute to the dissemination of more rigorous prevalence figures to avoid potential overestimation of the problem.

Since previous studies have analyzed the drivers of CIU in relation to overall CIU, which potentially mixed a range of engagement and core CIU dimensions (Caplan, 2003; Davis, 2001; Quiñones-García & Korak-Kakabadse, 2014), our second objective was to identify how individual differences wire people to be more vulnerable to this maladaptive use of the

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[1] From now on, we refer to this factor as core CIU for the sake of consistency with our terminology and the aforementioned debate.

Internet, focusing on the core dimensions of the compulsive diagnostic tool. For this we built on Davis's (2001) model of diathesis and stress, according to which there need to be previous psychopathological issues (e.g. social anxiety), access to the tool (and the social possibilities of it), and a lack of social support. These conditions result in a series of maladaptive cognitions about the self and the world that predict maladaptive Internet use. Building on studies that report a strong link between low self-concept clarity and social anxiety in face-to-face contexts (e.g. Stopa, Brown, Luke, & Hirsch, 2010), we expected this trait to be particularly central in predicting a person's likelihood to make up for the difficulties of face-to-face interactions with online encounters. Importantly, we argue that, at low levels of social support and in line with the importance that Davis's (2001) model gives to the social aspects, self-concept clarity would be a key vulnerability factor of CIU. Thus, our third objective was to test the extent to which SCC is associated with core CIU at low levels of social support while controlling for neuroticism and distorted cognitions previously identified as powerful drivers of CIU (i.e. preference for online interaction). Finally, since the impact of self-concept clarity on individuals' well-being seems to be more relevant in Western cultures (Cross et al., 2003; Dwairy, Achaoui, Abouserie, & Farah, 2006), our final objective was to confirm that the relationship between SCC and CIU in our representative of Eastern culture (UAE) would be weak in contrast to that in the Western sample (US).

2. Measuring Prevalence: Compulsive Internet Use, Engagement, or Both?

Instruments evaluating compulsive Internet use are largely inspired by the diagnostic classification of pathological gambling in the DSM IV and Griffiths's (1998) review of Brown's (1991, 1993) Hedonic Management model. Although these tools may use different sets of items, they converge around the constitutive elements of the problem (Davis, 2001; Meerkerk et al., 2010). These are cognitive salience (i.e. the activity dominates one's thoughts), tolerance (i.e. the increasing amount of time required to obtain the same experience with the activity), behavioral salience (i.e. the activity dominates one's behavior), withdrawal symptoms (i.e. feeling negative emotions when the activity is stopped or diminished), relapse and reinstatement and loss of control (i.e. one needs to return to the same level of use after trying to stop, thereby losing control over the use), and conflict (i.e. with one's own life and with meaningful others' lives) (Brown, 1991; Griffiths, 1996). With regard to the dimension of euphoria (obtaining a "high" from engaging in the activity), there is some disagreement. Griffiths (1998) and Meerkerk (2010) called this dimension "mood

change," as they argued that, rather than seeking "a high," quite often individuals were looking to be immersed in the activity.

Most prevalence studies pertain to teenagers, yet some prevalence figures for adults have been released. These vary considerably: 14.4% of German adults (Montag, Jurkiewicz, & Reuter, 2010), 30% of Japanese adults (Lu, Watanabe, Qingbo, Uji, Shono, Kitamura, 2011), 8.4% of young British adults (Charlton, 2002), and 61% of British adults (Quiñones-García & Korak-Kakabadse, 2014). Although the different tools to assess CIU converge in the conceptualization of the aforementioned dimensions, part of this variety may come from using different items in their chosen scale to assess the supposedly same dimension. Another important source of disparity is the scoring mechanisms that have been used to confirm a positive diagnostic. The first system corresponds to the DSM IV-inspired schemes which estimate figures either by confirming a number of items endorsed out of a given total (typically more than half of the total, such as 6 out of 10 items endorsed; Griffiths & Hunt, 1995; Charlton, 2002), or by reaching a total average score above the equivalent of scoring "frequent" for each question in the scale (Meerkerk et al., 2010). The second system corresponds to Brown's nomothetic criteria, according to which one should endorse all of the dimensions to be given a positive diagnostic. Charlton (2002) and Charlton and Danforth (2007) found that, when this system was applied, none and 1.7% respectively were diagnosed as compulsive users from their samples. Nevertheless, Charlton (2002) argues that this rather restrictive diagnostic system is far from reliable when applied to current tools which mix actual compulsive use indicators and those associated with a positive high engagement with the tool. Thus, Charlton and Birkett (1995) found that their respondents seem to derive positive valued consequences from engaging significantly with their computers. Similarly, Steinkuehler and Williams (2006) found significant social gains for highly engaged individuals with online gaming. Likewise, Shotton (1991) compared high users who could well fall into the supposed CIU pattern with normal users and found that the users reported improved reasoning and analytical skills, technological knowledge and a range of positive emotional outcomes, including self-esteem and lower depression. In the light of these studies, Charlton (2002) ran factor analysis with the key dimensions of CIU measured through items developed in previous studies (e.g. Griffiths & Hunt, 1995) and their own scales of apathy/engagement computer use. They found two independent factors: an engagement factor made of items measuring the dimensions of tolerance, cognitive salience, and euphoria; and core compulsive use factor (called addiction in their study) made up of withdrawal,

behavioral salience, relapse and reinstallment/control loss, and conflict. The author concluded that, whereas tolerance, cognitive salience, and euphoria were clear indicators of high engagement, none of these dimensions were related to negative consequences (Charlton, 2002). Thus, as opposed to behavioral salience, where the activity dominates your life, thinking excessively about the activity did not cause significant conflict with their lives. According to Grohol (2012), this characteristic of high engagement is in fact a phase through which anyone trying a new technology may go, and this eventually wears off for the majority. Beard and Wolf (2001) also argued that having the idea always on your mind (cognitive salience) and wanting to use the tool for longer every time were still signs of a likely healthy high engagement.

