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Brizi, A, Metastasio, R, Biraglia, A orcid.org/0000-0002-1323-2586 et al. (1 more author) (Cover date: May-August 2021) The relation between locomotion and assessment regulatory orientations and the problematic Internet use. Psicologia Sociale, 16 (2). pp. 249-265. ISSN 1827-2517

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Over the last 20 years there has been an increasing concern in academic literature and public policy over the problematic aspects and consequences of Internet Usage (IU). The use of Internet has often been praised for its inclusivity, its revolutionary impact on communications flow and its capability of removing geographical barriers (Bauer, Gai, Kim, Muth, & Wildman, 2002). Global Internet users have grown to almost two and half billion (Internet World Stats, 2013) and the average time spent online by European households has risen to 87%, recording an increase of about 32 percentage points compared to 2007 (Eurostat, 2017). Some critics have nevertheless pointed out pitfalls in the increasing use of the Internet, including its potentially dangerous effect on social relationships (Sanders, Field, Diego, & Kaplan, 2000) and a real dependence on the medium (Kim & Haridakis, 2009).

There is an extensive literature relating to the vulnerability of young people and students to more Problematic Internet Use (PIU) (e.g. Kuss et al., 2013; Kuss & Lopez-Fernandez, 2016; Wallace, 2014), while the relative adult population has only recently been studied, with the phenomenon not yet comprehensively investigated (Ioannidis et al., 2018).

Recent literature found that the number of seniors that access the Internet has increased between 20 to 67% in those over 55 years (European Commission, 2013) and the little literature that involved elder people, barely includes the specific effects of problematic Internet use in adults. Only one study found that one effect of the problematic use of Internet studied in older population is the excessive internet-based shopping (Rose & Dhandayudham, 2014).

In general, there is a large debate on the negative consequences resulting from Internet addiction. PIU represents an emerging public health problem with costly effects that can occur across a wide age range (Fineberg et al., 2018). In response to the emerging problem, a European Problematic Use of the Internet (EU-PIU) Research Network was formed to bring together

expert researchers and national and international scientific initiatives under one European-led Network (Cost Action, 2018).

The phenomenon is being investigated from different perspectives. Some authors adopted a clinical perspective identifying an "Internet Addiction Disorder" (IAD, Goldberg, 1995) like any online compulsive behaviour which causes stress on family, friends, loved ones and work environment, interfering with normal living (Moreno, Jelenchick, & Christakis, 2013). A diagnostic instrument named the "Internet Addiction Test (IAT)" was developed to detect the presence of characteristic symptoms, such as the lack of self-control, the lack of self-disclosure and the excessive use of technological items. Studies concurrently use the terms PIU and Internet Addiction and/or Compulsive Internet Use to describe the same construct (Mittal et al., 2013; Sun et al., 2012).

In this line, scholars have examined the relationship between IAD and personality disorders, mood disorders, obsessive compulsive disorders and desire thinking (Ha et al., 2007; Yen, Ko, Yen, Wu, & Yang, 2007; Jang, Hwang, & Choi, 2008; Ko, Yen, Yen, Chen, & Chen, 2012; Spada, Caselli, Slaifer, Nikčević, & Sassaroli, 2014). Furthermore, Biraglia, Brizi, Salvati, Metastasio and Mannetti (2017) found that individuals with a higher level of assessment orientation (the regulatory mode concerned with critical evaluation) present higher scores in the IAT, and that this effect is more pronounced in males than in females. The same study showed that higher levels of locomotion (typical of individuals who are oriented to getting things done) are negatively related to IAT scores.

Other authors have focussed on the inter-personal uses of Internet and have proposed a cognitive-behavioural model (Davis, 2001; Caplan, 2002: 2010) suggesting that individuals who suffer from psycho-social problems may prefer online interaction to face to face (FtF)

conversations. This preference, according to the dual model suggested by Nadkarni and Hoffman (2012), would be motivated by the needs to belong and for self-presentation. The present study examines the relationships between the dimensions of Caplan's cognitive-behavioural model of generalised problematic Internet use (GPIU) and two regulatory modes (RMs): Locomotion and Assessment (Higgins, Kruglanski, & Pierro, 2003; Kruglanski, Thompson, Higgins, Atash, Pierro, & Shah, 2000). We propose that Locomotion and Assessment regulatory orientations have opposite effects on the likelihood of developing GPIU: Locomotion is negative associated with GPIU dimensions while assessment is positively associated with them.

