Running Head: Identity and Facebook use

Differential identity components predict dimensions of problematic Facebook use

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**Abstract**

Whilst limited previous work has detailed the influence of personal and social identities on the development and maintenance of a number of addictive behaviours, fewer still have determined whether specific aspects of group identification are more or less predictive of ongoing (problematic) behaviour. Using Leach et al’s (2008) hierarchical model of in-group identification, we examined the relationship between components of self-definition (individual self-stereotyping, in-group homogeneity) and components of self-investment (satisfaction, solidarity, and centrality) on problematic Facebook use (adapted from Caplan’s (2010) Generalised Problematic Internet Use Scale 2) in 73 current Facebook users. Results showed that (i) in-group-based identities are important in predicting levels of Facebook use; (ii) aspects of group membership identity associated with how invested an individual is with the in-group (centrality and solidarity) are particularly important whereas those aspects which reflect self-definition (self-stereotyping, in-group homogeneity) are not; (iii) perceptions associated with a sense of belonging and attachment to other group members (solidarity) and, most importantly, how chronically salient one’s group membership is for the self (centrality) are fundamental aspects of this self-investment mechanism; and (iv) aspects of problematic Facebook use associated specially with cognitive preoccupation and behavioural compulsivity are *not* influenced by identity-based factors.

 *Keywords:* problematic Facebook use; in-group identification; centrality; solidarity; self-investment; self-definition.

*Differential identity components predict dimensions of problematic Facebook use.*

Social networking sites (SNS) are online communities where users create public profiles, interact with friends and meet new people and are used predominantly for the maintenance of relationships established both on and offline (Symeonidis, Biczok, Shirazi & Perez-Sola, 2018; Ryan, Chester, Reece & Xenos, 2014). With approximately two billion active users of Facebook alone and about 900 million of these users logged into the site every day, it is clear that SNS have become an important part of our day-to-day life (Ryan, Reece, Chester & Xenos, 2016). It has also been argued that failure of individuals to regulate SNS use can lead to outcomes that negatively affect social and personal lives (see Sun & Zhang, in press; Marino et al., 2019; Atroszko, Balcerowska, Bereznowski, Biernatowska, Pallesen, & Andreassen, 2018;Kuss & Griffiths, 2017, 2011; Ryan, et al, 2014). For example, evidence suggests that excessive Facebook use is related to symptomologies suggestive of anxiety (Rosen, Whaling, Rab, Carrier & Cheever, 2013), depression (Pantic, Damjanovic, Todorovic et al., 2012) as well as decreased self-esteem (Stici & Uysal, 2015). A recent report also highlighted significant relationship between Facebook use and social anxiety in parents and their offspring suggesting intergenerational transmission (Ruggieri, Santoro, Pace, Passanisi & Schimmenti, 2020). Importantly a meta-analysis of approximately 23 independent samples comprising circa 14,000 participants confirmed problematic Facebook use to be positively correlated with psychological distress indices and negatively correlated with well-being (see Marino, Gini, Vieno & Spada, 2018).

Research has also identified a number of possible psychological correlates of problematic Facebook use. These include individual difference-based factors, such as personality and motivations for use (e.g. Nikbin, Iranmanesh & Foroughi, 2020; Schyff, Flowerday. Kruger & Patel, 2020; Abasi & Drouinm 2019; Marino, Vieno, Moss, Caselli, Nikcevic & Spada, 2016, Amichai-Hamburger, Wainapel & Fox, 2002) and those that focus on group membership as a social influence processes, such as compliance and identification (e.g. Stöckli & Hofer, 2020; Doornwaard, Moreno, van den Eijnden, Vanwesenbeeck, & Ter Bogt, 2014). For example, Marino, Vieno, Pastore, Albery, Frings and Spada (2016) showed that, in a sample of adolescents, subjective norms and personality variables (i.e. conscientiousness, emotional stability and extraversion) were related to problematic Facebook Use, whereas social identity, group norms and gender related to frequency of Facebook use. In a related study, Marino, Gini, Angelini, Vieno and Spada (2020) replicated the effect of social norms and also showed emotion regulation via, so called e-motions, predicted problematic use. Whilst this research highlights that social influence processes correlate with Facebook use, it is not clear whether specific aspects of group identification are predictive of ongoing (problematic) behaviour. The current study examines the role of one possible underlying process for this link, namely social identification (psychological affiliation between the self and a social category, Tajfel & Turner, 1979).

To the extent that *social identification* reflects the relationship of an individual with one’s group per se, and not with other group members, how a person defines oneself in relation to a group is comprised of (a) an appraisal of similarities they share with others in their in-group and (b) a personal sense of meaningful and directive self-investment with a chosen in-group (Leach et al, 2008). Leach and colleagues’ (2008) hierarchical model of in-group identification identified five components across the higher-order group dimensions of *self-definition* (individual self-stereotyping, in-group homogeneity) and *self-investment* (satisfaction, solidarity, and centrality). In terms of self-definition, *individual self-stereotyping* is how far one perceives oneself as representative or similar to the prevailing in-group prototype, whilst *in-group homogeneity* refers to the degree to which one perceives the in-group as inherently homogeneous and relatively different from out-group comparators. For the self-investment dimension, *satisfaction* is the degree of positive evaluation afforded to the in-group, *solidarity* is expressed as a sense of belonging and psychological attachment to and in-group, and *centrality* refers to how salient and important the in-group is for one’s self-identity. These components, reflected in their respective dimensions, provide an account of those factors which determine one’s experienced identity.

