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# Self-concept clarity and compulsive Internet use: The role of preference for virtual interactions and employment status in British and North-American samples

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*Background and aims:* Compulsive Internet Use (CIU) describes a maladaptive relationship with the Internet characterised by loss of control and conflict. Although also affecting adults, most studies use teenage samples, and theoretical development on risk factors is scarce. According to Davis (2001), the social connectivity function of the Internet is key in identifying traits associated with CIU. Since Self-Concept Clarity (SCC) is strongly related to social anxiety, and virtual interactions allow “self-edition”, we hypothesized that individuals low in SCC could choose virtual interactions as safer alternative to satisfy their social needs. This could in turn increase the risk of CIU. Building on a previous study, we also expected CIU to be more harmful in the unemployed. *Methods:* We collected samples from the UK ( $N = 532$ ) and US ( $N = 502$ ) with equal distribution of employed and unemployed individuals. We ran Measurement Invariance tests to confirm that the constructs were equivalent across countries. Subsequently, we conducted mediation and moderation analysis to test our hypothesis with Multigroup Confirmatory Factor Analysis. *Results:* Measurement Invariance was confirmed. The relationship between SCC and CIU was partially mediated by preference of virtual interactions in both countries. This preference was significantly related to lower social support. Short term unemployment seemed to accentuate the negative impact of CIU on life satisfaction in both countries, although only marginally significantly in the US. The unemployed reported significantly lower levels of life satisfaction. *Conclusion:* We demonstrated that SCC is a key vulnerability factor to CIU in adults, and confirmed the additional risks for the unemployed.

**Keywords:** self-concept clarity, compulsive Internet use, preference for virtual interaction, unemployment, life satisfaction, social support

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## INTRODUCTION

The fast-paced improvements on mobile technologies, and the pressures of modern lifestyle are contributing to the intensification of Internet use (Landers & Lounsbury, 2006). In the mid-90s, Young (1998) reported that some people were developing a maladaptive relationship with the Internet, characterized by loss of control and conflict with their lives. Studies at that time were mostly anecdotal and reliant on ad-hoc diagnostic tools. Recently, a more rigorous operationalization has been developed, inspired by the DSM-IV diagnostic criteria for pathological gambling, and other theoretical developments in the field of “behavioral addictions” (e.g., Griffiths, 1995; Meerkerk, van den Eijnden, Franken & Garretsen, 2010; Sim, Gentile, Bricolo, Serpelloni & Gulamoydeen, 2012). Nowadays, there seems to be agreement in the key elements summarized by Meerkerk et al. in their definition of Compulsive Internet Use (CIU) as the “pattern of Internet use characterized by loss of control, preoccupation, conflict, withdrawal symptoms, and use of the Internet as a coping strategy” (2010, p. 729). Most of the studies have been carried out with teenagers (e.g., Andreou & Svoli, 2013; Chow, Leung, Ng & Yu, 2009; Israelashvili, Kim & Bukobza, 2012; Jia, 2012; Ryan, Chester, Reece & Xenos, 2014; van der Aa et al., 2009); nonetheless, evidence is gradually suggesting that CIU is

also present in adults (Lu et al., 2011; Montag, Jurkiewicz & Reuter, 2010; Yau, Potenza & White, 2013). Although the DSM-5 has rejected the inclusion of generalized CIU as a clinical disorder, the Internet has permeated all areas of modern life; hence, identifying the individual differences leading to higher CIU vulnerability are paramount.

Adding to the focus on teenagers, the examination of traits which could make individuals more vulnerable to CIU has been rather exploratory. A popular research path has been in examining the link between the Big Five and CIU. Because of the characteristics of the virtual environment, researchers expected introversion to predict CIU (e.g. Landers & Lounsbury, 2006). More in-depth analyses showed that this, and all other Big Five factors, seems to lose their predictive value when neuroticism is entered in the regression analysis (Charlton & Danforth, 2009). As a proxy for low psychological well-being, neuroticism seemed a relevant contender to explain CIU (Meerkerk et al., 2010). However, although some researchers found significant correlations between neuroticism and CIU (Charlton & Danforth, 2009; Yang, Choe, Baity, Lee & Cho, 2005),

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many others have failed to confirm this association (e.g. Landers & Lounsbury, 2006; Nithya & Julius, 2007).

According to Davis (2001), the mixed evidence on the associations between broad personality factors could be clarified by identifying individual differences in vulnerability to CIU, specific to the unique function of the Internet. Thus, in contrast to other net compulsions (i.e. sexual, gaming), a generalized maladaptive relationship with the Internet revolves uniquely around the social connectivity function of the tool. Hence, the author argues that individuals who experience maladaptive thoughts about the self in relation to the suitability of the virtual context for social contact (e.g. "I am no one if I am not online") are at higher risk of CIU. Similarly, Young (1999, 2013) stressed that the combination of negative beliefs about the self, and the opportunities for anonymous interaction that the Internet offers, made the latter a likely coping mechanism for the negative feelings derived from problematic self-beliefs. Davis's (2001) model proposes depression as an antecedent of these distorted cognitions. However, Meerkerk et al. (2010) found that depression did not add any unique variance beyond neuroticism. Nonetheless, as a broad personality trait, neuroticism on its own is unlikely to predict the development of maladaptive thoughts about the suitability of virtual interactions to meet all needs for social contact.

