RUNNING HEAD: IMPULSIVITY IN SELF-HARM

**Out of the Blue: Untangling the Association between Impulsivity and Planning in Self-Harm**

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**Abstract**

Background: Planned and unplanned acts of self-harm may have distinct clinical and psychological correlates. Trait impulsivity is one factor that might be expected to determine whether self-harm is planned. Research so far has focussed on suicide attempts and little is known about how individuals engaging in planned and unplanned acts of self-harm differ. The aim of the current study was to examine how individuals who report planned self-harm, unplanned self-harm, and no self-harm differ in terms of impulsivity and affective symptoms (depression, anxiety, activated mood).

Method: An online survey of University students (*n* = 1350) was undertaken including measures of impulsivity, affective symptoms and self-harm. Analyses made use of a multinomial logistic regression model with affective and cognitive forms of impulsivity estimated as latent variables.

Results: Trait affective impulsivity, but not cognitive, was a general risk factor for whether self-harm occurred. There was no evidence of differences between planned and unplanned self-harm. Affective symptoms of depression and anxiety mediated the relationship between affective impulsivity and self-harm.

Limitations: The study was cross-sectional, relied on a student sample which may not generalise to other populations.

Conclusions: Trait affective impulsivity is associated with self-harm but it appears to be mediated by depression and anxiety symptoms. The exact relationships between trait affective impulsivity, depression, anxiety and self-harm require further longitudinal research in clinical populations but might lead to improved risk assessment and new therapeutic approaches to self-harm.

**Keywords:** Self-harm; Impulsivity; Depression; Anxiety; Planning

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Some suicide attempts or acts of self-injury appear to be quite impulsive, lacking a priori planning or premeditation, whereas others seem to follow a process of ideation and planning (Jeon et al., 2010; Spokas, Wenzel, K., & Beck, 2012) and thought to be more serious in terms of both suicide and self-harm (National Institute for Health and Clinical Excellence 2011). The rates of so called ‘impulsive’ suicide attempts appear to vary depending on how this is defined. Focussing specifically on whether proximal planning was reported prior to the act (the most widely adopted criterion for ‘impulsive’ suicidal acts) between 13% and 78% of suicide attempts appear impulsive across studies (Rimkeviciene, O'Gorman, & De Leo, 2015). However, it is not clear whether similar findings occur for self-harm in general (though according to Csorba, DInya, PLener, Nagy & Páli, 2009, 27% report extended thinking about the act prior to non-suicidal forms of self-harm). Here we adopt the Royal College of Psychiatrist’s definition of self-harm as an act of intentional self-injury irrespective of suicidal intent (which may cover a range of specific behaviours including self-cutting, burning and poisoning; Kapur, Cooper, O’Connor, & Hawton, 2013; Royal College of Psychiatrists., 2010). The presence of two possible forms of self-harm, the planned and the unplanned (Jeon et al., 2010; Nakagawa et al., 2009), raises the possibility that there may be distinct clinical and psychological characteristics linked to these two different types of self-injury. This possibility would have important implications for services and clinicians, who may have to adapt their practice depending on the degree of planning associated with the self-injury an individual presents with.

A recent review has suggested that unplanned suicide attempts (compared to planned attempts) are associated with less intent to die, lower lethality, interpersonal motives, absence of a mental disorder or co-morbidity (Rimkeviciene et al., 2015). However, similar research in the context of self-harm more generally is rarer (although see Haw and Hawton, 2011). In the current study we aimed to expand upon the research into planning and self-harm by looking at psychological factors that may distinguish planned and unplanned acts of self-harm.