Recognising the relationship between these two sources in determining how one conceives of one’s identity is important to delineate a more mechanistic understanding of identity processes. For example, even though individuals may view themselves as a drinker, a smoker, a gambler or a Facebook user in terms of self-definition (also referred to identity endorsement [see Lindgren et al, 2017; Hertel et al, 2019], variability in the mental and affective resources committed to or *invested* in this understanding may increasingly predict one’s experienced identity (see DeMarree et al., 2007a, DeMarree et al., 2007b). In other words, endorsing oneself as a Facebook user in terms of being similar to other members of this group is one thing, how invested or committed to this understanding one is may be increasingly fundamental for determining how an individual decides to act.

Whilst previous work has shown that this approach provides a reliable and valid understanding across a broad range of target groups including, among others, racial groups (e.g. Koval, Laham, Haslam, Bastian, & Whelan, 2012), gender ingroups (e.g. Kenny & Garcia, 2012) and online groups (e.g. Howard & Magee, 2013), little work to date has examined the role of these individual dimensions in understanding emergent self-identities experienced by in-group members as a function of more problematic or habitual behaviour. This is not to say that work has not identified social identity processes as fundamental in ongoing behaviour (see Cruwys et al, 2020). Indeed, evidence suggests the importance of social identities for behavioural enactment and behavioural change for a number of addictive behaviours (e.g. Frings and Albery, in press; Frings, Wood, Lionetti & Albery, 2019; Best et al., 2016; Best, Bliuc, Iqbal, Upton, & Hodgkins, 2018; Frings & Albery, 2015; 2016; Frings, Collins, Long, Pinto, & Albery, 2016; Buckingham, Frings & Albery, 2013). The closest addiction-related work has come to explore the key components of Leach and colleagues’ understanding only considered the higher order categorisations of *self-definition* and *self-investment* (see Hertel, Peterson & Lindgren, 2019). Hertal and colleagues (2019) showed that one aspect of identity investment, the frequency of thoughts associated with one’s drinker identity, was positively associated with alcohol consumption and also the risk of alcohol use disorder, whereas a second aspect, identity importance, was unrelated. The current study extends this work by examining the differential effects of the core components of self-definition and self-investment for driving in-group identity in accounting for potentially problematic behaviour, in this instance, problematic Facebook use (PFBU).

Based on Davis’ cognitive-behavioural model of compulsive internet use, Caplan (2010) argues for the explanatory role of four conceptually distinct factors that explain an individual’s ongoing problematic (or not) internet use. The first refers to the extant literature suggesting that a preference for online social interaction (POSI) is a symptom of problematic use (see Caplan, 2006; Kim & Davis, 2009). People use the internet excessively because they perceive such on-line interaction as less threatening than face-to-face interaction and believe themselves to be more efficacious in their social interaction in this context (Caplan, 2006). The second refers to the idea that people are motivated to use the internet as a means to regulate their mood (Moretta & Buodo, 2018). For instance, it has been shown that those higher in social anxiety are more likely to engage in online interactions because it allows them to alleviate any anxiety associated with how one presents oneself in a face-to-face social interaction (Caplan, 2006). In addition, relationships between problematic SNS use and outcomes such as depression seem to vary depending on people’s preferences and ability to manage interpersonal relationships (i.e. their *attachment style*) (see Young, Kolubinski & Frings, 2020). The third and fourth concepts, cognitive preoccupation and compulsive internet use, discriminates between thinking-based and behavioural aspects associated with generic deficient self-regulation. In essence this deficiency is characterised by a deficit in conscious self-control (Caplan, 2010). For example, more obsessive thoughts about on-line interaction characterises cognitive preoccupation, while thoughts associated with behavioural detriments in one’s ability to resist or apply agency to personal internet use suggests individual differences in compulsive internet use. Taken as a whole these types of factors are likely to result in related negative outcomes associated with problematic internet use. How variability in these dimensions is accounted for by (a) one’s general identity as a Facebook user and (b) variability in sub-components of identity has not been explored. This is important to the extent that previous work that has examined the role of identity processes in Facebook use [e.g. Marino et al, 2016] (and, for that matter, other addictive behaviours [e.g. smoking - Vangeli & West, 2012; gambling – Montes, 2019)]; alcohol consumption – Frings et al, 2016), has not detailed how bottom-up *known* identity components (e.g. centrality, self-stereotyping, etc) may be related to relevant motives and decision-making processes. Moreover, an examination of how these components may interact with different indicators of problematic use has not been made in Facebook use or any other potential addictive behaviours. For example, are the relationships between self-definition or investment-type indicators of identity strength more or less influential in explaining different aspects of the problematic use profile (e.g., cognitive pre-occupation, affect regulation, compulsion, etc).

This paper directly addresses these issues by examining the relationship between components of one’s identity and differential aspects of PFU. Given links between identification and adherence to ingroup norms and behaviours, it can be generally predicted that identifying oneself as a Facebook user will be linked with greater levels of Facebook use (both problematic and non-problematic). However, as little research has directly addressed the effects of subcomponents of identity on addictive behaviours in general, nor components of PFBU specifically, we took an exploratory approach. We focussed initially on identifying relationships between different components of identity and Facebook use components and, where relationships were present, tested the unique variance associated with each component. This allowed us to test the impact of identity generally on PFBU and also the relative importance of each component.

**Method**

Participants

Seventy-seven (49 female and 28 male) participants aged 18-48 years (*M* = 23.46, *SD* = 5.52) were recruited from the undergraduate and postgraduate student population at a London-based university in return for course credit. Four (2 males and 2 females) reported currently not having a Facebook account or spending any time per week on Facebook and were subsequently excluded from analyses. There was a bimodal response for the time spent using Facebook for the categories “3 to 6 hours per week” and “7 to 14 hours per week” [“less than 1 hour”: n = 11, 15.1%; “1 - 2 hours”: n = 15, 20.5%; “3 – 6 hours”: n = 20, 27.4%; “7 – 14 hours”, n =20, 27.4%; “> 14 hours”: n = 7, 9.6%].

**Design**

 A correlational design was utilised to explore the relationships between attitude towards Facebook, dimensions of PFU and self-identification and self-investment components.