Self-Concept Clarity (SCC), or the extent to which "contents of self-concept are clearly and confidently defined, internally consistent and temporally stable" (Campbell et al., 1996, p. 141), could be a key variable in the vulnerability to CIU. Those low in SCC exhibit a heightened sensitivity to social stimuli, and tend to engage in excessive social comparison, developing feelings of inadequacy about their own self-concept (Campbell et al., 1996). Since social interactions often involve certain degree of information exchange about our self-concept, the lack of clarity increases their anxiety about social contact. In contrast, those with a clear self-concept tend to develop more confident social interactions. In fact, studies consistently suggest that those with low SCC struggle to develop adaptive and functional social interactions (Butzer & Kuiper, 2006). For instance, SCC impairs conflict resolution within teams, cooperative problem solving and romantic relationship success (e.g., Bechtoldt, De Dreu, Nijstad & Zapf, 2010; Lewandowski, Nardone & Raines, 2010). More problematically, low SCC is a key driver of social anxiety in college students (Stopa, Brown, Luke & Hirsch, 2010) and adults (Wilson & Rapee, 2006) beyond depression and anxiety.

A unique feature of interactions in virtual environments is the possibility to enhance self-presentation whilst omitting conflicting aspects of the self and the self-concept. This is true even of virtual interactions with offline acquaintances, since this environment still offers greater self-editing properties (Chung, 2013; Ryan et al., 2014). According to the *hyper-personal theory of communication*, these unique characteristics offered by the virtual space allow individuals to focus on the important aspects of social relationships and this, in turn, contributes to positive identity building (Walther, 2007). In view of this, it is sensible to expect that those who exhibit personality features that hinder the development of healthy social interactions in non-virtual environments, could be particularly attracted to virtual

interactions in so far as this space provides them with a more convenient channel to fulfil their social needs. Importantly, the social connectivity function of the Internet could have a double-edged sword effect on individuals with low SCC. Thus, a study with teenagers has demonstrated that low SCC is strongly related to CIU (Israelashvili et al., 2012). Although particularly salient in this life stage, SCC also plays a critical role on adults' confidence to engage, develop and maintain social relationships (Lewandowski et al., 2010). Thus, SCC could also be related to CIU in adults.

Building on the link between low SCC and impairment of functional interactions, and the possibilities that virtual context offer for self-edition, we expect that individuals with low SCC perceive this context as a safer environment to meet their social needs, and therefore develop Preference for Virtual Interactions (PVI). Importantly, PVI has been associated with maladaptive Internet use in previous studies. Thus, Chung (2013) purported that those who preferred virtual interactions spent double the amount of time online, a proxy for CIU. Furthermore, Caplan (2003) concluded that PVI was a strong driver of CIU. In short, we expect that those with low SCC develop PVI, and that this mediates the link between SCC and CIU. However, since SCC has been associated with CIU in a previous study with teenagers, we do not expect PVI to preclude the direct effects of SCC on CIU. Hence, we hypothesize a partial mediation.

*Hypothesis (1). The relationship between Self-Concept Clarity and Compulsive Internet Use is partially mediated by Preference for Virtual Interactions.*

Although social interactions complement and can bring additional benefits for individuals' well-being, studies suggest that these on their own are unlikely to offer the levels of overall social support that traditional interactions provide (Chung, 2013). First, participation in active online groups can be highly time-consuming, which inevitably leads to lower availability for Face to Face (FtF) interactions (Cummings, Kiesler & Sproul, 2002). Second, those who solely rely on virtual interactions for social support are likely to over-estimate the benefits they receive (Wright, Rains & Banas, 2010). In fact, Helgeson, Cohen, Schulz and Yasko (2000) found that individuals who actively participate in online support groups often re-assessed the quality of their previous social networks in a negative way. In short, we argue that restricting interactions exclusively to online encounters limits the opportunity to engage in FtF interactions that compensate for the drawbacks of virtual encounters, thereby decreasing the perception of overall social support.