The two-factor model resulting from the factor analysis of the common dimensions used to diagnose CIU was confirmed in a further study with game users (Charlton & Danforth, 2007). Further evidence was provided by a later study which supports that these dimensions have different antecedents and consequences, with the compulsive factor being more strongly associated with the Big Five trait of neuroticism (Charlton & Danforth, 2009). Charlton and Danforth (2009) also found that the two factors differ significantly in relation to the time spent online, with those endorsing core compulsive criteria reporting an average of two days more than those who were classified as engaged. In view of the evidence gathered in these studies, Charlton and Danforth (2009) recommended addressing the issue of overestimation by including only the core dimensions of compulsive use in future prevalence studies. In view of this evidence, a third alternative to measure prevalence and one that would be less likely to overestimate the scope of the problem is one where only these core compulsive features are included for a positive diagnostic. Using these compulsive use indicators and replicating previous threshold agreements for comparison purposes (i.e. more than half of the items endorsed (Griffiths & Hunt, 1995)), Charlton (2002) found that 62% of those classified as addicted in his sample would have been attributed the label only by endorsing the engagement criteria. Similarly, Charlton and Danforth (2007) found 10% fewer people classified as compulsive users when estimating prevalence with the core criteria as opposed to when they included the engagement items too (from 38.7 to 28.7). In view of this, we expect that once Charlton's core CIU criteria are applied to the measure of CIU developed by the widely validated measure of Meerkerk et al. (2010), the levels of prevalence will be significantly lower than when evaluating prevalence with all of the items in the scale, as this contains high engagement items too.

Hypothesis 1 Prevalence of compulsive Internet users with Meerkerk's original scale and cut-off limit is significantly higher than prevalence estimated with Charlton's criteria.

3. Diathesis-Stress Model of Compulsive Internet Use

Brown's Hedonic Management model (1991, 1993) states that we all seek activities that help us experience pleasure in our lives. The difference between this self-management and motivational process and the development of addictions lies in individual vulnerabilities (Loonis, 2000). In particular, Brown (1991) argues that the excessive appetite for the behavior (Internet in this case) results from restricted access to other related sources of reward. Hence, they will be more likely to engage in hedonic tone manipulation with the particular object of addiction. A useful framework to identify these vulnerabilities in relation to generalized CIU is Davis's (2001) cognitive-behavioral model. The term "generalized" is used to distinguish from other compulsive behaviors for which the Internet is only the channel that materializes the drive (e.g. sex addiction materialized through online resources). Importantly, Davis's model states that the unique aspect of this generalized CIU is that it provides the perfect environment to meet a social need in those individuals who lack social support and struggle to maintain healthy and adaptive social interactions in the face-to-face world. Hence, the Internet becomes the alternative reward source for that social need. The model also posits that, underneath the social struggle, individuals present an underlying psychopathology related to social anxiety and/or depression, which manifests itself through distorted cognitions about the self in relation to their social environment (e.g. "I am no one if I am not online"). In short, the diathesis combined with restricted social support becomes a key driver of the compulsive Internet use.

Regarding underlying psychopathology factors, the Big Five broad trait of neuroticism has been often studied in relation to CIU as a proxy for depression and anxiety (Charlton & Danforth, 2009; Meerkerk et al., 2010). Studies suggest, however, that this variable is far from a consistent predictor of CIU, as some studies find it unrelated to compulsive Internet use (Landers & Lounsbury, 2006; Nithya & Julius, 2007). Building on the emphasis that Davis puts on vulnerability factors associated with one's social world, individual differences more closely related to how an individual interacts with his/her social environment are more likely to be powerful explanatory factors in the development of the condition. In particular, a personality trait that is associated with distorted cognitions about the self as well as the

underlying psychopathology of social anxiety is Self-Concept Clarity (SCC). Campbell et al. define SCC as the extent to which the "contents of self-concept are clearly and confidently defined, internally consistent and temporally stable" (1996:141). A related aspect of the self-concept is self-esteem, which includes the actual content and evaluation of the self-concept itself. Whereas scholars have associated self-esteem with different well-being indicators, they have paid less attention to structural aspects of the self-concept. Nevertheless, SCC explains further and unique variance in psychological adjustment, coping style, stress, and well-being (Bechtoldt, De Dreu, Nijstad, & Zapf, 2010; Bigler, Neimeyer, & Brown, 2001; Campbell, Assanand, & Di Paula, 2003).

Of particular relevance for the cognitive-behavior model used in this study is the way in which self-concept clarity can affect well-being through its impact on one's interaction with one's social world. According to Campbell et al. (1996), low self-concept is associated with higher sensitivity to social stimuli and a higher level of social comparison (Vartanian & Dey, 2013). In fact, a strong association between low SCC and pathological social comparisons has been confirmed, even when controlling for depressive symptoms (e.g. Butzer & Kuiper, 2006). Furthermore, evidence suggests that low SCC may cause impairment in a variety of functional social interactions, with studies suggesting greater difficulty in conflict resolution, cooperative problem solving, and romantic relationship success (Bechtoldt et al., 2010; Lewandowski, Nardone, & Raines, 2010). It would seem that lacking a stable set of beliefs with regard to oneself impedes adaptive social transactions, as individuals are anxious about disclosing their fractured self-concept to others. In fact, researchers have found that the lack of SCC is an antecedent of social anxiety in face-to-face contexts. Thus, Wilson and Rapee (2006) concluded that low SCC was a key predictor of social phobia beyond the effect of depressive and anxiety symptoms. Similarly, Stopa et al. (2010) also found self-concept clarity to predict social anxiety in a sample of undergraduate studies beyond self-esteem and depression. In short, a disintegrated self-concept could significantly impair individuals' adaptive relationships with others, which further impedes clarifying their self-concept.