**Materials**

 *General Facebook use*. Facebook use was measured with the following items: “Do you currently have a Facebook account (“Yes” or “No”), “How many hours per week do you spend on your Facebook account?” (response options “< 1 hour/week”, “1-2 hours/week”, “3-6 hours/week”, “7-14 hours/week”, “over 14 hours per week.”).

 *Problematic Facebook Use.* To measure PFBU we adapted Caplan’s (2010) Generalised Problematic Internet Use Scale 2 (GPIUS2). The GPIUS2 assess five subscales across fifteen items: preference for online social interaction (three items, α = .78; e.g. “I prefer online social interaction over face-to-face communication”); mood regulation (three items, Cronbach’s α = .90; e.g. “I have used Facebook to make myself feel better when I was down”); cognitive preoccupation (three items, α = .82; e.g. “When I haven’t been on Facebook for some time, I become preoccupied with the thought of going online”); Compulsive internet use (three items, α = .76; e.g. “I have difficulty controlling the amount of time I spend on Facebook”); negative outcomes (three items, α = .85; e.g. “I have missed social engagements or activities because of my Facebook use”). Participants were presented with a series of statements and asked to record on an eight-point scale how far they agreed or disagreed with each (scale anchors were 1 (“definitely disagree”) and 8 (“definitely agree”).

 *Social identification with Facebook users.* The 14-items developed by Leach et al (2008) to measure in-group identification was used. These items were further categorised as two dimensions; self-definition (α = .68) and self-investment (α = .63). Self-investment was made up of three sub-scales; *solidarity* (e.g. “I feel solidarity with Facebook users”) (α = .69)), *satisfaction* (e.g. “I think that Facebook users have a lot to be proud of”) (α = .71)), and *centrality* (e.g., “The fact that I am a Facebook user is an important part of my identity”) (α = .66)). Self-identification comprised two subscales; individual *self-stereotyping* (e.g., “I am similar to the average Facebook user”) (α = .65)) and *in-group homogeneity* (e.g., “Facebook users have a lot in common with each other”.).  Statements were presented on seven-point Likert-type scales (1 = “strongly disagree” to 7 = “strongly agree”.) with higher scores indicative of greater levels of component measures of identity.

 *Attitudes to Facebook use.* Seven items measured attitude towards personal FB use (α = 67). These were presented on seven-point Likert scales (1 = “strongly disagree” to 7 = “strongly agree” (e.g., “I like to use FB” and “I regret using FB”) with increased scores equating to a more positive attitude).

**Procedure**

 After consent had been gathered, all participants completed each of measures in the same order: demographic information (age, gender), general Facebook use, problematic Facebook use, the self-identification measures (Leach et al, 2008) and finally attitudes towards one’s own Facebook use.

**Ethics**

 The study procedures were carried out in accordance with the ethical guidance provided by the British Psychological Society. The University Research Ethics Committee of London South Bank University approved the study. All subjects were informed about the study and all provided informed consent.

Results

Identification of candidate predictors

Initial Pearson’s r correlation coefficients between PFBU total and PFBU components and age, hours of FB use per week, attitudes towards FBand identity components were calculated to ascertain significant relationships for inclusion in subsequent regression analyses (see Table 1). Bonferroni corrections for multiple tests were applied within each criterion variable such that only Pearson’s r correlations achieving *p* < .0055 were included as candidate predictors.

Effects of patterns of use, Facebook use attitude and identity components on PFBU

Analyses involved multiple linear regressions with PFBU score and PFBU sub-scales as the criterion factors and those variables significantly correlated with PFBU and its components (see Table 1) as model predictors. In terms of assumptions, a sample size of seventy-four was adequate given a maximum of two predictor variables included per regression performed and sufficient to detect an effect size of *f*2>= .14 (power = .80, α =.05). Secondly, all of the Pearson r correlation coefficients between predictor variables were < .80 (-.01 < r < .63) and collinearity statistics were within acceptable limits showing low multicollinearity (Tolerances > .10; VIFs < 10). Mahalanobis distance scores showed there to be no significant multivariate outliers and residual and scatterplots showed that the normality, linearity and homoscedasticity assumptions were met. (Descriptive statistics for variables is reported in Table 2.).

Insert Table 1 about here

Insert Table 2 about here

Overall PFBU

 Results showed that a model comprising solidarity and centrality significantly predicted PFBU, *F* (2, 70) = 16.69, *p* < .001, R2 = .32, Adj R2 = .30. Centrality was the only independent significant predictor of PFBU, β = .45, *t* (70) = 3.88, *p* < .001, sr2 = .14, 95% CIs [.92, 2.87]. Solidarity did not independently relate to PFBU, (Solidarity, β = .18, *t* (70) = 1.59, *p* = .12, sr2 = .03, 95% CIs [-.19, 1.64].

PFBU Subscales

*Online Preference*

 Only centrality significantly predicted the online preference subscale score, β = .40, *t* (70) = 3.64, *p* < .001, R2 = .16, Adj R2 = .15, 95%, CIs [.29, .98].

*Mood Regulation*

 A model comprising solidarity and centrality significantly predicted mood regulation, *F* (2, 70) = 15.37, *p* < 001, R2 = .31, Adj R2 = .29. Both centrality, β = .33, *t* (70) = 2.85, *p* < .01, sr2 = .08, 95% CIs [.17, .94], and solidarity (β = .30, *t* (70) = 2.54, p < .05, sr2 = .06, 95% CIs [.10, .82] were independently related to mood regulation.

*Cognitive Preoccupation*

 No variables were shown to correlate significantly according to the Bonferroni requirement and, as such, a regression model was not constructed.