In the following sections, we review the relevant literature on GPIU and RMs and propose the research hypotheses. We then present the results of an empirical study to test our predictions and discuss the relevance of our results to theory, together with potential future research directions.

The Cognitive-Behavioural Model of GPIU

The cognitive-behavioural theory of Generalized Problematic Internet Use (GPIU) was first advanced by Davis (2001; Davis, Flett, & Besser, 2002). According to this theory, basic psycho-social problems such as loneliness and depression may induce individuals to develop maladaptive Internet-related cognitions and behaviours that may cause negative consequences. In other words, GPIU cognitions and behaviours and their negative consequences are the *effect*, and not the cause of a broader psychological problem. Starting from Davis' seminal works (2001; 2002), past research has identified four specific dimensions associated with the negative outcomes of Internet use: preference for online social interaction, mood regulation, cognitive preoccupation, and compulsive behaviour (Caplan, 2010).

According to Caplan (2003), the first dimension, *Preference for online social interaction* (POSI) is described as a cognitive, individual-difference construct that characterises people who feel safer, more confident and comfortable with online interaction with people than with the traditional face-to-face interaction. Past research has demonstrated substantial empirical evidence that individuals with social anxiety, low level of social skills, loneliness and low self-presentational confidence have higher levels of POSI (Caplan 2003, 2006; Kim, LaRose, & Peng, 2009). The second dimension, *Mood regulation,* refers to a motivation to use Internet as a tool to regulate one's own emotional state (Caplan, 2006; LaRose, Lin, & Eastin, 2003). The third dimension, *Cognitive preoccupation,* characterises people who have obsessive thoughts about Internet use (Caplan, 2010). In other words, individuals may find themselves continuously thinking of connecting to Internet (Shapira et al., 2003; Caplan & High, 2011. The fourth dimension, *Compulsive Internet use*, refers to compulsive Internet activities that interfere with everyday life and to the individual's sensation of not being in control of these activities (Kim & Davis, 2009). Cognitive preoccupation and compulsive behaviour are conceptualised as two sub-facets of a general dimension of deficient self-regulation (Caplan, 2010), representing, respectively, its cognitive and the behavioural manifestation.

This theoretical model has been empirically tested by Caplan (2010), and subsequently, the derived measure has been validated in several independent studies across different countries (Fioravanti, Primi & Casale, 2013; Tabaraei, Nikoogoftar, & Minoosepehr, 2014).

Of particular interest for the present study are those by Casale, Fioravanti, Flett, and Hewitt (2014, 2015) showing that problematic Internet use is related both to socially-prescribed perfectionism (Hewitt & Flett, 1991) and to self-presentational styles. Casale and colleagues (2014) demonstrated how individuals who perceive others' pressure to achieve very high

standards, experience fear of negative evaluation and a lack of social support. These variables are positively related to generalised problematic Internet use. In another study, Casale and colleagues (2015) showed that a defensive self-presentational style, used to avoid any manifestation of personal imperfection, may induce a more positive reception of some features of computer- mediated communication (CMC), such as reduced presence of non-verbal cues and temporal flexibility. It appears that greater appreciation of these CMC features, perceived as tools to avoid display of imperfections, mediates the relationship between a defensive self-presentational style and generalised problematic Internet use.

On the basis of previous literature on GPIU (Caplan, 2002, 2003, 2005), we hypothesised that two distinct self-regulatory orientations, locomotion and assessment, might differentially impact each of the dimensions of social skill model developed by Caplan. In the following, we will briefly discuss the RMs, explaining our hypothesis.

Regulatory Mode Theory

The Regulatory Mode theory distinguishes two motivational orientations: locomotion and assessment (Higgins et al., 2003; Kruglanski et al., 2000). Locomotion is "the aspect of self-regulation concerned with movement from state to state and with committing the psychological resources that will initiate and maintain goal-related movement in a straightforward and direct manner" (Kruglanski et al., 2000, p. 794).