Virtual interactions constitute a unique social context where individuals have a much lower reliance on appearance and can conceal aspects of the self with which they are less comfortable (Chung, 2013; Walther, 2007). This, of course, varies with the extent to which they engage in completely virtual interactions with people whom they have never met before, or if it is a virtual interaction with offline acquaintances. Even then, studies suggest that there is a high degree of self-editing properties that have no parallel in our face-to-face social

world (Reinecke and Trepte, 2014). The hyperpersonal theory of communication suggests that these features of the virtual space stimulate the development of deeper and more meaningful relationships, potentially enhancing self-image and positive identity building (e.g. Walther, 2007). In view of the opportunities to protect the undesirable aspects of the self in virtual interactions, we argue that individuals with low SCC are likely to perceive this context as a safer environment to meet their social needs. This, however, could potentially result in undesired effects, as Israelashvili et al. (2012) reported a significant association between low SCC and CIU in teenagers. Indirect support for this has also been found in teenage groups; thus, social phobia has been linked to compulsive Internet use in teenage groups (Yen, Ko, Yen, Wu, Yang, 2007), and, as argued earlier, social phobia seems to be strongly linked to SCC. Since extensive evidence supports the theory that SCC also plays a key role in well-being throughout adult life (e.g. Wilson & Rapee, 2006), a significant relationship between SCC and CIU in adults could be expected.

Notwithstanding, Davis's (2001) model suggests this predisposition is likely to interact with social support factors in predicting CIU (Davis, 2001). Social support involves the necessary presence, availability, and quality of stable human interactions, meaningful others who can offer help and support if needed (Belloch, Sandín, & Ramos, 1995). Feelings of available social support are considered a natural resource that increases levels of a hormone called oxytocin, which has soothing and calming effects on the experience of distress (Heinrichs, Baumgartner, Kirschbaum, & Ehlert, 2003; Campbell, 2008). Because of these properties, social support can play a key role in the prevention of and recovery from addictions (Volkow & Li, 2005). Regarding CIU, Charlton (2002) found that the key condition that would move individuals from high engagement to compulsive use was their perception that face-to-face interactions were problematic or nonexistent. In view of this, we expect that when individuals perceive low levels of social support, the relationship between self-concept clarity and CIU is strong and negative. In contrast, when levels of social support are high, we expect the salience of social-related traits to be less relevant than personal preferences for online interactions (Caplan, 2003) and other general personality traits associated with underlying psychopathology of anxiety and depression (i.e. neuroticism) (Meerkerk et al., 2010).

Hypothesis 2a Self-Concept Clarity is related to Core Computer Internet Use when individuals perceive low levels of overall Social Support in the US.

Hypothesis 2b This effect is statistically independent from Neuroticism and Preference for Online Interaction.

Hypothesis 3 At high levels of Social Support, Self-Concept Clarity is a weaker predictor of Core Compulsive Internet Use where Neuroticism and Preference for Online Interaction are more relevant.

Importantly, the relationship between self-concept clarity and well-being seems to be culturally bounded. In Western cultures, the normative view of the self is an integrated set of components that remain relatively stable across time and situations (Markus & Kitayama, 1991). Human behavior has been conceptualized within a highly individualistic view of the person, independent from others and highly unique, and this, in turn, influences how a person sees himself and his self-concept (Cross et al., 2003). Markus and Kitayama (1991) labeled this concept "independent self-construal," and it is often associated with people in individualistic cultures. In contrast, members of Eastern cultures tend to have a more collectivistic view about the self and others, and are more open to the influences of the external environment (social and otherwise) in the way the self and identity are constructed. Hence, individuals from these cultures are more likely to exhibit "interdependent or relational self-construal," as they think of themselves as part of a broad interconnected network. Because of these characteristics, individuals in these cultures are likely to be more tolerant of potential inconsistencies in aspects of the self-concept regarding time or situation variability (Cross et al., 2003).

Importantly, these differences influence the impact that a lack of stability in self-concept has on well-being. Thus, in a study conducted by Campbell et al. (1996), the authors found that self-concept clarity was more weakly associated with individuals' positive evaluation of themselves in an Eastern country (Japan), as opposed to Western countries, where these associations were stronger. Other studies have also confirmed weaker associations between SCC and different well-being indicators in Eastern and high relational self-construal countries compared to Western or independent self-construal countries (Suh, 2002; Cross et al., 2003). Most of the evidence supporting these claims has been gathered with East Asian studies (e.g. Cross et al., 2003; Campbell, 1996), though there is evidence that Middle

Eastern countries such as the UAE or Lebanon also exhibit a more relational self-construal (Kamal & Chu, 2012; Taher et al., 2008).

The UAE is a Middle Eastern country which has been understudied in relation to the compulsive Internet use in adults, and the values of its society stem mainly from Islam and Arabic tradition (Abdulla, Djebarni, & Mellahi, 2011). Although UAE citizens amount to approximately 20% of the population, immigrants come from other Eastern countries (i.e. Arab and Iranian 23%, South Asian 50%), with a smaller proportion of Europeans and Americans at 8% (Suliman, 2006; World Fact Book, 2014). Building on the idea that individuals from the UAE are likely to exhibit more interdependent self-concepts (e.g. Dwairy et al., 2006; Fernandez, Paez, & Gonzalez, 2005; Taher et al., 2008), and therefore more likely to tolerate lack of stable self-concept across time and situations, we expected that the relationship between SCC and CIU would be rather weak. Because of the complex composition of this country's population, and to avoid the culture fallacy, we decided to control for collectivist values, which are a proxy for relationship-focused self-construal.

Hypothesis 4 The relationship between Self-Concept Clarity and Core Compulsive Internet Use in the UAE sample is weak.