One factor that appears likely to distinguish planned and unplanned suicide attempts is trait impulsivity, the tendency for an individual to engage in behaviours with a lack of planning, premeditation or regard to potential risks (Robbins, Gillan, Smith, de Wit, & Ersche, 2012; Smith et al., 2007). Trait impulsivity here describes a disposition and so is different to the description of a particular act (e.g., a suicide attempt) as “impulsive” because it appeared unexpected or was not planned. A large body of research links both suicide attempts and self-harm to greater levels of trait impulsivity (e.g., Anestis et al., 2012a; Anestis, Tull, Bagge, & Gratz, 2012b; Carli et al., 2010; Dougherty et al., 2009; Herpertz, Sass, & Favazza, 1997; Turecki, 2005). There is some evidence that urgency (the tendency to act impulsivity in response to affective states) in particular is linked to self-harm (Anestis et al., 2012b; Peterson & Fischer, 2012), although Peterson and Fischer (2012) did not identify a prospective relationship between urgency and self-harm. Most studies have not considered the role of urgency and affective impulsivity in relation to either suicide attempts or self-harm in general. Whilst it might be expected that trait impulsivity would lead to more unplanned self-harm, the alternative hypothesis has also been suggested that greater impulsivity will lead to more planned self-harm (Witte et al., 2008). Specifically, it has been noted that those with high trait impulsivity tend to have a greater likelihood of experiences such as accidental injury, substance use and culturally accepted forms of self-injury (e.g., piercings, scarification), which may ultimately lower an individual’s threshold for acting on suicidal thoughts, and possibly engaging in self-harm more generally (Bender, Gordon, Bresin, & Joiner, 2011; Witte et al., 2008). They may also have more challenging lives as a consequence of their impulsiveness, leading to a greater suicidal and self-injurious thinking (Turecki, 2005). This leads to the possibility that high trait impulsivity may also increase the risk of engaging in planned acts of self-harm (versus no self-harm), and may even lead to planned rather than unplanned acts.

Trait impulsivity does not appear to clearly distinguish between planned and unplanned suicide attempts across a number of studies that have looked at (Rimkeviciene et al., 2015). However, this has not been explored for self-harm more generally whether or not there was any reported intent to die. Whilst intuitively it would be expected that impulsive individuals tend to engage in unplanned rather than planned acts of self-harm, it may be that impulsivity is elevated in both cases, or is even most pronounced in the case of planned self-harm. Self-harm in many cases serves an important function for individuals, for example, managing aversive emotional states (Armey, Crowther, & Miller, 2011; Chapman, Gratz, & Brown, 2006; Mikolajczak, Petrides, & Hurry, 2009). Trait impulsivity is liable to increase exposure to aversive emotional states and may therefore result in increased planning of self-harm as a method of coping.

Research into the structure of impulsivity support a higher-order trait with facets relating to lack of planning and perseveration, which is be distinct to urgency (Smith et al., 2007). Other data suggests that positive and negative urgency load onto a higher-order facet of mood-driven ‘rash action’ (Cyders & Smith, 2008). These results suggest the presence of distinct, though related, cognitive (planning, perseveration) and affective (urgency) forms of impulsivity, which may have distinct pathways into self-harm and planning. As self-harm may often be triggered by aversive affective states, affective impulsivity may be more important as a predictor than cognitive impulsivity. In the current study we therefore distinguish between these two forms of impulsivity.

Many studies exploring impulsivity in the context of self-harm do not control for affective symptoms, such as anxiety and depression. This is problematic, since such symptoms appear to be positively linked to trait impulsivity (Peluso et al., 2007) and may be more common in planned acts of self-injury (e.g., Rimkeviciene et al., 2015; although see Jeon et al., 2011; Nakagawa et al., 2009) and thus may suppress any negative relationship between trait impulsivity and planning. Positive affective states or activated mood states may also play a role in some instances of self-harm. For example, suicide attempts have been linked to manic-hypomanic states in some clinical groups, although not others (Balestrieri et al., 2006). Hence we also include positive, activated mood in our analyses.

The aim of the current study was to compare those reporting planned acts of self-harm to those reporting unplanned acts and those reporting no acts of self-harm in terms of their level of trait impulsivity, including affective impulsivity. We also control for affective symptoms (depression, anxiety and activated mood). It was hypothesised that:

1. Greater trait impulsivity (all forms) would be associated with greater odds of reporting self-harm, even whilst controlling for affective symptoms.
2. Trait impulsivity (all forms) would be greater in unplanned self-harm compared to planned self-harm, and this effect would remain whilst controlling for affective symptoms.