*Hypothesis (2). Preference for Virtual Interactions is negatively related to Perceived Social Support.*

A more distant variable to consider in the development of CIU, which is highly relevant in the time of high job insecurity in the West, is job loss. In line with this, a qualitative study found that unemployed individuals experience an intensification of their Internet use, with the aim of job searching but also for social purposes, in an attempt to overcome a reduction in their social contact following employment termination (Kakabadse, Kouzmin & Kakabadse, 2000). Thus, losing one's job has the collateral damage of potentially removing a source of social interaction,

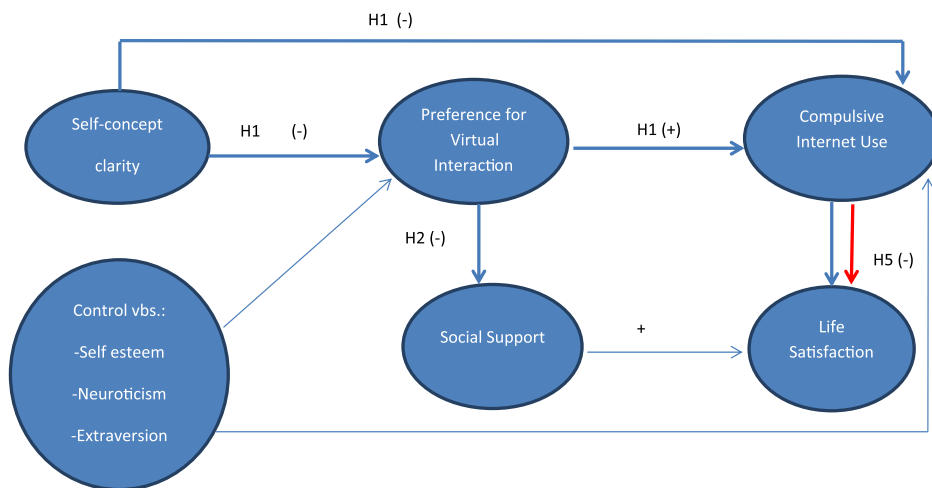


Figure 1. Theoretical Model. Red arrows indicate the moderation hypothesis. Hypotheses 3 and 4 are not included as they refer only to differences in variable levels and not in the relationships between them

as FtF is still unavoidable in most working contexts. Studies suggest that even short, routine connections at work (as opposed to more intense interpersonal relationships) can potentially and cumulatively promote the health benefits attributed to social relationships (Heaphy & Dutton, 2008). Although negative social interactions at work are indeed powerful stressors, workplaces still represent primary sources for social contact (Kinicki, Prussia & McKee-Ryan, 2000). This can be particularly salient in long-hours cultures that inevitably leave lesser time to interact with alternative social interaction sources. In view of this, and in line with Kakabadse et al.'s findings (2000), we expect that perceived social support would be lower for recently unemployed individuals (i.e. 12 months or less) than those in active employment. Relatedly, studies confirm that quality of life worsens significantly during the first six months of becoming unemployed (Del Pozo-Iribarria, Ruiz, Pardo & San Martín, 2002; Kinicki et al., 2000). Hence, we expect life satisfaction to be lower in recently unemployed individuals than employed ones.

*Hypothesis (3). Levels of perceived social support are significantly lower in unemployed individuals.*

*Hypothesis (4). Levels of life satisfaction are significantly lower in unemployed individuals.*

Individuals can experience problems with their SCC as a result of significant life changes (Wilson & Rapee, 2006). Relatedly, researchers have recognised losing a job as a risk factor for psychological adjustment, including the content and structure of the self-concept (Paul & Moser, 2009). However, these changes are likely to be more visible in long term unemployment. Since we only considered recently unemployed individuals, we did not expect to detect significant difference in levels of SCC. Similarly, although the qualitative study on unemployed individuals suggested that, indirectly, they could be at a higher risk of developing a maladaptive relationship with the Internet, CIU is often diagnosed if experienced for six months or more, hence we could not justify a hypothesis expecting significant differences in the levels of CIU. Furthermore, unemployment may be just one of the reasons why people become over-attached, as previous studies show how workaholics in

employment seem to also develop a maladaptive relationship with the tool (Quiñones-García & Korak-Kakabadse, 2014). Nevertheless, since CIU results in reduced well-being (Young, 1998), and unemployed individuals are at both a higher risk of decreased well-being due to their loss, and seem to spend more time socialising and job searching online (e.g. Kakabadse et al., 2000), the impact of CIU on life satisfaction is expected to be stronger for unemployed individuals.

*Hypothesis (5). Unemployment moderates the association between Compulsive Internet Use and Life Satisfaction. Thus, this relationship is stronger in unemployed individuals.*

All hypothesis are illustrated in Figure 1. In sum, our first objective was to examine the role of self-concept clarity and preference for virtual interactions as specific vulnerability factors of compulsive Internet use. Furthermore, given the importance of unemployment in the current economic context in the West, our second objective was to validate the proposed model in samples of employed and unemployed individuals. Because of the high impact that losing a job has on well-being, and the increased intensity of the Internet use of recently unemployed individuals, we expected CIU to be more harmful for those who had become recently unemployed (i.e. within the last 12 months). These associations were tested in two independent samples from countries with similar levels of the Internet usage: the UK and the USA, thus we expect our findings to be relatively robust.