4. Materials and Methods

4.1. Participants and Procedure

We gathered data with an online survey administered through a large market research company with local panels in over 37 countries. The chosen countries were the US (N=268) and the UAE (N=270). We selected respondents whose age was between 18 and 65 (M_{US}=45, SD_{US}=2.3; M_{UAE}=41, SD_{UAE}=9.3), and we required balanced samples in terms of gender, although the UAE sample contained a slightly higher percentage of male respondents (USA: 134 male and 134 female; UAE: 147 male and 123 female). The market research company that we used for data collection specializes in offering panels for cross-cultural research and provides panelists who broadly reflect the population of the country in question. A key requirement to be a panel member was to be a resident of the given country. It is important to consider that the UAE has a high level of expatriates from other countries, though these are mainly from Eastern countries which are traditionally considered collectivist cultures (23% Arab and Iranian and 50% South Asian). This unique characteristic of the UAE population was equally reflected in our panel composition. Nevertheless, since the key requirement for

the hypothesis was to hold more collectivist values (as a proxy for interdependent self-construal), we included a measure for collectivism and confirmed that our UAE sample held significantly higher collectivist values than the US sample ($\bar{x}_{UAE}$=3.30 $\bar{x}_{US}$=2.90; t (536)=-2.41; p<.05). US respondents spent an average of 3.23 hours outside work online (SD=2.60), whereas in the UAE they spent 2.54 hours (SD=1.75), and this difference was highly significant (t (536)=-3.43, p<.001). When asked about the main source of social support (including virtual, non-virtual, work colleagues), non-virtual friends including family showed the highest percentages in both countries (UAE=77%, US=76%), closely followed by work colleagues (UAE=9%, US=10%), and finally virtual friends (UAE=10%, US=9%) or none (UAE=4%, US=5%). We also asked the preferred channel to interact with the main source of social support for minor problems. In UAE, we found that whereas 54% of people still preferred to discuss these matters face to face, the rest would do so using the phone or by instant message. For major problems, the face to face percentage increased to 76%. This was similar in the US, with minor problems being 51% and major problems 73%.

4.2. Instruments

4.2.1. Self-Concept Clarity

We used Campbell et al.'s Self-Concept Clarity Scale (1996). This is a 12-item scale on the 5-point Likert scale, ranging from 1=*strongly disagree* to 5=*strongly agree*. A sample item is "My beliefs about myself often conflict with one another." Cronbach's alphas were .84 for the US and .87 for the UAE.

4.2.2. Compulsive Internet Use

We used Meerkerk et al.'s Compulsive Internet Scale (2010), which consists of 16 items, and respondents answered each of the items on a 5-point Likert scale from 1=never to 5=very often. A sample item was: "How often do you feel depressed or irritated when you cannot use the Internet?" The Cronbach's alpha for the scale was .95 for the USA and .94 for the UAE. As discussed in section 2, we followed Charlton's theoretical model and only included the dimensions of the construct that tap purely in the core compulsive factor (please see table 1a for further reference). Cronbach's alpha for the core CIU was .82 for the US and .75 for the UAE.

[Please insert Table 1a]

4.2.3. Preference for Online Social Support

We used three items from Caplan's (2003) preference for online interaction scale. Here, we asked respondents to rate the extent to which they agree or disagree with each statement on a Likert-type scale ranging from 1=strongly disagree to 5=strongly agree. A sample item was "Online social interaction is more comfortable for me than face-to-face interaction." The Cronbach's alpha for this scale was .89 for the US and .81 for the UAE.

4.2.4. Social Support

We used Rena et al.'s 5-point Likert scale (1999). It ranges from 1=never to 5=very often. A sample item was "Do you have someone to confide in or talk to about your problems?" The Cronbach's alpha was .85 for the US and .83 for the UAE.

4.2.5. Control Measures

We used the four-item sub-scale of neuroticism from the Mini-IPIP (Donnellan et al., 2006), and we rated the statements on a 5-point Likert scale. The Cronbach's alpha for neuroticism was .69 for the US and .60 for the UAE. We also controlled for individually held values about collectivism with the 6-item scale from Yoo, Donthu, & Lenartowicz (2011), and Cronbach's alpha was .87 in both countries.

4.3. Data Analysis

In order to test hypothesis one, we estimated prevalence levels following different methods. First, we followed the CIU scale developers' recommendation to establish the threshold on the overall score of someone who would select more than "sometimes" (i.e. response >2) for each item in the scale. We then used Charlton's framework, according to which the core addiction dimensions (i.e. the ones that need to be considered for prevalence purposes) were: withdrawal, conflict, loss of control, and cognitive salience. This resulted in the use of 9 out of the total 16 items (see Table 1a and Table 3 for item description). Second, we followed a system commonly used by those inspired by the DSM IV cut-off criteria; thus, we attached a positive diagnostic to compulsive users, those who endorsed more than half of the items (Griffiths & Hunt, 1995). The endorsement criteria were attributed through the dichotomization of item scores, and we used two different criteria: first, a less conservative one, akin to Meerkerk's (2010) suggestion of using responses from "sometimes" upwards (i.e. response >2), and, second, a more restrictive one, admitting an endorsed item if individuals rated the statement from "often" upwards (i.e. response >3) (similar to Griffiths

and Hunt, 1995). Subsequently, and given that some of our subjects would be duplicated in each group, we used McNemar's paired proportions method to test hypothesis 1.

[Please insert Table 1b]

The remaining hypotheses were tested with Structural Equation Modeling (SEM) and AMOS 20 software. Since we used samples from two countries, we first conducted Multigroup Confirmatory Factor analysis (MGCF) to confirm Metric Invariance (MI) of the constructs. We then tested the structural model separately for each country to allow us to test the moderation effect of social support with MGCF. We used the median split method, which consists of (1) estimating the median of the continuous variable (i.e. social support in this case) and using it to dichotomize the given continuous variable; (2) running MGCFA to test the relationships between the variables at the two levels of the moderator (e.g. Van der Aa et al., 2009); and (3) evaluating the differences in chi-square between a model that allows a free path from SCC to core CIU, and a fully restricted model (Van der Aa et al., 2010). We estimated model parameters with Maximum Likelihood and used various goodness-of-fit indices to assess the model's fit. These were chi-square statistic divided by the degrees of freedom (χ^2/df), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). The χ^2/df ratio must be below 3, the value of CFI should be above .9, and the values of RMSEA and SRMR below .08 (e.g. Baumgartner & Homburg, 1996).