*Compulsive Use*

 A model comprising personal FB Use (Hours per week) and personal FB use attitude significantly predicted the compulsivity subscale score, *F* (2, 70) = 8.33, *p* < .001, R2 = .19, Adj R2 = .17. Hours per week, β = .23, *t* (70) = 2.09, *p* < .05, sr2 = .05, 95% CIs [.03, 1.26], and attitude to personal use, β = .35, *t* (70) = 3.23, *p* < .01, sr2 = .13, 95% CIs [.11, .44] were significantly related to FB compulsive use. No identity variables were shown to correlate significantly.

*Deficient Self-Regulation*

 This item is composed of the aggregate responses to cognitive preoccupation and compulsive use. Personal FB Use (Hours per week), personal FB use attitude and solidarity together was significantly related to deficient self-regulation, *F* (3, 69) = 5.88, *p* < .001, R2 = .20, Adj R2 = .17. Personal FB use attitude, β = .24, *t* (69) = 2.02, *p* < .05, sr2 = .05, 95% CIs [.00, .64] was shown to be significant while hours per week, β = .18, *t* (69) = 1.67, *p* = .10, sr2 = .03, 95% CIs [-.17, 1.96], and solidarity, β = .21, *t* (69) = 1.78, *p* = .08, sr2 = .04, 95% CIs [-.04, .74] were not.

*Negative outcomes*

 Only centrality was significantly related to the negative outcomes subscale score, β = .39, *t* (71) = 3.61, *p* < .001, R2 = .16, Adj R2 = .14, 95% CIs [.14, .49].

Discussion

Identity (both self and social) has been shown to be related to ongoing health behaviours in general (see Cruwys et al, 2020; Bentley, Greenaway, Haslam, Cruwys, Steffens, Haslam, & Cull, 2020) as well as the development of, maintenance of and change from, a range of addictive behaviours (e.g. Buckingham, Frings & Albery, 2013; Frings & Albery, in press, 2015; Blevins, Abrantes, Anderson, Caviness, Herman, & Stein, 2018; Priebe, Beauchamp, Wunderlich & Faulkner, 2020; Dono, Miller, Ettridge, & Wilson, 2020), including, to a lesser extent, Facebook use (Ruggieri et al, 2020; Marino et al, 2016). However, very limited evidence has been presented that identifies those fundamental components of group-based self-identification that are important for predicting differential aspects of ongoing addictive behaviour. This work has concentrated on identity centrality (Lindgren, Ramirez, Namaky, Olin & Teachman, 2016) or identity investment as applied to drinking-related self-concept (i.e. Hertel, Peterson, & Lindgren, 2019). In contrast this paper examined differential components of *group-based identification* in accounting for potentially problematic behaviour, in this instance, problematic Facebook use (PFBU). Leach et al’s (2008) hierarchical multicomponent model of in-group identification allowed us to measure the extent to which individuals shared similarities with others in their in-group, or *self-definition* (comprising individual self-stereotyping and in-group homogeneity), and the extent to which these individuals had a sense of purposeful *self-investment* with their in-group (comprising solidarity, centrality and satisfaction).

Our results clearly indicate that specific dimensions of in-group identification are associated with PFBU in general as well as with certain components of such problematic behaviour. At the highest order of identification differentiation, none of the components of *self-definition* (in-group homogeneity and self-stereotyping) were found to predict any aspects of PFBU. In contrast, two of the three components of *self-investment*, centrality and solidarity, accounted for significant variability in general PFBU and three and one of the five sub-components of PFBU respectively. This suggests that in general increasing PFBU is better explained by an increasing perception of personal self-investment in the in-group and not by how one thinks about oneself in relation to other in-group members (self-definition) per se. This is consistent with evidence which has shown the importance of inflated self-investment aspects of drinking identity (or self-concept), and most specifically how often one thinks about oneself as a drinker, for increased alcohol use disorders risk (Hertel et al., 2019).

What does this inflated self-investment look like in the context of Facebook use? Our findings argue that while increasing levels of self-investment in the in-group is related to increasing PFBU, two component factors are particularly important in describing this relationship, namely centrality and solidarity. The third investment component, satisfaction, is not.

Solidarity is best articulated as “psychological bond with, and commitment to, fellow group in-group members” (Leach et al, 2008, p. 147; see Lewin, 1948) and is manifest in a sense of belonging, attachment and co-ordination with other members. To this end, our findings show that increasing PFBU is associated with an increasing psychological affiliation with other Facebook users in terms of how much they feel they belong to and are attached to perceived others in their group. In terms of the subcomponents of PFBU, solidarity was shown to be independently positively predictive specifically and only for mood regulation. This suggests that inflated solidarity is important in understanding one’s motivation to use Facebook as a means to regulate personal mood (see Moretta & Buodo, 2018). How this relationship develops cannot be argued from correlational designs. Future work should utilise prospective or experimental methods to delineate cause-effect relationships over time or artificially manipulate one (or other) of the factors and observe variability in the other factor. That the regulation of mood is a core aspect of addictive behaviours per se (e.g. Wiers & Stacy, 2006), points to a more general implication of this finding. Namely, that feelings of being intrinsically bonded with other people who behave in a similar way to oneself may be a marker, or proxy, for increasingly problematic behaviour. If this is the case, currently unanswered questions around the threshold at which solidarity is associated with problematic versus non-problematic behaviour in terms of the regulation of mood become apparent. Solidarity may also be a key barrier to changing behaviour, as one may be reluctant to relinquish the connections associated with it. To follow the logic through, intervening to change one’s sense of solidarity with other users may influence the pronounced and actual need to regulate one’s mood via Facebook use.