## METHOD

### Participants and procedure

We gathered data through an online survey with an existing British panel ( $N = 523$ ) and a North-American one ( $N = 520$ ). We selected respondents whose age was between 18–65 ( $M_{UK} = 45.3, SD_{UK} = 12.3; M_{USA} = 46.8, SD_{USA} = 12.9$ ). The sample was balanced in terms of gender (UK: 257 male and 266 female; USA: 256 male and 264 female) and employment status ( $UK_{employed} = 277, UK_{unemployed} = 246; USA_{employed} = 268, USA_{unemployed} = 252$ ). Since we



wanted to observe the effect of recent unemployment, we selected individuals who had been unemployed for 12 months or less.

### Measures

*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 alpha was .80 for the UK and .85 for the USA.

*Compulsive Internet Use.* We used the revised version of Meerkerk et al.'s Compulsive Internet Scale (2010) with two additional items for tolerance (Quiñones-García & Korak-Kakabadse, 2014). The revised scale consists of 16 items, and respondents answer 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 this scale was .94 for the UK and .95 for the USA.

*Preference for Virtual Interaction.* We used Caplan's three-item scale (2003). 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 "I prefer communicating with people online rather than face-to-face (Please rate the extent to which you agree with the following statements)". The Cronbach's alpha for this scale was .89 for the UK and .89 for the USA.

*Social support.* We used Rena, Skinnera, Lee and Kazisa'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 .87 for the UK and .85 for the USA.

*Life satisfaction.* We measured life satisfaction with Pavot and Diener's scale (1993). It consists of five items and the response scale goes from 1 = strongly disagree to 7 = strongly agree. A sample item was "In most ways, my life is close to my ideal." Cronbach's alpha was .92 for the UK and .90 for the USA.

*Control measures.* We included short measures of variables that have shown strong associations with CIU in previous studies including self-esteem (Sariyska et al., 2014), neuroticism (Meerkerk et al., 2010) and extraversion. We used the two four-item sub-scales of neuroticism and extraversion from the Mini-IPIP (Donnellan, Oswald, Baird & Lucas, 2006), and the global measure of self-esteem (Robins, Hendin & Trzesniewski, 2001). In both cases, we rated the statements in a 5-point Likert scale. The Cronbach's alpha for neuroticism was .60 for the UK and .60 for the USA.

### Statistical analysis

We tested our hypothesis with the Structural Equation Model (SEM) and AMOS 20. We entered all variables as latent variables, except for self-esteem, which is a one-item variable, therefore it was entered as an observed variable. Each latent variable had three to five indicators (items of the scale), except for Compulsive Internet Use and Self-Concept

Clarity, as both have over 12 items. Since these constructs had more than double the amount of indicators than the other latent variables, five item parcels were made estimating the means or conceptually related items based on the theoretical dimensions of Compulsive Internet Use.

Preconditions for SEM were tested first (Tabachnik & Fidell, 2001). The sample size was largely above the minimum recommended of 200 cases, or 15 cases per variable. Second, bivariate correlation between the variables of study revealed coefficients between .11 and .40 hence the values were below the severe multicollinearity threshold of .70. Next, normality was checked. Although univariate normality was mostly supported, the data violated multivariate normality. In these common situations, the use of the bootstrap resampling method to estimate model parameters has been recommended and was followed in this study (Nevitt & Hancock, 2001).

Next, we conducted the first two steps of Measurement Invariance to ensure respondents across the two countries attributed the same meaning to all variables of study (Milfont & Fisher, 2010). We estimated model parameters with Maximum Likelihood and AMOS 20. We used various goodness of fit indices to assess the model's fit: chi-square statistic divided by the degrees of freedom ( $\chi^2/df$ ), the comparative fit index (CFI), the incremental fit index (IFI), the Tucker-Lewis coefficient (TLI), and the root mean square error of approximation (RMSEA). The  $\chi^2/df$  ratio must be below 3, the values of RMSEA below .08, and the values of CFI, IFI and TLI should be higher than .90 (Kline, 2005) although often good fit is considered when values are closer to .95 (e.g., Iacobucci, 2010).

First, Configural invariance was confirmed by the good fit of the measurement model tested simultaneously with the North-American and British sample with Multigroup Confirmatory Factor Analysis (MGCF) and AMOS 20 (Byrne, 2008) (CFI = .951; IFI = .952; RMSEA = .035; SRMR = .05). Second, Metric invariance was tested by comparing a model with no constraints across groups to one with equal factor loadings constraint across samples. Since the increase in chi-square was not significant, metric invariance was supported. Hence, we concluded that the relations between each scale item and their underlying construct were the same across the two countries (Milfont & Fisher, 2010; Cheung & Rensvold, 2002).

Next, we tested the hypothesised relationships with MGCF analysis and employment as the grouping variable in each country. We tested the mediation hypothesis following James, Mulaik and Brett's (2006) mediation analysis procedure for SEM. Here, we constrained the path from the independent to the dependent variable to zero in the baseline model and compared the fit of this model to one where the path was freely estimated (i.e. partial mediation). Following the parsimonious principle, full mediation was supported if there were no significant differences between the models. We tested the moderation hypothesis with MGCF following the procedure of van der Aa et al. (2009).