5. Results

5.1.   Prevalence Analysis

The resulting prevalence estimates following the three methods described in 4.3 can be appreciated in Table 1b. McNemar test was significant for the comparison of compulsive users' proportions estimated with Meerkerk's criteria and that estimated with Charlton's (response>2) in the USA (χ^2=88.02, df=1, P<.001) and the UAE (χ^2=94.37, df=1, P<.001). Expectedly, these differences were also significant when comparing Meerkerk's criteria to Charlton's more stringent one (χ^2 =31.29, df=1, P<.001)(χ^2 =16.52, df=1, P<.001). Hence, hypothesis 1 was supported.

5.2.   Moderation Analyses

[Please insert Tables 2 & 3]

First, we present the bivariate correlations between the variables of study for each country (Table 2). Our main construct of study seems to be significantly associated in both countries. In order to test hypothesis 2 with SEM, we developed a latent variable model, and the indicators of each latent variable and their respective factor loadings can be appreciated in Table 3. Since we had samples from two different countries, we conducted measurement invariance tests. First, we fitted the model with the hypothesized relationships to the two groups in the US and the UAE. The baseline model showed good fit (χ^2/df=1.78, CFI=.945, RMSEA=.038, SRMR=.05), supporting basic configural invariance. We then constrained the loadings of the latent variables to be equal across the two samples in order to test for metric invariance. Given that the comparison of the models was not significant ($\Delta\chi^2$ (1)=22.52, Δdf=24, p=.285), metric invariance was also supported; hence, we could assume that the instruments were not measuring different constructs across the two national groups (Cheung & Rensvold, 2002). We then tested the quality of the measurement model by confirming that all factor loadings in relation to their latent variable were well above .5. Construct reliability and Average Variance Extracted (AVE) were respectively above the recommended threshold of .7, which further supports construct validity (Fornell & Larcker, 1981).

[Please insert Tables 3 & 4]

Subsequently, we ran MGCFA for people who scored high versus low for levels of social support using the split median method (i.e. dichotomizing social support by the median) for each country. The model fit for the moderation model in the US showed good fit (please see Table 4). Constraining the path from SCC to core CIU to be equal significantly harmed the model fit ($\Delta\chi^2$ (1)=3; p<.05), suggesting that the two groups were significantly different. The difference between these groups can be further appreciated in Figure 1a, where the low social support group showed a highly significant path between SCC and CIU, thereby supporting hypothesis 2a. Since we also confirmed that this relationship was significant in the presence of neuroticism and preference for online social interaction, we also confirmed hypothesis 2b. In contrast, in the high social support group, both neuroticism and POI showed significant paths; hence, hypothesis 3 was supported. We ran the same analyses for the UAE; however, the model constraining the path from SCC to core CIU did not significantly show worse fit. Hence, the equality constraint should be retained for parsimony purposes, suggesting a lack of moderation effect in this country. Furthermore, we also found that the association between SCC and core CIU was only marginally significant at low levels of social support (please see

Figure 1b). Hence, hypothesis 4 is partially supported, as the relationships are even weaker than expected.

[Please insert Figure 1a & 1b]

6. Discussion

Previous studies have offered a variety of figures regarding prevalence of CIU, yet evidence suggests that most diagnostic tools are using systems that mix core CIU criteria with healthy engagement, which could result in an overestimation of the figures (Charlton & Danforth, 2009). Following Charlton's framework, we revised the CIU instrument and compared prevalence figures between the original scale with the criteria recommended by the authors and the core dimensions suggested by Charlton. We confirmed that the original recommendations overestimated the prevalence by at least 20%–40%, depending on the level of stringent criteria applied. Hence, our results with the US and the UAE samples expand Charlton's findings with general British samples (2002) and intensive game players (2007). In view of this, we recommend a more careful consideration of the diagnostic tool and the dimensions included to avoid overestimating and labelling adapted individuals who obtain positive consequences from their high engagement. A second objective of this study was to examine the vulnerability of falling into a pattern of compulsive hedonic management through the Internet to meet unfulfilled social needs. Our findings lend support to and expand on Davis's (2001) diathesis-stress model, according to which low access to social support interacts with underlying vulnerabilities related to social anxiety to predict CIU. Our final objective was to investigate whether SCC and CIU would be weakly related in collectivistic cultures as opposed to individualistic cultures, and our findings supported our hypothesis.

Brown's model of hedonic management (1991, 1993) applied to behavioral addictions suggests how these, in a way, are fulfilling a psychological function and could be conceptualized as the extremes of a continuum on self-regulation processes, pathological forms of what otherwise would be routine hedonic management driven by individual vulnerabilities. In line with Davis's (2001) model, previous studies have examined generic personality traits (i.e. neuroticism) which showed some significant relationships in some studies; however, others found no significant relationship (e.g. Landers & Lounsbury, 2006; Meerkerk et al., 2010). We argue that to some extent this could be due to the problem of engagement and core criteria being mixed in previous studies, but also because a more

complex interaction between social aspects and personality-related traits was to offer more sound explanations. In this study, we expand on Davis's (2001) model by showing that, when these needs are for social support, those who have an inability to engage in healthy interactions owing to unclear self-concept are more likely to develop an excessive appetite for this behavior, as it provides opportunities to overcome those difficulties. Interestingly, we also found that, at high levels of social support, self-concept clarity becomes unimportant whereas one's preference for online social interaction and neuroticism become relevant predictors of CIU. Thus, it would seem that, when social needs are met, the underlying predisposition to experience anxiety (neuroticism) would make a higher contribution in explaining the development of the syndrome. Equally, the significant association between preference for online interaction and CIU in both countries is in line with and expands on the study by Caplan (2003), who found this variable to be a key predictor of CIU. Thus, we argue that this is the case only when social support needs are relatively fulfilled, as, when this is not the case, self-concept clarity becomes more salient. It is in those situations, perhaps, where this preference for online interaction could develop, as, in line with the hedonic management model, online interactions would be satisfying an unmet need.