In contrast, assessment is "the comparative aspect of self-regulation concerned with critically evaluating entities or states, such as goals and means, in relation to alternatives in order to judge relative quality" (Kruglanski et al., 2000, p. 794). Both locomotion and assessment orientations can either be measured using a dispositional scale (e.g. Pierro, Leder, Mannetti,

Higgins, Kruglaski, & Aiello, 2008) or be experimentally manipulated (e.g. Brizi, Chirumbolo, Mannetti, & Scerbo, 2017). The two variables are independent: a person can have one mode dominate the other, can have strong tendencies in both orientations, or can have weak tendencies in both orientations.

Stronger locomotion (Higgins, Pierro, & Kruglanski, 2008; Kruglanski et al., 2000; Pierro, Kruglanski, & Higgins, 2006) is related to various measures of task orientation, achievement orientation, intrinsic motivation, self-esteem, and to the Big Five personality traits (Costa & McCrae, 1992) of extroversion and conscientiousness.

Strong assessors are preoccupied with these kinds of critical evaluations (Higgins et al., 2003) and are more prone to negative affectivity such as social anxiety, depression, public and private self-consciousness, and evidence lower levels of optimism and self-esteem (Higgins et al. 2003; Kruglanski et al. 2000). People with higher level of assessment make more frequent social comparison (Kruglanski et al., 2000), have greater emotional instability (Kruglanski et al., 2000), and greater sensitivity to social feedback, as well as lower and less stable perceived closeness with others (Higgins et al., 2003). As mentioned above, many of these aspects such as personality disorders, mood disorders, obsessive compulsive disorders and desire thinking (e.g. Ha et al., 2007; Spada, Caselli, Slaifer, Nikčević, & Sassaroli, 2014) are usually associated with Internet addiction. It is plausible to hypothesise that an assessor can use internet because of his preference for online social interaction due his lack of social competence and for regulating his own mood. Assessment is also related to obsessional thinking (Emmelkamp & Aardema, 1999), to a repetitive unconstructive mode of thinking, which is a feature of the impulsivity–compulsivity dimension (Bartz & Hollander, 2006, Hollander & Zohar, 2004). It is also

plausible to hypothesise, based on these personality characteristics, that an assessor can develop an obsessive and compulsive use of Internet.

By contrast, locomotion is associated with positive affect, emotion regulation skills and high self-esteem (Kruglanski et al., 2000, Kruglanski et al., 2009). In terms of this view, locomotion would be negatively related (or unrelated) to obsessive–compulsive, impulsive use of Internet.

The importance of this study lies in its demonstration that locomotion can protect against developing an Internet addiction and that assessment heightens Internet addiction.

Present research

On the basis of previous literature on social-skill model of GPIU (Caplan, 2002, 2003, 2005) and on Regulatory Mode Theory (Higgins et al., 2003; Kruglanski et al., 2000), we hypothesise that:

H1: A higher assessment orientation will be positively associated with all the dimensions of Caplan's model, namely preference for online social interaction, mood regulation, cognitive preoccupation, compulsive behaviour, and negative outcome.

Specifically, we hypothesise that the association between Assessment and negative outcome dimension is mediated by POSI, mood regulation, cognitive preoccupation and compulsive behaviour.

H2: A higher locomotion orientation will be negatively associated with all the dimensions of Caplan's model, namely preference for online social interaction, mood regulation, cognitive preoccupation, compulsive behaviour, and negative outcome.

Specifically, we hypothesise that Locomotion is negatively related with negative outcome dimension and this relationship is mediated by POSI, mood regulation, cognitive preoccupation and compulsive behaviour.

We anticipated that: a) assessment orientation would have an indirect effect on the dimension of negative outcome, mediated by deficient self-regulation, mood regulation, and preference for online social interaction, and b) locomotion orientation would have both an indirect effect mediated mostly by preference for online social interaction, and a direct effect on negative outcome.

Method

Participants: We collected the data using the platform Amazon Mechanical Turk (Mturk), which has been proven to be a representative panel of the population of the United States (Goodman & Paolacci, 2017). Also, MTurk participants are significantly more diverse than typical college samples; realistic compensation rates do not affect the data quality; the data obtained are at least as reliable as those obtained through traditional methods (Buhrmester, Kwang, & Gosling, 2011). Two hundred and forty-six participants completed a brief questionnaire. Both male and female American respondents participated in the study, with a slightly higher proportion of women (52.4%). The average age was 38.65 years, with a standard deviation of 11.36. The majority of the respondents (82.5%) was either full- or part- time employed and had at least a college degree (63.4%). 61% of the respondents were married or in a stable relationship at the time of the study. All respondents received $ 1.00 each as a compensation for their participation. The average time of completion for the survey was 19 minutes and 12 seconds.