### Ethics

The study procedures were carried out in accordance with the Declaration of Helsinki. The Institutional Review Board

Table 1a. Mean, standard deviation and bivariate correlations of the variables of study for the British sample ( $N_{\text{employed}} = 277$  and  $N_{\text{unemployed}} = 266$ )

Variables	Employed		Unemployed		1	2	3	4	5	6	7	8
	Mean	SD	Mean	SD								
	1. Self-Concept Clarity	3.24	.76	3.24								
2. Neuroticism	3.06	.76	3.19	.90	-.574**							
3. Extraversion	2.83	.92	2.51	.87	.140*	-.182**						
4. Self-Esteem	3.77	1.61	3.19	1.66	.362**	-.444**	.379**					
5. Preference Virtual Interaction	2.07	1.07	2.17	1.07	-.351**	.183**	-.083					
6. Social Support	3.38	1.00	3.07	1.08	.159**	-.247**	.324**					
7. Compulsive Internet Use	2.30	.87	2.26	.77	-.470**	.271**	-.051	-.048				
8. Life Satisfaction	3.82	1.41	3.05	1.43	.297**	-.396**	.230**	.559**	-.101	.459**		

Note: \*\* $p < .010$ , \* $p < .05$ . Below the diagonal we present the correlation coefficients for the employed group and above the diagonal those for unemployed.

Table 1b. Mean, standard deviation and bivariate correlations of the variables of study for the North-American sample ( $N_{\text{employed}} = 268$  and  $N_{\text{unemployed}} = 252$ )

Variables	Employed		Unemployed		1	2	3	4	5	6	7	8
	Mean	SD	Mean	SD								
	1. Self-Concept Clarity	3.56	.84	3.58								
2. Neuroticism	2.74	.76	2.75	.80	.512**							
3. Extraversion	2.90	.83	2.89	.88	.054	.035						
4. Self-Esteem	4.66	.48	4.33	1.72	.392**	-.469**	.260**					
5. Preference Virtual Interaction	2.08	.08	1.97	1.01	.440**	.121*	.071	-.022				
6. Social Support	3.53	.98	3.46	1.01	.205**	-.301**	.134*	.366**	.048			
7. Compulsive Internet Use	2.19	.90	2.12	.82	.563**	.268**	.012	.016	.588**	-.093		
8. Life Satisfaction	4.37	.37	4.11	1.56	.204**	-.370**	.149*	.606**	.037	.533**	.086	

Note: \*\* $p < .010$ , \* $p < .05$ . Below the diagonal we present the correlation coefficients for the employed group and above the diagonal those for unemployed.

of the University of Northampton Business School (former Institution of the two authors) approved the study. All subjects were informed about the study and all provided informed consent.

RESULTS

Descriptive statistics

We estimated means, standard deviations and bivariate correlations for the variables of study for each country. Since we drew hypotheses about the impact of unemployment, we ran these preliminary analyses separately for employed and unemployed individuals in each country

(results can be appreciated in Tables 1a and 1b). Preliminary support for hypotheses 1 and 2 can be appreciated in these tables. Thus, SCC is related to CIU and PVI in the direction expected (hypothesis 1), and PVI is negatively related to social support (hypothesis 2) in both countries regardless of the employment status.

Formal hypothesis testing

We tested the measurement models separately for each country and then simultaneously with MGCF to test Measurement Invariance (MI) as described in the statistical analysis section. Since the multi-group model with country as a grouping variable showed good fit (CFI = .951, TLI = .945, IFI = .952, RMSEA = .035), we used this

Table 2. Measurement properties

Construct and indicators	UK				USA			
	Stand. Loading	Item reliability (λ2)	AVE	Construct reliability	Stand. loading	Item reliability (λ2)	AVE	Construct reliability
Self-Concept Clarity			.510	.903			.571	.922
Λ <sub>1</sub>	.693	.480			.702	.493		
Λ <sub>2</sub>	.726	.530			.763	.582		
Λ <sub>3</sub>	.785	.616			.820	.672		
Λ <sub>4</sub>	.741	.550			.761	.580		
Λ <sub>5</sub>	.667	.444			.740	.547		
Λ <sub>6</sub>	.592	.350			.719	.513		
Λ <sub>7</sub>	.784	.614			.834	.695		
Λ <sub>8</sub>	.757	.573			.812	.660		
Λ <sub>9</sub>	.657	.432			.635	.403		
Preference for virtual social interaction			.730	.890			.736	.893
Λ <sub>1</sub>	.891	.793			.856	.732		
Λ <sub>2</sub>	.849	.720			.852	.725		
Λ <sub>3</sub>	.822	.676			.867	.751		
Social Support			.562	.865			.537	.852
Λ <sub>1</sub>	.726	.527			.689	.475		
Λ <sub>2</sub>	.816	.666			.785	.616		
Λ <sub>3</sub>	.679	.461			.700	.490		
Λ <sub>4</sub>	.767	.588			.744	.553		
Λ <sub>5</sub>	.756	.571			.744	.553		
Compulsive Internet Use			.675	.912			.695	.919
Λ <sub>1</sub>	.781	.610			.884	.781		
Λ <sub>2</sub>	.831	.691			.839	.703		
Λ <sub>3</sub>	.869	.755			.698	.487		
Λ <sub>4</sub>	.796	.633			.858	.736		
Λ <sub>5</sub>	.829	.687			.879	.772		
Life Satisfaction			.699	.920			.699	.920
Λ <sub>1</sub>	.855	.731			.873	.762		
Λ <sub>2</sub>	.883	.779			.870	.757		
Λ <sub>3</sub>	.932	.868			.916	.839		
Λ <sub>4</sub>	.803	.645			.826	.682		
Λ <sub>5</sub>	.688	.473			.676	.457		
Neuroticism			.410	.653			.445	.689
Λ <sub>1</sub>	.764	.583			.815	.664		
Λ <sub>2</sub>	.421	.177			.400	.160		
Λ <sub>3</sub>	.665	.442			.711	.505		