**Methods**

**Participants & Procedure**

The sample consisted of students at a UK university, with invitations to participate in a study of ‘personality and behaviour’ posted on the university student intranet. Information regarding the study was provided online, with contact details of researchers provided should participants have any questions. Inclusion criteria were that participants were aged > 18 years and were proficient in English (self-declared by the participant). Data was collected using an online survey, run using the SurveyMonkey website (www.surveymonkey.com). Ethical approval was obtained from the University of Nottingham Medical School Ethics Committee. All participants provided informed consent.

**Measures**

***Self-Harm*.** Participants were divided into three groups based on their responses to two questions about self-harm. The first question asked if in the past four weeks participants had self-harmed, with a brief definition of self-harm also provided (“intentionally hurt yourself in some way”). Participants responding “no” to this question were placed in the *No Self-Harm* group, whilst participants responding “yes” to this question were then asked “Think about the last time you did this. To what extent did you plan doing this?” Those who responded “I planned it to some extent” or “I definitely planned it” were placed in the *Planned Self-Harm*, whilst those responding “I didn’t plan it at all”, were placed in the *Unplanned Self-Harm* group.

***Barratt Impulsiveness Scale (BIS; Patton, Stanford, & Barratt, 1995)).*** The scale measures impulsivity as a trait measure. It comprises 30 items, rated across a four-point scale (rarely/never, occasionally, often, almost always/always). Scoring of the BIS provides a total impulsivity score alongside sub-factors identifying attentional impulsivity (difficulty remaining focused), motor impulsivity (acting without thought) and non-planning impulsivity (absence of forward planning). Greater scores indicate increased trait impulsivity. The scale is widely used and has good test re-test reliability (Spearman’s *Ρ* = .83) and internal consistency (α = 0.83; Stanford et al., 2009) and the factor structure has been supported (Patton et al., 1995; although see also Reid, Cyders, Moghaddam & Fong, 2013). Internal consistency for this study ranged from *α* = .60 to *α* = .74.

***UPPS Impulsive Behaviour Questionnaire (UPPS; Whiteside & Lynam, 2001).*** The UPPS was included as a further measure of trait impulsivity which derives from personality theory. It includes 45 items, rated on a four-point scale (agree strongly, agree some, disagree some, disagree strongly). The UPPS measures four distinct pathways to impulsivity: urgency (tendency to behave impulsively under conditions of negative affect), lack of premeditation (absence of forward planning), lack of perseveration (inability to maintain focus on boring tasks) and sensation seeking (tendency to enjoy and pursue exciting activities). This four-factor structure has been supported (e.g., Magid & Colder, 2007) and the subscales have good internal consistency (α > 0.80; Whiteside & Lynam, 2001). A fifth subscale developed later by Cyders and colleagues (2007) focussing on positive urgency (tendency to behave impulsively under conditions of positive affect) was also included. This positive urgency subscale has high reported internal consistency (*α* = .94) and was predictive of positive mood-driven impulsive behaviours (Cyders & Smith, 2007). Internal consistency for the subscales in this study ranged from *α* = .87 to *α* = .94.

***Mood Disorders Questionnaire* (MDQ; Hirschfeld et al., 2000).** The MDQ is a 13-item screening tool for hypomanic and manic experiences. Each item concerns life-time experiences or symptoms associated with heightened or activated mood states (“Has there ever been a period of time when you were not your usual self and…you had more energy than usual?”). Convergent validity with other measures of activated mood has been demonstrated in student samples (Udachina & Mansell, 2007). Internal consistency for this study was *α* = .81.

***Hospital Anxiety and Depression scale (HADS; Zigmond & Snaith, 1983)*.** The HADS measures experience of anxiety and depression, in the preceding week without reliance on somatic symptoms. The scale comprises 14 items, 7 relating to anxiety and 7 to depression. Responses are scored on a 0-3 scale, with scores above 8 on either subscale indicating likelihood of clinically relevant experience. In their review of the literature, Bjelland, Dahl, Haug & Neckelmann (2002) report good reliability and validity for the HADS across a variety of domains. Internal consistency for this study *α* = .81 and *α* = .83, for the depression and anxiety subscales, respectively.