Our findings suggest that centrality, or the saliency of thoughts influencing the subjective importance attributed to one’s group membership (Cameron, 2004), is particularly important in understanding certain components aspects of problematic Facebook use. Increasing centrality was shown to be associated with an increasing preference for online social interaction. In other words, the more chronically salient one’s in-group membership is and, as such, the greater the importance ascribed to this membership, the more likely it is that one will have a preference for online interactions which is driven by the belief that these interactions are likely to be experienced as less threatening (or anxiety provoking) (Caplan, 2006; Kim & Davis, 2009), The increasing chronicity in the saliency of one’s thoughts about being part of the in-group of Facebook users was also shown to predict motivations to regulate mood through its use. As was the case for solidarity, we can make no claims around the direction of causality in the relationship between centrality with on-line preference and mood regulation and at what point this relationship becomes characterised as problematic psychologically and behaviourally.

Interestingly, centrality was also shown to be uniquely predictive of increasing reported negative outcomes associated with Facebook use, namely difficulties in managing one’s life and missing engagements and activities. This suggests that centrality is not only important for predicting defining factors of PFBU *per se* (i.e. online preference and mood regulation), but it also relates to an increasing experience of negative outcomes which, theoretically, are the result of these factors (see Caplan, 2010). In other words, the increasing chronicity of the saliency of one’s group membership may be a valid measure of the increasing likelihood of experiencing negative outcomes associated with one’s behaviour. This reinforces previous work which has identified identity (personal and group-based) as important in understanding not only differential levels of engagement in addictive behaviours (e.g. Hertel et al, 2019; Lindgren, Neighbors, Gasser, Ramirez, & Cvencek, 2017; Frings, Melichar, & Albery, 2016), but also the maintenance of and recovery from such patterns (e.g. Frings, Wood, Lionetti, & Albery, 2019; Frings & Albery, 2015, 2016, in press; Hutchison, Cox & Frings, 2018; Best et al, 2016; Dingle, Haslam, Best, et al, 2019).

It is also clear that the third *self-investment-*based factor, satisfaction, was not important in understanding problematic Facebook use in general nor any of its dimensions. More generally, this suggests that the positive feelings one has about the ingroup (Cameron, 2004; Leach et al, 2008) do not appear to be important in PFBU experience, whereas how salient for the self the group membership is (centrality) and one’s sense of a significant bond to the group (solidarity) are. One’s commitment to the group, and other group members, and how prominent and accessible the group membership is in one’s thoughts, appear to be independent of and more discriminatory in Facebook use than the positive feelings one has about the group. This may be because satisfaction with being a user varies considerably for people with high levels of PFBU; for instance, those “overusing” SNS but not recognising the impact it is having who may be satisfied as opposed to those contemplating or having attempted unsuccessfully to reduce their use, who may be more ambivalent or less positive about their experienced identity. Whether this type of understanding holds true for other addictive behaviours remains to be answered.

Turning now to our findings that neither components of *self-definition* (in-group homogeneity and self-stereotyping) were found to account for variability in any aspect of PFBU. It is clear that for this behaviour at least, how similar to a prototypical group member we view ourselves as, and how homogenous we believe our group to be in terms of shared similarities and minimal differences, is less important than how *deeply* we are invested in our group membership. So, for problematic Facebook use, the degree to which we self-stereotype as a ‘typical’ member of that highly cohesive and similar group for which we are a member does not relate to how problematic that behaviour is.

Our results also show that identity-based factors were not associated with those aspects of PFBU associated with deficient self-regulation. Deficient self-regulation refers to the failure to monitor effectively how frequently and intensely you are performing the behaviour. It is associated with a developing impaired conscious control and is manifest as cognitive preoccupation (i.e. obsessive patterns of thinking) and behavioural compulsivity (Caplan, 2010; Caplan & High, 2011; Wood, 2017). In other words, group-based identification is not influential in these aspects of problematic Facebook use. How many hours per week one reports using Facebook and an increasingly positive belief set about your own Facebook use are. Specifically, both factors were shown to increase relative to an increase in reported compulsive use and were not found to relate to cognitive preoccupation with Facebook. In terms of the behavioural frequency measure, this confirms the consistent finding that repeated and reinforced behaviour creates impaired control over actions and generates an urge or desire-based response (Baumeister & Nadal, 2017; Tiffany, 1990).

Whilst these finding have shown the importance of group-based investment as fundamentally related to increasingly problematic Facebook use a number of limitations are apparent. First, the cross-sectional nature of the study does not allow for any more causative interpretations to made. To determine whether self-investment-based identity factors play a causal role in predicting Facebook use, or whether increasing Facebook use per se determines changes in these identity measures, requires a prospective/longitudinal investigation. Such an approach would allow for a meaningful exploration of the development of the problematic use as a function of a “changing” related identity (and components therein). Second, whilst the sample size in this study was sufficient to detect a medium effect size (Cohen et al, 2013), these findings require replication in a larger sample of Facebook. This would enable us to examine differential identities for individuals who use the Facebook platform for different reasons. A related point is that the current sample of Facebook users spent, in terms of modal response, between 3 and 14 hours per week on Facebook with less than 10 per cent reporting more than 14 hours per week usage. With previous work detailing that self-report usage to be significantly greater than actual time spent on the platform (see Junco, 2013), it is likely that this sample were *not* excessive users. Again, future work should include a broad range of users to include a range of both intensive and less intensive users. Third, in line with other studies which aimed to provide motivational and individual difference-based examinations of problematic Facebook use (e.g. Marino et al, 2018, 2019, 2020), the present study utilised an adaptation of Caplan’s (2010) Generalised Problematic Internet Use Scale 2 (GPIUS2) which has previously found to be generalisable to Facebook use specifically (Moretta & Buodo, 2018). This said, whilst an adapted GPIUS2 appears to provide a fairly robust measure of cognitive and motivational components in Facebook use, the development of a bespoke measure should not be ruled out. Indeed, it is possible that while the general indicators of problematic Facebook use are the same as for generic internet use, the relative weighting of component indicators may not be. Fourth, only self-report data were examined and, as such, future work should include more objective measures of Facebook use/misuse (e.g. diary-based usage, etc), and identity-based measures (e.g. association tasks) to assess the concurrent validity of different indices.