Note: AVE stands for Average Variance Extracted. Since extraversion was not significantly related to CIU in either UK or US we did not include it as a control variable in the Structural Equation Model analyses.

Table 3. Path estimates and model fit indices for multigroup analysis

Hypothesis	Paths	UK paths		USA paths		Multigroup Model Fit	
		B <sub>Employed</sub>	B <sub>Unemployed</sub>	B <sub>Employed</sub>	B <sub>Unemployed</sub>	UK	USA
1	Self-Concept Clarity → Preference Virtual Interactions	-.278*	-.271*	-.515*	-.525*	$\chi^2/df = 1.62$	$\chi^2/df = 1.72$
	Self-Concept Clarity → Compulsive Internet Use	-.323*	-.348*	-.353**	-.384**	CFI = .946	CFI = .941
	Preference for Virtual Interactions → Compulsive Internet Use	.363**	.401**	.376*	.389*	IFI = .946	IFI = .941
2	Preference for Virtual Interactions → Social Support	-.152*	-.177*	-.039	-.165*	TLI = .944	TLI = .938
5	Compulsive Internet Use → Life Satisfaction	-.102	-.207**	-.022	-.108*	RMSEA = .034 $\Delta\chi^2(1) = 3.4;$ $p < .05$	RMSEA = .037 $\Delta\chi^2(1) = 2.8;$ $p = .070$
Control paths	Neuroticism → Compulsive Internet Use	.150	-.020	.222*	.063		
	Neuroticism → Preference for Virtual Interactions	.134	.227	.077	-.021		
	Self-esteem → Compulsive Internet Use	-.128 <sup>†</sup>	-.131 <sup>†</sup>	-.215**	-.707		
	Self-esteem → Preference for Virtual Interactions	.042	.050	-.177*	-.034		

Notes: \*\* $p < .010$ , \* $p < .05$ , <sup>†</sup> $p < .10$ ;  $\chi^2/df$ =Chi-Square differences divided by degrees of freedom; CFI\_Comparative Fit Index; IFI\_Incremental Fit Index; TLI\_Tucker Lewis Index; RMSEA\_Root Mean Square Error of Approximation. “B” refers to the standardized regression coefficients that were estimated with Multigroup Structural Equation Modelling in each country. Employment status was the grouping variable. Hypotheses 3 and 4 are not presented here as they refer to differences in variable levels, not in their paths. Hypothesis 5 was tested adding an equality parameter in the path between Compulsive Internet Use and Life Satisfaction for employed and unemployed groups, and moderation was confirmed when chi-square differences between this model and one without the equality constrain were significant.

baseline model to test MI. Given that the comparison of the models with factor loadings constrained to be equal across countries was not significant ( $p > .05$ ), basic MI was supported. 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 predominately and respectively above the recommended threshold of

.7 and .45, which further supports construct validity (Fornell & Larcker, 1981) (see Table 2).

Hypothesis 1 was tested by fitting the model separately in each country (model fit indices can be noted in Table 3 and Figures 2 and 3). Considering that the difference between the models with and without a path between SCC and CIU was significant in UK ( $\Delta\chi^2(1) = 21.01$ ;  $p < .001$ ) and US ( $\Delta\chi^2(1) = 33.86$ ;  $p < .001$ ), the less parsimonious model