Materials and Procedure

Assessment and locomotion scale. We measured assessment and locomotion using the scale developed by Kruglanski and colleagues (2000). The measurement comprehends two independent 12-item sub-scales, one for assessment and one for locomotion. We measured the construct on a 6 point scale and sample items include: *'I spend a great deal of time taking inventory of my positive and negative characteristics'*; *'I often compare myself with other people'* for the assessment sub-scale and *'When I decide to do something, I can't wait to get started'* and *'I don't mind doing things even if they involve extra effort*' for the locomotion subscale. Cronbach's Alpha for the assessment subscale is .87, and for the locomotion subscale is .90.

Problematic Internet use. We measured problematic Internet use with the Generalised Problematic Internet Use Scale 2 (GPIUS2, Caplan, 2010). The scale consists of 15 items, 3 items for each of the five dimensions of the cognitive-model: preference for online social interaction (POSI, exemplar item "*I prefer online social interaction over face-to-face communication*"), mood regulation (exemplar item "*I have used the Internet to talk with others when I was feeling isolated*", cognitive preoccupation (exemplar item "*I would feel lost if I was unable to go online*"), compulsive Internet use (exemplar item "*I find it difficult to control my Internet use*", negative outcome (exemplar item "*My Internet use has created problems for me in my life*"). We measured the Problematic Internet Use Scale 2 on a 7-point scale.

In the present study, Cronbach's Alpha were: .76 for the GPIUS2 total score, .93 for preference for online social interaction, .88 for mood regulation, .77 for cognitive preoccupation,

.93 for compulsive Internet use, .88 for negative outcome, and .81 for deficient self-regulation (derived by the combination of cognitive preoccupation and compulsive Internet use).

Results

We created for each participant an index of locomotion, computing the twelve items from the scale, an index for assessment. Also, we created four indexes for each dimension of Generalised Problematic Internet Use Scale 2 for each participant. Specifically, POSI was obtained by computing items 1, 3, 13, mood regulation computing items 4, 5, 8, negative outcome computing items 7, 14, 15, and deficient self-regulation derived by the sum of cognitive preoccupation and compulsive internet behaviour (items: 2, 6, 9, 10, 11, 12).

We ran a collinearity test for assessment and locomotion. Collinearity between these two variables can be excluded (tolerance is .994 and VIF 1.00).

According to George and Mallery (2010) and Gravetter and Wallnau (2014), Skewness and Kurtosis indices of variables suggest that the departures from normality were acceptable, expect for kurtosis of negative outcome (see Table 1). These results can be explained by the tendencies of participants to give extreme answers [Insert table 1 here]. Table 2 presents the mean, standard deviation, and correlations among the variables.

[Insert table 2 here]

Data Analysis

We ran two independent models of the mediated relations between negative outcome of Internet use and each of the two regulatory orientations were tested by means of the PROCESS (Hayes, 2013) macro for SPSS (version 25, 2017).

Mediation Analysis for the Assessment Orientation

To test our first hypothesis, we ran a mediation model using the SPSS macro PROCESS (model 4) with 10.000 bootstrap samples and 95% confidence intervals. The first mediation model was estimated to derive the total, direct and indirect associations of Assessment orientation with Negative outcome through Deficient self-regulation, Mood regulation, and Preference for online social interaction. We used locomotion, gender and age as control variables. All variables were centered. The results (Figure 1) show how Assessment orientation is significantly associated to increased levels of deficient self-regulation and mood regulation, but is not significantly associated with the preference for online social interaction (POSI). Assessment, as hypothesised, is not directly associated with Negative outcome. On the contrary, the total mediated effect (B = .16, SE = .05, 95% CI [.072, .26]) is significant, and, from the CIs estimated for each of the mediating variables (Table 3), we can see that the only significant mediator is deficient self-regulation (B = .21, SE = 0.05, 95% CI [.12, .31].