Importantly, our study also found that, in the UAE participants, the association between SCC and CIU at low levels of social support was rather weak. Thus, in line with previous literature, it would appear that, in the independent construal sample (US), the influence of lacking a clear and stable self-concept is more important for well-being than it is for those with a more interdependent self-construal (UAE). In the past, cross-cultural studies solely based on the dimensions identified at national level have been criticized because they ignore the extent to which individuals hold the values of their country of origin (Matsumoto & Yoo, 2006; Baker, Meyer, & Chebat, 2013). Thus, in a study conducted by Brotheridge and Taylor (2006), the authors found that immigrants adopted the values of the current host country, rather than their home country. Since the UAE is a country with a high level of immigration and we wanted to compare the impact of SCC on CIU in relation to the different self-construal attributed to Eastern/Collectivist vs Western/Individualist, we measured and controlled for individually held values of collectivism. In line with the expected, the US held significantly lower collectivist values than the UAE sample. Thus, our findings are, in this sense, relatively robust and contribute to the limited literature on CIU in adult populations, and, in particular, Eastern adult samples.

6.1. Limitations and Future Research

The present study has, nonetheless, limitations that we would like to acknowledge. First, we used a cross-sectional design; thus, we cannot infer causal direction of the relationships. Another limitation concerns generalizing the results, as the participants were panelists from market research. However, owing to the widespread Internet use in the US, we are confident that these participants are not significantly heavier Internet users than the general population. A different case is that of the UAE; we do not expect participants to have been representative of the UAE citizenry (since this is a country whose nationals constitute only 20% of the population), but representative of the unique makeup of this country's population. Nevertheless, individually held cultural values were controlled for; hence, our findings may not be representative of the UAE, but could be so of Eastern samples, as these seem to hold, on average, more collectivist values than Western ones. Notwithstanding, future research with other Eastern countries would clarify whether these relationships persist. Furthermore, though this study confirms vulnerability factors in the West, we know less about the vulnerabilities in the Eastern or highly collectivistic culture. Though it seems SCC is not a key driver, studies suggest that CIU does exist in the East; therefore, vulnerability factors need to be investigated further. Our model highlights the key role of socially related vulnerabilities, and it is likely that this is also the case in the East, yet, in contrast to the self-orientation focus of the West, we argue that constructs that measure perceptions of lack of respect by the groups that shape one's identity could play a more significant role in these cultures. Another area that merits further research is the transition from engagement to addiction. We recommend that experimental and diary study methodologies are employed in order to identify the drivers that push someone to move from engagement to compulsive Internet use. This should contribute not only to confirming the key dimensions required to estimate prevalence figures and develop more sound diagnostics, but also to understanding how to prevent CIU.

6.2. Conclusions

In closing, our results confirm Davis's (2001) model regarding the crucial role of social factors and the interaction between these and underlying personality traits. We expand on this model by putting the focus on a trait that in past research has been strongly related to social inadequacies in face-to-face interactions, thereby suggesting low self-concept clarity individuals to be key contenders for virtual interaction attraction. The findings somewhat

validate a key element from the Hedonic Management model of behavioral addictions, since they show a close link between a trait that underlines social anxiety (lack of social reward) and the compulsive use of a tool that provides opportunities to meet social needs.