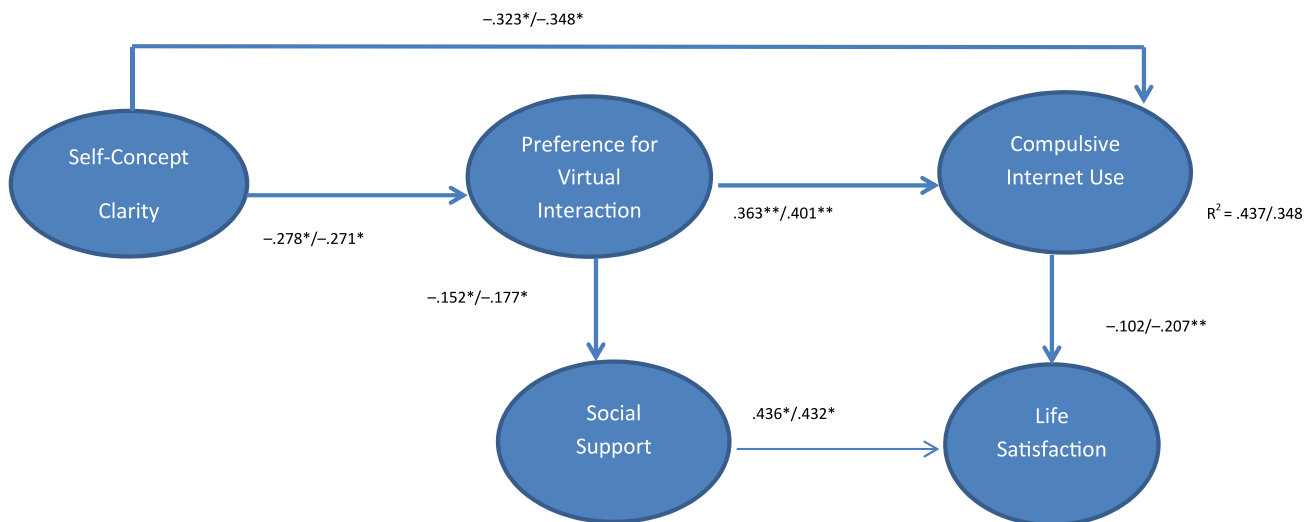


Figure 2. Path estimates for the UK sample

Note: \*\* $p < .010$ , \* $p < .05$ . We have omitted the control variables for clarity of presentation. Coefficients are presented in this order: Employed/Unemployed



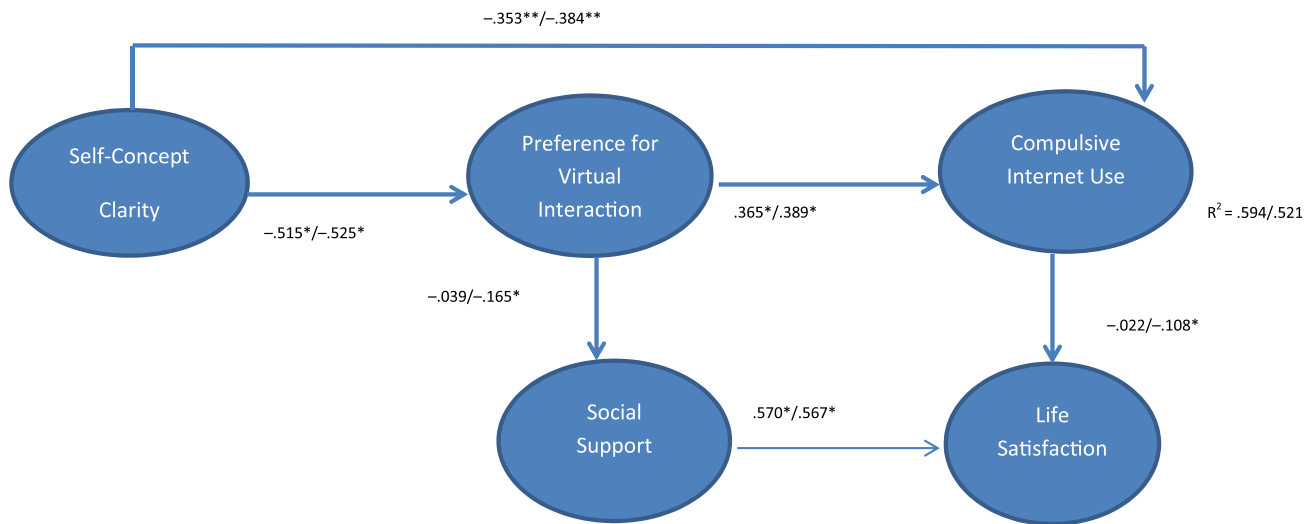


Figure 3. Path estimates for the US sample  
 Note:  $^{**}p < .010$ ,  $^*p < .05$ . We have omitted the control variables for clarity of presentation. Coefficients are presented in this order: Employed/Unemployed

(i.e. partial mediation) was retained in each country, therefore hypothesis 1 was supported. Since partial mediation was supported, the proportion of mediated effect was estimated dividing the indirect effect by the total effect for each country (% Mediated = unstandardized indirect effect / unstandardized total effect =  $ab / c$ )\*100). We found that 24% and 39% of the relationship between SCC and CIU was mediated by preference for virtual interactions in the UK and US, respectively.