**Statistical Analysis**

Latent variable modelling (LVM) was then used to explore whether the groups differed in terms of their relationships with impulsivity. Due to skewness in some variables (e.g., depression) robust Maximum Likelihood (MLR) estimation was used. The use of MLR corrects for the effects of non-normality in the observed variables (Satorra & Bentler, 1994; Yuan & Bentler, 2000). The analysis was undertaken using Mplus 7(Muthén & Muthén, 1998-2012). Mplus is capable of making use of cases with incomplete data, where missing data is modelled as a function of the covariates in the model using full information maximum likelihood (Schafer & Graham, 2002). Age was predictive of missing data (UPPS subscales, depression, anxiety and self-harm) with older participants being more likely to complete the measures, and so was included as a covariate within all the analyses. Perhaps surprisingly, more impulsive individuals were more likely to complete the BIS attention and UPPS preservation scales, though effects were small and impulsivity was not predictive of other missing data.

Initially a measurement model featuring a single impulsivity latent variable was fitted. A multinomial logistic regression model was then estimated, whereby this impulsivity latent variable was modelled as a predictor of the categorical self-harm behaviour variable (three levels: no self-harm, planned self-harm, unplanned self-harm) with no self-harm being the reference category. Anxiety and depression were included as covariates. Following the guidelines suggested by Jackson, Gillaspy, and Purc-Stephenson (2009) model fit was assessed using a range of fit statistics. The chi-square statistic, the root-mean-square error of approximation (RMSEA: Steiger, 1990), the standardized root-mean-square residual (SRMR) the comparative fit index (CFI; Bentler, 1990) and the Tucker-Lewis Index (TLI; Tucker & Lewis, 1973) were used. A chi-square which was not significant and CFI and TLI values above .90 indicate reasonable fit (Bentler, 1990; Hu & Bentler, 1999). For the RMSEA and SRMR values less than .05 indicate, however values less than .08 also suggest adequate fit (Bentler, 1990; Hu & Bentler, 1999; Jöreskog & Sörbom, 1993).

For the multinomial logistic model it is not possible to estimate these fit indices but the Akaike information criterion (AIC) was used to contrast the fit of alternative models (e.g., with or without controlling for affective symptoms). AIC enables comparisons of the level of information loss associated with alternative theorized models, with smaller values indicating the better model (i.e., the model that best minimizes information loss; Burnham & Anderson, 2004). Initially the link between impulsivity and self-harm was explored with the effect of affective symptoms set to zero (Models 1 and 2). Affective symptoms were then estimated as covariates (Models 3) and mediators (Model 4). Analyses were repeated using only complete cases (n = 630) leading to equivalent results, favouring the same model and producing similar model parameters. Only the results including incomplete cases are therefore reported here.

**Results**

**Sample Characteristics**

There were 1350 eligible participants accessing the study (*n* = 371 male, *n* = 969 female, *n* = 10 missing), aged between 18 and 65 years. Rates of missing data ranged from zero to 42.44% per variable, with missing data more common as the survey progressed and the most common pattern of missing data being complete nonresponse following the BIS, which came early in the survey (*n* = 213 cases). These rates and pattern are as would be expected with an online survey where many individuals may start the survey but drop out early. There were *n* = 1141 cases entered into the analyses. No missing data was present for *n* = 630 cases. Seven-hundred and eight individuals reported no recent self-harm, 43 reported a planned episode of self-harm and 42 reported an unplanned episode in the past four weeks (missing data for n = 557). Descriptive statistics for study variables are reported in Table 1.