In sum, our findings have shown that: (i) group-based identities are important in understanding problematic addictive behaviours, in this case Facebook use; (ii) those aspects of group membership identity associated with how invested an individual is with the in-group are particularly important whereas those aspects which reflect self-definition are seemingly obsolete; (iii) perceptions associated with a sense of belonging and attachment to other group members and, most importantly, how chronically salient one’s group membership is for the self are fundamental aspects of this self-investment understanding; and (iv) aspects of problematic Facebook use associated specially with cognitive preoccupation and behavioural compulsivity are *not* influenced by identity-based factors. Whilst these findings present an initial exploration into the differential effects of varying sources of identity on problematic Facebook use, future work should elaborate these findings in other problematic behaviours to facilitate conceptual generalisation.

References

Albery, I. P., Collins, I., Moss, A. C., Frings, D., & Spada, M. M. (2015). Habit predicts in-the-moment alcohol consumption. *Addictive Behaviors*, 41, 78-80.

Amichai-Hamburger, Y., Wainapel, G., & Fox, S. (2002). " On the Internet no one knows I'm an introvert": Extroversion, neuroticism, and Internet interaction. *Cyberpsychology & Behavior*, 5(2), 125-128.

Atroszko, P. A., Balcerowska, J. M., Bereznowski, P., Biernatowska, A., Pallesen, S., & Andreassen, C. S. (2018). Facebook addiction among Polish undergraduate students: Validity of measurement and relationship with personality and well-being. *Computers in Human Behavior*, *85*, 329-338.

Baumeister, R. F., & Nadal, A. C. (2017). Addiction: Motivation, action control, and habits of pleasure. *Motivation Science*, *3*(3), 179-195.

Bentley, S. V., Greenaway, K. H., Haslam, S. A., Cruwys, T., Steffens, N. K., Haslam, C., & Cull, B. (2020). Social identity mapping online. *Journal of Personality and Social Psychology*, 118 (2), 213–241.

Best, D., Beckwith, M., Haslam, C., Alexander Haslam, S., Jetten, J., Mawson, E., & Lubman, D. I. (2016). Overcoming alcohol and other drug addiction as a process of social identity transition: The social identity model of recovery (SIMOR). *Addiction Research & Theory*, 24(2), 111-123.

Best, D., Bliuc, A. M., Iqbal, M., Upton, K., & Hodgkins, S. (2018). Mapping social identity change in online networks of addiction recovery. *Addiction Research & Theory*, 26(3), 163-173.

Blevins, C. E., Abrantes, A. M., Anderson, B. J., Caviness, C. M., Herman, D. S., & Stein, M. D. (2018). Identity as a cannabis user is related to problematic patterns of consumption among emerging adults. *Addictive Behaviors*, 79, 138-143.

Buckingham, S. A., Frings, D., & Albery, I. P. (2013). Group membership and social identity in addiction recovery. *Psychology of Addictive Behaviors*, *27*(4), 1132.

Caplan, S. E. (2006). Relations among loneliness, social anxiety, and problematic Internet use. *CyberPsychology & Behavior*, *10*(2), 234-242.

Caplan, S. E. (2010). Theory and measurement of generalized problematic Internet use: A two-step approach. *Computers in Human Behavior*, 26(5), 1089-1097.

Caplan, S. & High, A. (2011) Online social interaction, psychosocial well-being, and problematic internet use. In K. Young, & C. Abreu (Eds.)., *Internet Addiction: A Handbook and Guide to Evaluation and Treatment*, (pp. 35-53). New Jersey: Wiley.

Cameron, J. E. (2004). A three-factor model of social identity. *Self and identity*, 3(3), 239-262.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2013). *Applied multiple regression/correlation analysis for the behavioral sciences*. Routledge.

Cruwys, T., Greenaway, K., Ferris, L. J., Rathbone, J., Saeri, A. K., Williams, E., Parker, S. L., Change, M. X. L., Croft, N., Bingley, W., & Grace, L. (2020). When trust goes wrong: A social identity model of risk taking. *Journal of Personality and Social Psychology*. <http://doi.org/10.1037/pspi0000243>

DeMarree, K. G., Petty, R. E., & Briñol, P. (2007a). Self and attitude strength parallels: Focus on accessibility. *Social and Personality Psychology Compass*, 1(1), 441-468.

DeMarree, K. G., Petty, R. E., & Turnes, P. B. (2007b). Self-certainty: Parallels to attitude certainty. *International Journal of Psychology and Psychological Therapy*, 7(2), 159-188.

Dingle, G. A., Haslam, C., Best, D., Chan, G., Staiger, P. K., Savic, M., Beckwith, M., Mackenzie, J., Bathish, R & Lubman, D. I. (2019). Social identity differentiation predicts commitment to sobriety and wellbeing in residents of therapeutic communities. *Social Science & Medicine*, 237, 112459.

Dono, J., Miller, C., Ettridge, K., & Wilson, C. (2020). “I'm not the anti-smoker now. I just don't smoke anymore”: social obstacles to quitting smoking among emerging adults. *Addiction Research & Theory*, 28(3), 240-249.

Doornwaard, S. M., Moreno, M. A., van den Eijnden, R. J., Vanwesenbeeck, I., & Ter Bogt, T. F. (2014). Young adolescents' sexual and romantic reference displays on Facebook. *Journal of Adolescent Health*, 55(4), 535-541.

Frings, D., & Albery, I.P (in press) An identity-based explanatory framework for alcohol use and misuse. In Frings, D. & Albery, I.P. (Eds.) *The Alcohol Handbook: From Synapse to Society*. New York: Routledge.