We then confirmed a significant and negative path between preference for virtual interactions and social support in the UK and US, thereby supporting hypothesis 2. Subsequently, we tested the moderation effect of unemployment with MGCFA using employment condition as the grouping variable in each country. Constraining the path between CIU and life satisfaction significantly harmed model fit in the UK ( $\Delta\chi^2(1) = 3.4$ ;  $p < .05$ ), suggesting that this path was significantly different in the two groups, which supports hypothesis 5. This was also the case in the US, although here the differences were only marginally significant ( $\Delta\chi^2(1) = 2.8$ ,  $p = .070$ ). In view of this, hypothesis 5 was broadly supported.

Hypotheses 3 and 4 referred to differences in variable levels rather than on the actual process, hence they were tested with *t*-test. With regards to hypothesis 3, differences were significant and in the direction expected in UK (i.e. Unemployed:  $M = 3.07$ ,  $SD = 1.08$ ; Employed:  $M = 3.37$ ,  $SD = 1.01$ ;  $t(521) = 3.382$ ,  $p < .001$ ;  $d = .36$ ). The effect size was found to exceed Cohen’s (1988) convention for a small effect ( $d = .2$ ). In the US, social support was lower in the unemployed, but not significant (Unemployed:  $M = 3.45$ ,  $SD = 1.01$ ; Employed:  $M = 3.52$ ,  $SD = .98$ ;  $t(518) = .779$ ,  $p = .436$ ;  $d = .07$ ). Hence hypothesis 3 was only partially supported.

As expected, unemployed individuals experienced lower life satisfaction ( $M = 3.05$ ,  $SD = 1.43$ ) than employed individuals in the UK ( $M = 3.82$ ,  $SD = 1.40$ );  $t(521) = 6.136$   $p < .001$ ;  $d = .54$ . These results were replicated in the US, thus unemployed individuals experienced lower life satisfaction ( $M = 4.11$ ,  $SD = 1.56$ ) than employed

individuals ( $M = 4.37$ ,  $SD = .37$ );  $t(518) = 1.99$ ,  $p < .05$ ;  $d = .23$ . The effect size for these analysis was found to exceed Cohen’s (1988) convention for a medium and small effect respectively ( $d = .5$  and  $d = .2$ ). Hence, hypothesis 4 was supported.

## DISCUSSION

We aimed to investigate the role that SCC has in developing preferences for virtual social interaction, and the negative consequences that these can have on levels of the perceived social support and CIU. We also wanted to demonstrate whether this maladaptive relationship with the tool was significantly more harmful for those recently unemployed, as a collateral damage of a generalised lower level of well-being and increased time spent online. In developing our hypotheses, we built on Davis’ (2001) diathesis-stress model and the potential vulnerability of SCC theory, as the latter seems to play a key role in our ability to enjoy social interactions in traditional contexts. Our results confirmed that structural elements of the self-concept are crucial in understanding the vulnerability of individuals to the negative consequences of excessive reliance on virtual interactions to meet social needs. Since we control for the evaluative aspects of the self-concept (i.e. self-esteem), and for personality factors that researchers consistently associate with CIU (i.e. neuroticism and introversion); we believe that our findings support the crucial role that SCC plays in both direct and indirect vulnerability to experience CIU.

These results expand current influential frameworks on developing CIU, according to which an underlying psychopathology is a necessary condition (Davis, 2001). Meerkerk et al.’s study (2010) had challenged the latter, as they found that neuroticism was more important to understand the risk of CIU than depression and loneliness. Nevertheless, other studies failed to consistently replicate the key role of neuroticism (e.g., Nithya & Julius, 2007). In view of our findings, we demonstrate that the study of individual differences that suit the unique characteristics of virtual

environments could be a more sensible path to understand individuals' vulnerability to CIU. Finally, we also include the impact that crucial macro-economic variables have on individuals' well-being. Thus, we demonstrate how Compulsive Internet Use poses a higher well-being threat to individuals who have recently become unemployed.

Some of the limitations include the use of a cross-sectional design, hence we cannot infer causal direction of the relationships and demonstrate the partial mediation. However, the replication of findings across two large samples from different countries renders the results relatively robust. Our participants were panellists from market research, which could compromise generalization. Nevertheless, due to the widespread Internet use in these countries, we are confident that these participants are not significantly heavier Internet users than the general population. Our study did not examine the type of virtual interactions preference (e.g., synchronous vs. asynchronous); this could moderate the different associations between SCC and CIU. Also, unemployment can be uniquely experienced by participants and this was not controlled for in the study.

## CONCLUSIONS

In closing, our results provide new insights on the association between low SCC and CIU through the preference for virtual interactions. This is a key contribution to the CIU literature, as this is characterised by either generic exploratory studies with little theoretical elaboration or studies based on diathesis models that imply prior psychopathology, thereby potentially underestimating real vulnerability. However, further research is needed to (1) confirm whether these associations hold over time; (2) explore whether there is transfer of social gains from virtual to offline interactions for people low in SCC; (3) examine whether and how FtF contact buffers the relationship between virtual interactions and CIU. Future research will reveal how virtual and offline interactions can coexist and transform our social world whilst promoting well-being.

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