**TABLE 1 ABOUT HERE**

**Measurement Model**

A first step was to obtain a well-fitting measurement model for the impulsivity latent variable (Model 0). Based upon Smith and colleagues (2007) analysis of the structure of impulsivity we estimated a higher-order cognitive impulsivity trait with facets relating to lack of planning and perseveration. UPPS premeditation, UPPS perseveration, BIS non-planning, BIS attention and BIS motor were included as indicators. A second affective impulsivity factor used negative and positive urgency (UPPS) as indicators. Sensation seeking (UPPS) appear to be distinct from these factors and so was not included (Smith et al., 2007). The BIS subscales do not capture this sense of acting rashly in response to mood and so were estimated as indicators of cognitive rather than affective impulsivity.This measurement model fit the data poorly, scaled Χ2 (13, *n* = 1057) = 200.15, *p* <.01, RMSEA = .12, CFI = 0.92, TLI = .87, SRMR = .05. However, allowing the residuals associated with UPPS perseveration and BIS motor led to a better fitting model, scaled Χ2 (12, *n* = 1053) = 107.77, *p* <.01, RMSEA = .09, CFI = 0.96, TLI = .93, SRMR = .04. Within the model these two residuals were negatively correlated (*r* = -.51) reflecting the possibility that once the cognitive impulsivity factor is accounted for, acting without thinking or on ‘automatic pilot’ may carry a remaining inverse relationship with struggling to stick with a task. That is, it may be easier to stick with a task when one is able to operate in an unthinking or automatic way. Notably, the RMSEA is still high in this model but this may reflect the small number of degrees of freedom within the model (Kenny, Kaniskan, & McCoach, 2014). All standardized factor loadings were high (> .7, see Table 2). This measurement model was therefore used in subsequent analyses.

In the paper by Sharma, Kohl, Morgan & Clark (2013) an alternative model of impulsivity is suggested whereby the BIS attention subscale loads onto a common factor with urgency, although fit indices for this model fell below standards for good fit. We therefore tested an alternative factor structure where BIS attention loaded onto the urgency factor but found it to be a poor fit, Χ2 (12, *n* = 1053) = 279.73, *p* <.01, RMSEA = .15, CFI = 0.88, TLI = .80, SRMR = .06. This model was therefore not used further in the paper.

**TABLE 2 ABOUT HERE**

**Does Impulsivity Predict Self-Harm Behaviour?**

In Model 1 the latent impulsivity variable was modelled as a predictor of self-harm behaviour. No other covariates were initially included. Odds ratios and AIC values for all models are reported in Table 3. Whilst affective impulsivity was greater in those reporting planned self-harm, this effect did not reach significance for unplanned self-harm, although effect sizes were similar. There was no relationship between cognitive impulsivity and self-harm.

**TABLE 3 ABOUT HERE**

Model 2 was equivalent to Model 1, but the slopes between impulsivity and self-harm behaviour were constrained to be equal. In effect this model tests the possibility that those reporting planned and unplanned self-harm are equivalent in their level of impulsivity (when contrasted with those not reporting self-harm). This model was an improvement on Model 1, with a smaller AIC, ΔAIC = -4.1, despite being a simpler model. Thus there was evidence of those reporting planned and unplanned self-harm being equivalent in their level of affective impulsivity (when contrasted with those not reporting self-harm). A unit increase in affective impulsivity was associated with twice the odds of engaging in self-harm. Again, cognitive impulsivity was not related to self-harm. Excluding three outlying cases, based upon log-likelihood distances did not make any substantive difference to these results.

**Is Impulsivity Related to Self-Harm Controlling for Affective Symptoms?**

In Model 3, Model 1 was repeated with affective symptoms (anxiety, depression, activated mood) included as covariates. This model was an improvement on Model 1, ΔAIC = -57.03. Notably, neither affective nor cognitive impulsivity was related to either of the self-harm behaviour categories in this model. Both anxiety and depressive symptoms were independently related to greater odds of planned and unplanned self-harm compared with those reporting no self-harm. Activated mood was unrelated to self-harm.

**Do Affective Symptoms Mediate the Relationship between Affective Impulsivity and Self-Harm?**

It is possible that the reason why affective impulsivity was no longer related to self-harm when affective symptoms (depression & anxiety) were accounted for could be that these affective symptoms actually mediate the relationship between affective impulsivity and self-harm. This possibility was tested explicitly in Model 4. Model 4 was the same as Model 3, but included additional paths between affective impulsivity and both depression and anxiety. Depression and anxiety therefore acted as mediators in this model. If Model 4 was an improvement over Model 1 (where the *a* and *b* paths of this indirect effect are fixed to zero) this would provide evidence of a mediation effect (Shelvin, McElroy & Murphy, in press; Wickham, Taylor, Shelvin & Bentall, in press). Model 4 was a substantial improvement over Model 1, ΔAIC = -394.37.