Frings, D., & Albery, I. P. (2015). The social identity model of cessation maintenance: Formulation and initial evidence. *Addictive Behaviors*, 44, 35-42.

Frings, D., & Albery, I. P. (2016). The social identity model of cessation maintenance. In Buckingham, S. & Best, D. (Eds.). *Addiction, Behavioural Change and Social Identity* (pp. 116-137). London: Routledge.

Frings, D., Melichar, L., & Albery, I. P. (2016). Implicit and explicit drinker identities interactively predict in-the-moment alcohol placebo consumption. *Addictive Behaviors Reports*, 3, 86-91.

Frings, D., Collins, M., Long, G., Pinto, I. R., & Albery, I. P. (2016). A test of the Social Identity Model of Cessation Maintenance: The content and role of social control. *Addictive Behaviors reports*, 3, 77-85.

Frings, D., Wood, K. V., Lionetti, N., & Albery, I. P. (2019). Tales of hope: Social identity and learning lessons from others in Alcoholics Anonymous: A test of the Social Identity Model of Cessation Maintenance. *Addictive Behaviors*, 93, 204-211.

Hertel, A. W., Peterson, K. P., & Lindgren, K. P. (2019). Investment in drinking identity is associated with alcohol consumption and risk of alcohol use disorder. *Addictive Behaviors*, 89, 256-262.

Howard, M. C., & Magee, S. M. (2013). To boldly go where no group has gone before: An analysis of online group identity and validation of a measure. *Computers in Human Behavior*, *29*(5), 2058-2071.

Hutchison, P., Cox, S., & Frings, D. (2018). Helping you helps me: Giving and receiving social support in recovery groups for problem gamblers. *Group Dynamics: Theory, Research, and Practice*, 22(4), 187.

Junco, R. (2013). Comparing actual and self-reported measures of Facebook use. *Computers in Human Behavior*, 29(3), 626-631.

Kenny, D. A., & Garcia, R. L. (2012). Using the actor–partner interdependence model to study the effects of group composition. *Small Group Research*, 43(4), 468-496.

Kim, H. K., & Davis, K. E. (2009). Toward a comprehensive theory of problematic Internet use: Evaluating the role of self-esteem, anxiety, flow, and the self-rated importance of Internet activities. *Computers in Human Behavior*, *25*(2), 490-500.

Koval, P., Laham, S. M., Haslam, N., Bastian, B., & Whelan, J. A. (2012). Our flaws are more human than yours: Ingroup bias in humanizing negative characteristics. *Personality and Social Psychology Bulletin*, *38*(3), 283-29

Kuss, D. J., & Griffiths, M. D. (2011). Online social networking and addiction—a review of the psychological literature. *International Journal of Environmental Research and Public Health*, *8*(9), 3528-3552.

Kuss, D. J., & Griffiths, M. D. (2017). Social networking sites and addiction: Ten lessons learned. *International Journal of Environmental Research and Public Health*, *14*(3), 311.

Leach, C. W., Van Zomeren, M., Zebel, S., Vliek, M. L., Pennekamp, S. F., Doosje, B., Ouwerkerk, J.w., & Spears, R. (2008). Group-level self-definition and self-investment: a hierarchical (multicomponent) model of in-group identification. *Journal of Personality and Social Psychology*, *95*(1), 144-165.

Lindgren, K. P., Neighbors, C., Gasser, M. L., Ramirez, J. J., & Cvencek, D. (2017). A review of implicit and explicit substance self-concept as a predictor of alcohol and tobacco use and misuse. *The American Journal of Drug and*

 *Alcohol Abuse*, 43(3), 237–246

Lindgren, K. P., Ramirez, J. J., Namaky, N., Olin, C. C., & Teachman, B. A. (2016). Evaluating the relationship between explicit and implicit drinking identity centrality and hazardous drinking. *Addictive Behaviors Reports*, 4, 87-96.

Marino, C., Vieno, A., Moss, A. C., Caselli, G., Nikčević, A. V., & Spada, M. M. (2016). Personality, motives and metacognitions as predictors of problematic Facebook use in university students. *Personality and Individual Differences*, 101, 70-77.

Marino, C., Vieno, A., Pastore, M., Albery, I. P., Frings, D., & Spada, M. M. (2016). Modeling the contribution of personality, social identity and social norms to problematic Facebook use in adolescents. *Addictive Behaviors*, 63, 51-56.

Marino, C., Gini, G., Vieno, A., & Spada, M. M. (2018). A comprehensive meta-analysis on problematic Facebook use. *Computers in Human Behavior*, 83, 262-277.

Marino, C., Caselli, G., Lenzi, M., Monaci, M. G., Vieno, A., Nikčević, A. V., & Spada, M. M. (2019). Emotion regulation and desire thinking as predictors of problematic Facebook use. *Psychiatric Quarterly*, 90(2), 405-411.

Marino, C., Gini, G., Angelini, F., Vieno, A., & Spada, M. M. (2020). Social norms and e-motions in problematic social media use among adolescents. *Addictive Behaviors Reports*, 100250

Montes, K. S. (2019). Does Gambling Identity Predict Unique Variance in Negative Gambling-Related Outcomes: An Examination of Direct and Interactive Associations. *Journal of Gambling Studies*, 1-17.

Moretta, T., & Buodo, G. (2018). Modeling Problematic Facebook Use: Highlighting the role of mood regulation and preference for online social interaction. *Addictive Behaviors*, *87*, 214-221.

Pantic, I., Damjanovic, A., Todorovic, J., Topalovic, D., Bojovic-Jovic, D., Ristic, S., & Pantic, S. (2012). Association between online social networking and depression in high school students: behavioral physiology viewpoint. *Psychiatria Danubina*, *24*(1), 90-93.

Priebe, C. S., Beauchamp, M., Wunderlich, K., & Faulkner, G. (2020). “I’m a runner not a smoker”: Changes in identity as predictors of smoking cessation and physical activity. *Psychology of Sport and Exercise*, 101702.