[Insert Figure 1 and Table 3 here]

Mediation Analysis for the Locomotion Orientation

To test our second hypotheses, a mediation model was estimated to derive the total, direct and indirect associations of Locomotion orientation with Negative outcome through deficient self-regulation, mood regulation, and preference for online social interaction. We used assessment, gender and age as control variables. All variables were centered.

The results (Figure 2) show how Locomotion orientation is only significantly associated with preference for online social interaction (POSI), while, as hypothesised, it is directly associated with negative outcome (B = -.37, SE =.07, 95% CI [-.49, -.23]). However, contrary to

our predictions, the total mediated effect is not significant (B = -.02, SE= .04, 95% CI [-.11, .06]), since none of the three hypothesised mediations are significant (Table 4).

[Insert Figure 2 and Table 4 here]

Discussion and Conclusion

This study provides substantial support to our hypotheses showing that locomotion and assessment regulatory orientations have opposite associations with generalised problematic Internet. Based on these findings, an assessor is associated with greater vulnerability of developing an obsessive and compulsive use of Internet compared to a locomotor, due to some personality characteristics such as impulsivity and compulsive behaviours.

The mediation analysis has shown how the relation of assessment orientation on negative outcome is totally mediated and the main mediating dimension is deficient self-regulation. On the contrary, the effect of locomotion orientation is not significantly mediated by any of the three sub-dimensions of GPIUS2.

These results are in line with previous studies. Indeed, strong assessors show an obsessive-compulsive behaviour (e.g. Ha et al., 2007; Spada et al., 2014) and this is translated, in the context of our research, into an obsessive and continuous thinking of internet use, which interferes with their everyday life activities.

In sum, these results suggest that other basic individual differences, locomotion and assessment, influence problematic behaviour beyond the already established self-presentation style (Casale et al. 2015), socially prescribed perfectionism (Casale et al. 2014) and positive meta-cognition about Internet use (Casale et al., 2016).

Further, our results represent an extension of the regulatory mode theory, by showing that locomotion and assessment have independent and opposite relations with problematic Internet use. In the present study, we found similar results of Biraglia and colleagues (2017): participants with an assessment orientation showed negative outcome of Internet use, and this association is fully and significantly mediated by deficient self-regulation. On the contrary, locomotion is not associated with negative outcome of Internet use. This pattern of opposite and independent effects provides new evidence for the distinctive functioning of locomotion and assessment in self-regulation.

As for limitations, our study is based on cross-sectional data and cannot provide empirical evidence supporting the causal impact of RMs on actual Internet use. The impact of locomotion and assessment regulatory orientations on problematic internet use and on its negative outcome, across different measures and research populations, is of special interest, since these orientations, beyond being chronic individual concerns, may also be induced by situational factors as has been shown in several experimental studies (e.g., Benjamin & Flynn, 2006; Mannetti et al., 2009). This means that it is possible to create situations that induce stronger locomotion concerns and reduce assessment concerns, using procedures applied in experimental studies. These procedures relied mostly on verbal instructions aimed at recalling situations in which the participants had experienced locomotion or assessment concerns (Avnet & Higgins, 2003). In everyday training or educational settings, other and more subtle priming strategies might be adopted. It is possible that different types of music (e.g., rock vs. classic), as well as different wall colours (e.g., red vs. blue) or posters showing different scenarios (e.g., urban vs. natural environment) might induce a locomotion or an assessment mind-set. These priming strategies might be used to reduce assessment concerns and increase locomotion concerns both in individuals who show greater risk

of problematic Internet use and, more generally, in young people's training or educational contexts. For example, a priming strategy that reduces the assessment and increases locomotion could decrease the obsessive thinking about internet activities and its compulsive use, as a consequence, reduce the negative impact of internet addiction on everyday life.

Future experimental studies are very much needed and might be implemented in educational contexts, where they might also provide data concerning the long-term impact of "treatments" for increasing locomotion orientation and/or reducing assessment orientation. Additionally, while our sample is representative of different age groups and is evenly split between genders, it encompasses respondents from one country only (the United States). Due the different characteristics of this sample, we were not able to replicate the gender effect found in Biraglia et al. (2017).

Future research could further contribute to the role that assessment and locomotion play in different nationalities and countries with a bigger digital divide (e.g. emerging economies).

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