Model 5 was equivalent to Model 4, but anxiety and depression were constrained to have an equivalent effect upon both planned and unplanned self-harm. This model was an improvement on Model 4, ΔAIC = -3.17, and upon a model where only anxiety was constrained, ΔAIC = -1.39. Both indirect paths through depression, *B* = 0.28, SE = 0.08, *p* < .01, and anxiety, *B* = 0.32, SE = 0.10, *p* < .01, were significant, suggesting that affective impulsivity had an effect upon self-harm via depression and anxiety. Excluding three outlying cases, based upon log-likelihood distances did not make any substantive difference to these results. We added a past history of suicide attempt (binary variable, n = 140) to this model as an additional covariate but this did not make any substantive different to the results. Both mediation effects remained significant.

**Discussion**

The aim of this study was to determine the relationship between planned and unplanned forms of self-harm and impulsivity. The study found that roughly half of reported acts of self-harm were classified as being planned to some extent, suggesting that planning is relatively common in self-harm. We are not aware of any other studies that have reported rates of proximal planning in relation to self-harm. In the context of suicide attempts, rates vary, but planning does appear prevalent in many studies (22% - 87%; Rimkeviciene et al., 2015). The first hypothesis was only partially supported with affective impulsivity identified as a general risk factor for self-harm but losing its significance as a predictor after adjusting for affective symptoms. The second hypothesis was not supported as the model did not provide evidence of a difference in impulsivity between those endorsing planned and unplanned self-harm. In a further analysis, there was evidence that depression and anxiety mediate the relationship between affective impulsivity and self-harm.

The results supported the notion of distinct cognitive and affective forms of impulsivity. The finding that affective impulsivity, rather than cognitive, was related to self-harm (Model 2) is consistent with prior research (Peterson & Fischer, 2012). This is also consistent with research that urgency tends to be more related to problematic behaviours than other forms of impulsivity in general (Billieux, Gay, Rochat, & Van der Linden, 2010). One explanation is that urgency may be particularly associated with short-term management of emotional states (Billieux et al., 2010) and so may be reflective of difficulties around emotional regulation which have been reported in those who self-harm (Chapman et al., 2006). However, there was no evidence that affective impulsivity is a specific pathway to unplanned acts of self-harm. Rather, affective impulsivity acted as a general risk factor for self-harm.

This pathway between affective impulsivity and self-harm may be explained in part by the results of the mediation analysis. Affective impulsivity may be related to a number of difficulties including substance use and poor decision-making (Anestis, Soberay, Gutierrez, Hernández, & Joiner, in press; Billieux et al., 2010; Verdejo-Garcia, Lawrence, & Clark, 2008), the consequences of which could leave individuals feeling more depressed and anxious. These aversive emotions could in turn trigger self-harm as a means of regulating or managing these feelings (Armey et al., 2011; Chapman et al., 2006; Mikolajczak, Petrides & Hurry, 2009). Whilst anxiety is less commonly linked with self-harm than depression there is evidence that self-harm is associated with anxiety (Klonsky, Oltmanns, & Turkheimer, 2003). This may especially be the case where self-harm has dampening or de-arousing affective consequences for the individual. The possibility that impulsivity may play other roles in self-harm should not be ruled out. For example, there is evidence that the level of impulsivity can moderate whether affective states lead to self-harming urges and also affective responses to self-harm (Bresin, Carter, & Gordon, 2013; Di Pierro, Sarno, Gallucci, & Madeddu, 2014). Those with repeated episodes of self-harm may also differ to those with individual episodes in terms of the role of impulsivity and planning, and further research here is needed.