Rosen, L. D., Whaling, K., Rab, S., Carrier, L. M., & Cheever, N. A. (2013). Is Facebook creating “iDisorders”? The link between clinical symptoms of psychiatric disorders and technology use, attitudes and anxiety. *Computers in Human Behavior*, *29*(3), 1243-1254.

Ryan, T., Chester, A., Reece, J., & Xenos, S. (2014). The uses and abuses of Facebook: A review of Facebook addiction. *Journal of Behavioral Addictions*, 3(3), 133-148.

Ryan, T., Reece, J., Chester, A., & Xenos, S. (2016). Who gets hooked on Facebook? An exploratory typology of Facebook users. *Cyberpsychology: Journal of Psychological Research on Cyberspace*, *10*(3), 1-25.

Ruggieri, S., Santoro, G., Pace, U., Passanisi, A., & Schimmenti, A. (2020). Problematic Facebook use and anxiety concerning use of social media in mothers and their offspring: An actor–partner interdependence model. Addictive Behaviors Reports, 100256.

Satici, S. A., & Uysal, R. (2015). Well-being and problematic Facebook use. *Computers in Human Behavior*, *49*, 185-190.

Stöckli, S., & Hofer, D. (2020). Susceptibility to social influence predicts behavior on Facebook. *PloS One*, 15(3), e0229337.

Sun, Y., & Zhang, Y. (in press). A Review of Theories and Models Applied in Studies of Social Media Addiction and Implications for Future Research. *Addictive Behaviors*.

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.). *The Social Psychology of Intergroup Relations* (pp. 33–47). Monterey, CA: Brooks/Cole.

Tiffany, S. T. (1990). A cognitive model of drug urges and drug-use behavior: role of automatic and nonautomatic processes. *Psychological Review*, 97(2), 147.

Vangeli, E & West, R (2012) Transition towards a “non-smoker” identity following smoking cessation: An interpretative phenomenological analysis. *British Journal of Health Psychology*, 17(1): 171–184.

Wiers, R. & Stacy, A., (2006), Implicit cognition and addiction. *Current Directions in Psychological Science*, 15(6), 292–296.

Wood, W. (2017). Habit in personality and social psychology. *Personality and Social Psychology Review*, *21*(4), 389-403.

Young, L., Kolubinski, D. C., & Frings, D. (2020). Attachment style moderates the relationship between social media use and user mental health and wellbeing. *Heliyon*, 6(6), e04056.

Table 1.

*Pearson’s r correlation coefficients for PFBU total and PFBU components and age, hours of FB use per week, attitudes towards personal FB use and identity components.*

|  |  |  |
| --- | --- | --- |
| Predictor Variables |  | PFBU Component (criterion) |
|  | PFBU Overall | Online Preference | Mood Regulation | Cognitive Preoccupation | Compulsive Use | Deficient Self- Regulation | Negative Outcomes |
| *Age* | -.17 | -.18 | -.23 | -.05 | .06 | .00 | -.05 |
| *Gender*1 | .17 | .07 | .07 | .06 | .20 | .16 | .28\* |
| *Personal FB Use (Hours per week)* | .18 | .01 | .09 | .15 | .35\*\*# | .36\*\*# | .12 |
| *Personal FB Use: attitude* | .31\* | .15 | .19 | .20 | .38\*\*# | .35\*\*# | .24\* |
| *Solidarity* | .42\*\*# | .20 | .47\*\*# | .31\*\* | .26\* | .35\*\*# | .09 |
| *Satisfaction* | .27\* | .14 | .28\* | .20 | .18 | .23\* | .05 |
| *Centrality* | .55\*\*# | .40\*\*# | .49\*\*# | .28\* | .23 | .31\*\* | .39\*\*# |
| *Self-stereotyping* | .21 | .13 | .30\* | .13 | .01 | .09 | .05 |
| *In-group homogeneity* | .14 | .17 | .24\* | -.16 | .00 | -.10 | .11 |

\*\* p < .01, \* p < .05, #Bonferroni adjustment p = .0055

Note: 1 = point biserial correlation coefficients used for gender.

Table 2.

*Descriptive statistics for PFBU total, PFBU components, attitudes towards personal FB use and in-group identity components.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Measures | *M* | SD | Min | Max |
| *Attitude* |  |  |  |  |
| Personal FB Use: attitude | 26.64 | 4.71 | 14 | 34 |
| *In-group identification: Self-Investment*1 |  |  |  |  |
| Solidarity | 3.85 | 9.29 | 3 | 20 |
| Satisfaction | 15.93 | 4.94 | 4 | 27 |
| Centrality | 5.88 | 3.61 | 3 | 18 |
| *In-group identification: Self-definition*1 |  |  |  |  |
| Self-stereotyping | 6.43 | 3.00 | 2 | 12 |
| In-group homogeneity | 7.34 | 3.02 | 2 | 14 |
| *PFBU Component*2 |  |  |  |  |
| Online preference | 9.34 | 5.76 | 3 | 27 |
| Mood regulation | 9.30 | 5.95 | 3 | 24 |
| Cognitive preoccupation | 5.78 | 4.08 | 3 | 26 |
| Compulsive use | 6.34 | 3.70 | 3 | 17 |
| Deficient self- regulation3  | 12.12 | 6.32 | 6 | 21 |
| Negative outcomes | 4.38 | 2.88 | 3 | 32 |
| PFBU overall | 35.15 | 15.23 | 15 | 91 |

Notes: 1 = based on the in-group hierarchical model of in-group identification (Leach et al, 2008); 2 = adapted from the Generalised Problematic Internet Use Scale 2 (GPIUS2) (Caplan, 2010); 3 = deficient self-regulation = cognitive preoccupation + compulsive use.