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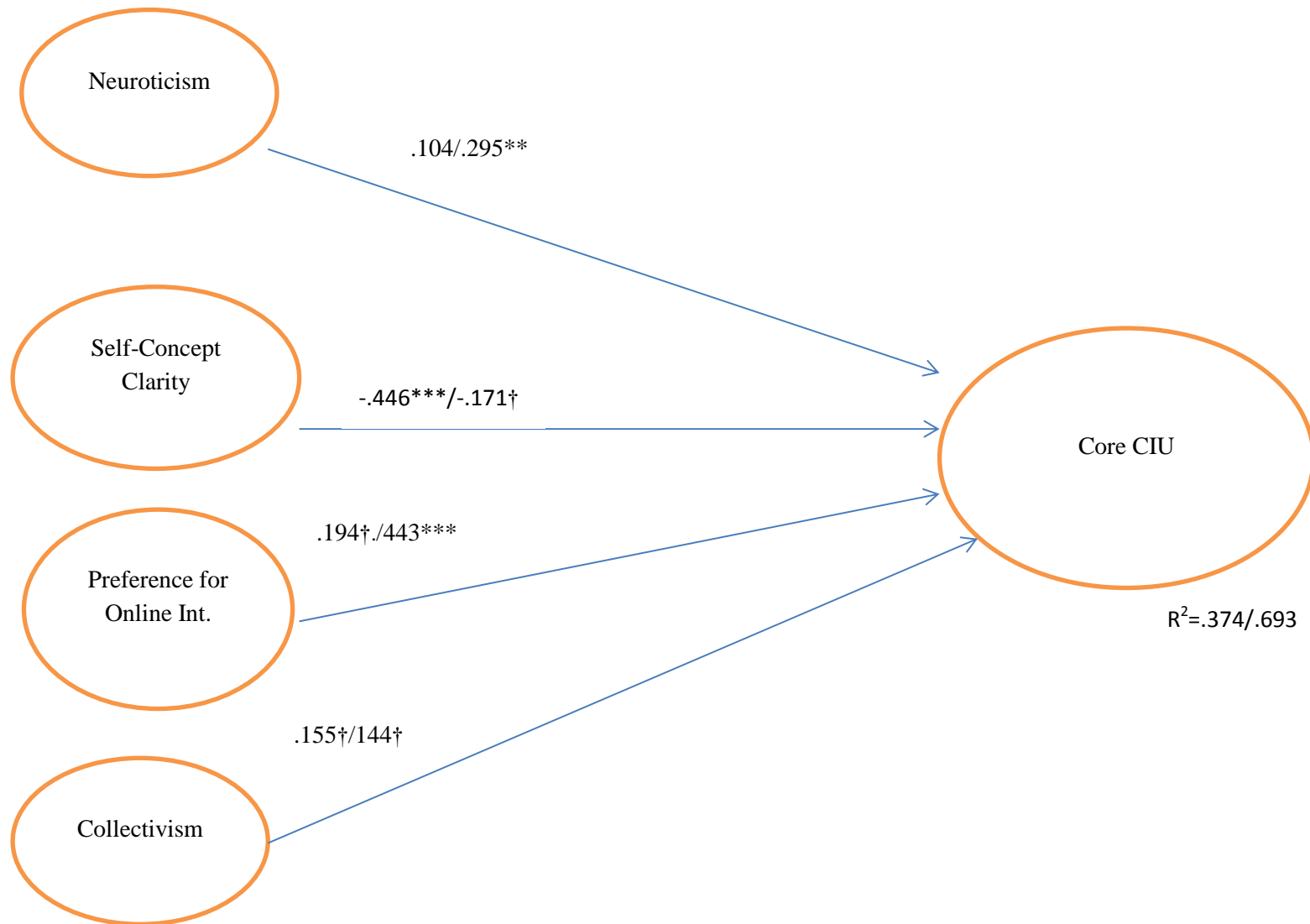
Figure 1. US Multigroup SEM analysis maximum likelihood parameters for low social support versus high social support.
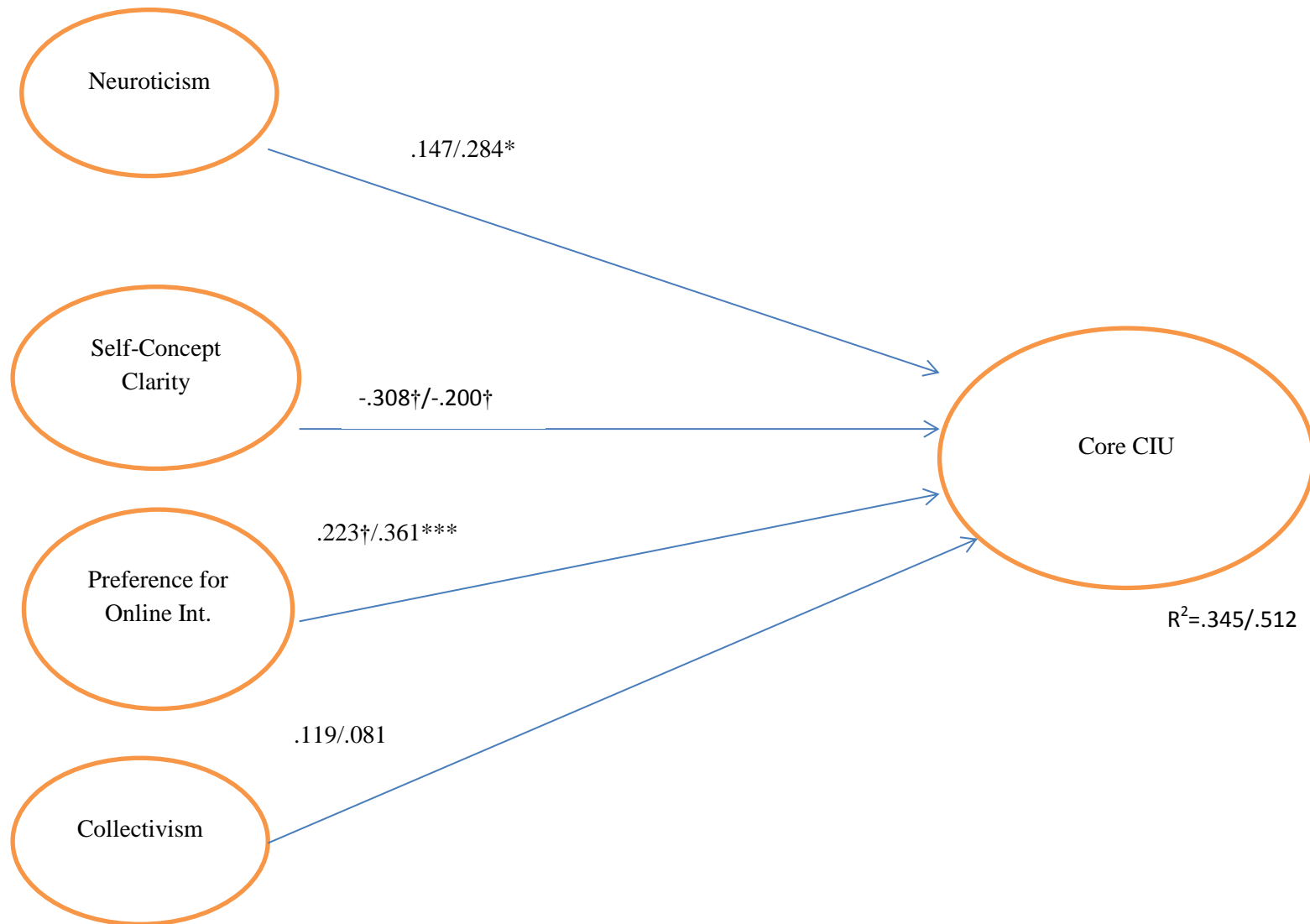
Figure 2. UAE Multigroup SEM analysis maximum likelihood parameters for low social support versus high social support.