The current study focussed on self-harm in general, irrespective of suicidal intent. This approach to defining self-harm is consistent with national guidance (National Collaborating Centre for Mental Health, 2004; Royal College of Psychiatrists, 2010). We recognise that others have favoured a distinction between non-suicidal and suicidal forms of self-harm (Klonsky, 2011), although others have also questioned the evidence relating to this decision (Kapur et al., 2013). It is possible that individuals who self-harm without suicidal intent are more identifiable within non-clinical populations. This means that there may have been individuals in the current study who’s planned self-harm carried an intent to die, and others where this intent was not present. As such, it may be that different findings would emerge if the current study incorporated suicidal intent (e.g., more pronounced differences between planned and unplanned episodes) and future research could explore this possibility.

As a cross-sectional design, the direction of effect cannot be inferred in the current study. Hence it may be that impulsivity is a consequence rather than a predictor of self-injury, although such a relationship seems theoretically less plausible. The current study is based upon a University student sample and may not generalize to other populations. Lastly it should be noted that the current study focuses on recent acts of self-harm, but it is unknown whether those individuals who endorse planned acts of self-harm also have experiences of unplanned self-harm in the past. It may be that individuals who engage in self-harm oscillate over time between planned and unplanned attempts. Longitudinal research would ideally be used to explore these temporal dynamics of self-harm and planning. The current study was limited by large levels of missing data on some variables. Whilst common for internet-based surveys, this missing data may have introduced bias, especially if data were Missing Not at Random (Schafer & Graham, 2002). Equivalent results emerged using incomplete cases and when only using complete cases in the analyses supporting the robustness of the results.

There were also small numbers of individuals reporting recent self-harm relative to those without these experiences. This is to be expected as the study focused on the natural occurrence of self-harm with a non-clinical population. Whilst specifically over-sampling those with experiences of self-harm (e.g., through clinical services) would be one means to gain a large sample of those who report self-harm, it might also distort results clear, for example by capturing the more severe end of the spectrum where planning may be more prevalent.

The current findings suggest that in supporting or treating individuals who are struggling with experiences of self-harm there may be limited value to trying to reduce trait cognitive impulsivity but it would be worth focussing on those individuals with high affective impulsivity who generate anxiety and depression symptoms that might lead to self-harm. Therefore the recognition of affective impulsivity in people who have self-harmed, whether unplanned or planned, should be given a higher priority in clinical practice if our findings are confirmed. The therapeutic focus might be on reducing trait affective impulsivity or in the presence of affective impulsivity, reducing the generation of depression and anxiety symptoms, recognising that the generation of such symptoms and both planned and unplanned self-harm may be quite fast. Further research is needed to explore how closely affective and measures of behavioural impulsivity are related, if and how trait affective impulsivity develops, how and when depression and anxiety symptoms leading to self-harm are generated or not, and how affective impulsivity can be psychologically or pharmacologically reduced or prevented. In such therapeutic work it would be helpful to focus part of the assessment upon the function of the self-harm and explore the links between self-harm and affective states. The current study does not support making any specific distinction between those who report planned versus unplanned acts of self-harm in clinical practice. However, the possibility that other important differences between those engaging in planned and unplanned self-harm such as in regards to the severity of the behaviour or suddenness of onset, should not be ruled out. The results also indicate that many acts of self-harm are not planned and so an absence of planning should not be taken by a clinician to indicate an absence of risk, especially if depressive and anxiety symptoms are present, and if affective impulsivity might generate depression and anxiety in clinical situations that have generated depression or anxiety in a given individual previously.

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Table 1

Sample Characteristics

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mean | SD | N missing (%) |
| Age | 23.62 | 7.64 | 0 (0) |
| Activated mood | 6.43 | 3.44 | 235 (17.41) |
| BIS attention | 17.96 | 3.31 | 334 (24.74) |
| BIS motor | 22.39 | 4.38 | 310 (22.96) |
| BIS non-planning | 26.01 | 5.46 | 328 (24.30) |
| UPPS premeditation | 22.05 | 5.64 | 558 (41.33) |
| UPPS perseveration | 21.02 | 5.69 | 550 (40.74) |
| UPPS negative urgency | 29.50 | 7.13 | 558 (41.33) |
| UPPS positive urgency | 26.93 | 8.83 | 559 (41.41) |
| Anxiety | 8.62 | 4.20 | 573 (42.44) |
| Depression | 4.28 | 3.63 | 569 (42.15) |
| Self-harm | - | - | 557 (41.26) |

*Note:* Variables presented in order they appeared in survey, starting from top.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Standardized factor loadings (cognitive impulsivity) | | | | | Standardized factor loadings (affective impulsivity) | |
|  | UPPS premeditation | UPPS perseveration | BIS attention | BIS non-planning | BIS motor | UPPS negative urgency | UPPS positive urgency |
| Model 0 | 0.72 | 0.73 | 0.74 | 0.72 | 0.76 | 0.79 | 0.87 |
| Model 1 | 0.72 | 0.75 | 0.73 | 0.72 | 0.74 | 0.84 | 0.81 |
| Model 2 | 0.72 | 0.75 | 0.73 | 0.72 | 0.74 | 0.84 | 0.82 |
| Model 3 | 0.72 | 0.75 | 0.73 | 0.72 | 0.74 | 0.72 | 0.95 |
| Model 4 | 0.72 | 0.75 | 0.73 | 0.72 | 0.74 | 0.84 | 0.78 |
| Model 5 | 0.72 | 0.75 | 0.73 | 0.72 | 0.74 | 0.84 | 0.79 |

Table 2

Standardized Factor loadings for all Estimated Models

Note: All factor loadings *p* < .05

Table 3

AIC, BIS and Odds ratios for all Estimated Models

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | Odds Ratios (95% CI) | | | | |
|  | AIC | BIC | Outcome | Cognitive impulsivity | Affective impulsivity | Depression | Anxiety | Activated mood |
|  |  |  |  |  |
| Model 1 | 51776.00 | 51982.62 | Planned self-harm | 1.02 (0.70-1.48) | 2.01 (1.27-3.17)\*\* | - | - | - |
|  |  |  | Unplanned self-harm | 1.05 (0.65-1.70) | 2.00 (0.91-4.39) | - | - | - |
| Model 2 | 51771.99 | 51968.54 | Planned self-harm | 1.03 (0.77-1.39) | 2.00 (1.30-3.08)\*\* | - | - | - |
|  |  |  | Unplanned self-harm | 1.03 (0.77-1.39) | 2.00 (1.30-3.08)\*\* | - | - | - |
| Model 3 | 51718.98 | 51955.85 | Planned self-harm | 0.90 (0.61-1.33) | 1.19 (0.80-1.76) | 1.20 (1.09-1.32)\*\* | 1.13 (1.03-1.24)\*\* | 1.06 (0.94-1.19) |
|  |  |  | Unplanned self-harm | 1.15 (0.83-1.59) | 0.99 (0.61-1.59) | 1.15 (1.04-1.29)\*\* | 1.19 (1.08-1.32)\*\* | 0.99 (0.87-1.13) |
| Model 4 | 51381.63 | 51628.57 | Planned self-harm | 0.94 (0.64 – 1.38) | 1.12 (0.63-2.00) | 1.20 (1.09-1.32)\*\* | 1.13(1.02-1.25)\* | 1.07 (0.95-1.21) |
|  |  |  | Unplanned self-harm | 1.01 (0.72-1.42) | 1.43 (0.81-2.50) | 1.13 (1.01-1.27)\* | 1.17 (1.05-1.30)\*\* | 0.96 (0.85-1.09) |
| Model 5 | 51378.46 | 51615.32 | Planned self-harm | 0.95 (0.65-1.37) | 1.16 (0.67-2.00) | 1.16 (1.07-1.26)\*\* | 1.15 (1.06-1.24)\*\* | 1.06 (0.94-1.20) |
|  |  |  | Unplanned self-harm | 1.00 (0.71-1.42) | 1.38 (0.83-2.31) | 1.16 (1.07-1.26)\*\* | 1.15 (1.06-1.24)\*\* | 0.97 (0.85-1.09) |

*\* p < .05,\*\* p < .01*