Table 1a. Equivalence between Brown's Criteria and the CIU Items from Meerkerk et al. (2009)

Charlton's criteria (2002, 2007, 2009)	Dimension in Meerkerk's (2010) CIU scale	Item N° in CIU scale
Engagement	Tolerance	15,16
Engagement	Cognitive salience	4,6,7
Engagement	Euphoria (mood change in the CIU scale)	12,13
Core Compulsive	Behavioral salience	5,8,10
Core Compulsive	Withdrawal	14
Core Compulsive	Conflict	3,11
Core Compulsive	Relapse and reinstatement/loss of control	1,2,9

Note: Items 15 and 16 do not belong to the original version of CIU; they were added by authors.
Please note that "Core compulsive" is called "addiction" in Charlton's work.

Table 1b. Prevalence of Core Compulsive Internet Use across the Two Countries

CIU Items and cut-off criteria	USA (%)	UAE (%)
All items with cut-off recommended by Meerkerk et al. (2010)	53	66
Addiction items only with Charlton's (2009) criteria (cut-off point >2)	28	41
Addiction items only with Charlton's (2009) criteria (cut-off point (>3)	12	13

Table 2. Mean, Standard Deviation, and Bivariate Correlations of the Variables of Study (N_{USA}=268 and N_{UAE}=270)

Variables	USA		UAE		1	2	3	4	5	6
	Mean	SD	Mean	SD						
1.Self-Concept Clarity	3.56	0.84	3.57	.70		-.400**	-.418**	.072	.016	-.449**
2.Neuroticism	2.74	0.76	2.92	.67	-.512**		.286**	-.110	-.022	.314**
3.Preference Online Int.	2.08	1.08	2.15	.94	-.440**	.121*		-.150*	.113	.456**
4.Social Support	3.53	0.98	3.38	.88	.205**	-.301**	.048		.155*	-.095
5. Collectivism	3.11	0.80	3.27	.70	-.249**	.004	.238**	.016		.123*
6. Compulsive Internet Use (core criteria)	2.12	0.96	2.35	.84	-.551**	.285**	.543**	-.079	.330**	

Note: **p<.010, *p<.05. Below the diagonal, we present the correlation coefficients for the American group, and, above the diagonal, those for the UAE.

Table 3. Factor Loadings, Construct Reliability, and Average Variance Extracted for the Constructs of Study

Construct and indicators	Loadings US	Loadings UAE
Compulsive Internet Use (AVE$_{USA}$:.54, CR$_{USA}$:. 93, AVE$_{UAE}$:.50, CR$_{UAE}$:. 85)		
1-How often do you find it difficult to stop using the internet when you are online?	.784	.700
2- How often do you continue to use the Internet despite your intention to stop?	.737	.630
3-How often do others (e.g. partner, children, parents, friends) say you should use the Internet less?	.775	.707
5-How often are you short of sleep because of the Internet?	.77	.632
8-How often do you think you should use the Internet less often?	.816	.843
9-How often have you unsuccessfully tried to spend less time on the Internet?	.721	.667
10-How often do you rush through your (home) work in order to go on the Internet?	.828	.774
11-How often do you neglect your daily obligations (work, school or family life) because you prefer to go on the Internet?	.776	.706
14-How often do you feel depressed or irritated when you cannot use the Internet?	.826	.823
Neuroticism (AVE$_{USA}$:.67, CR$_{USA}$:. 81, AVE$_{UAE}$: .57, CR$_{UAE}$:. 72)		
I have frequent mood swings.	.835	.667
I get upset easily.	.809	.832
Preference Online Int. (AVE$_{USA}$:.74, CR$_{USA}$:. 79, AVE$_{UAE}$:.62, CR$_{UAE}$:. 69)		
I prefer online social interaction over face-to-face communication.	.870	.683
Online social interaction is more comfortable for me than face-to-face interaction.	.836	.894
I prefer communicating with people online rather than face-to-face.	.881	.767
Self-Concept Clarity (SCC) (AVE$_{USA}$:.60, CR$_{USA}$:. 93, AVE$_{UAE}$:.56, CR$_{UAE}$:. 92)		
My beliefs about myself often conflict with one another.	.793	.747
On one day, I might have one opinion of myself, and, on another day, I might have a different opinion.	.763	.764
I spend a lot of time wondering about what kind of person I really am.	.761	.786
Sometimes I feel that I am not really the person that I appear to be.	.716	.749
When I think about the kind of person I have been in the past, I'm not sure what I was really like.	.841	.683
Sometimes I think I know other people better than I know myself.	.810	.803
My beliefs about myself seem to change very frequently.	.705	.781
If I were asked to describe my personality, my description might end up being different from one day to another day.	.774	.688
It is often hard for me to make up my mind about things because I don't really know what I want.	.818	.719
Collectivism AVE (AVE$_{USA}$:.54, CR$_{USA}$:. 86, AVE$_{UAE}$:.50, CR$_{UAE}$:. 85)		
Individuals should sacrifice self-interest for the group (either at school or the workplace).	.699	.646
Individuals should stick with the group, even through difficulties.	.597	.671
Group welfare is more important than individual rewards.	.859	.797
Group success is more important than individual success.	.895	.792
Individuals should only pursue their goals after considering the welfare of the group.	.642	.644
Group loyalty should be encouraged even if individual goals suffer.	.689	.618

Notes: AVE: Average Variance Extracted; CR: Construct Reliability

Table 4. Model Fit Indices

Model	$\chi^2(df)$	χ^2/df	CFI	RMSEA	SRMR	$\Delta\chi^2(p)$
A. Configural Invariance Model	1008.32(566)	1.78	.945	.038	.05	
B. Metric Invariance Model	1030.83(587)	1.75	.944	.038	.05	22.52(p=.285)
C. USA Social Support Median Split Model (low vs high)	866.05(566)	1.53	.936	.045	.07	
D. UAE Social Support Median Split Model (low vs high)	904.06 (566)	1.60	.905	.047	.08	