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The relationship between positive future thinking, brooding, defeat and entrapment

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ABSTRACT

Although there is robust evidence linking the absence of positive future thinking (PFT) to suicide risk, we know little about the factors associated with PFT or the characteristics of those who may be more vulnerable to such deficits when mood is low. In the present experimental studies, we investigated whether PFT would decrease following minor fluctuations in mood/defeat and whether such changes would vary as a function of brooding rumination and entrapment, established correlates of psychological distress. Positive future thinking was assessed before/after a negative mood or negative mood/defeat induction across two studies of healthy adults. In addition, participants completed measures of depressive symptoms, brooding rumination and/or entrapment at baseline. In Study one, positive future thinking decreased significantly following the negative mood induction and this reduction was associated with brooding. Following the mood/defeat induction, in Study two, positive future thinking decreased and this reduction was marked among those high on entrapment. Positive future thinking can be affected by even minor fluctuations in mood or feelings of defeat and these changes are most marked in individuals characterized by high brooding and entrapment.

1. Introduction

There is robust evidence that a pattern of future thinking characterized by the absence of positive thoughts (positive future thinking; PFT) rather than the over-representation of negative thoughts is associated with suicidal thinking and behaviour, independent of the effects of depression and general verbal fluency (MacLeod, Pankhania, Lee, & Mitchell, 1997; O'Connor, Connery, & Cheyne, 2000; O'Connor, Fraser, Whyte, MacHale, & Masterton, 2008; Sargalska, Miranda, & Marroquin, 2011; Williams, Van Der Does, Barnhofer, Crane, & Segal, 2008).[1] It is this paucity of positive cognitions when mood is low that is especially marked among suicidal patients. Recent research also suggests that PFT may be a more sensitive predictor of suicidal ideation than standard measures of global hopelessness (O'Connor et al., 2008) and that it moderates the effect of diathesis variables (e.g., perfectionism) on suicide risk (O'Connor et al., 2007). PFT is usually assessed by the future thinking task wherein participants are asked to generate thoughts about what they are looking forward to across different future time periods (MacLeod et al., 1997). PFT is distinct from more global measures of the future like hope and optimism because it taps an individual's specific expectations for the future rather than generalized expectations.

Despite its empirical and conceptual importance, we know little about the factors associated with PFT, or the characteristics of those who may be more vulnerable to such deficits when mood is low. Very few published studies have experimentally manipulated PFT (Lavender & Watkins, 2004; Williams et al., 2008). Given the dearth of such empirical studies, across two studies, we aimed to manipulate PFT experimentally in healthy adults to investigate whether positive future thinking variability could be explained in terms of three psychological factors known to be implicated in the aetiology and course of psychological distress (McLaughlin & Nolen-Hoeksema, 2011; Miranda, Tsypes, Gallagher, & Rajappa, 2013; O'Connor & Nock, 2014; O'Connor, Smyth, Ferguson, Ryan, & Williams, 2013; Taylor, Gooding, Wood, & Tarrier, 2011; Williams, 2001; Williams, Crane, Barnhofer, & Duggan, 2005).

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[1] There is a wider research literature on the relationship between future thinking and depression and anxiety, however, given the established relationship between positive future thinking and suicidal behaviour, we have focused on positive future thinking in the present study.

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Specifically, we investigated whether changes in PFT following experimental manipulation varied as a function of the extent to which participants tended to brood (Study one), feel defeated and trapped by life's circumstances (Study two).

Brooding refers to resource intense, trait-like ruminative cognitions which repetitively compare one's present situation with another unachieved benchmark (Treynor, Gonzalez, & Nolen-Hoeksema, 2003) and it is known to be associated with depression, anxiety and suicide risk (Chan, Miranda, & Surrence, 2009; Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2013; Miranda & Nolen-Hoeksema, 2007; Morrison & O'Connor, 2008; O'Connor & Noyce, 2008) though the mechanism of effect is less clear. Consistent with information processing approaches (e.g., Joormann, Yoon, & Zetsche, 2007; Mathews & MacLeod, 2005), when mood is low, brooding may bias cognitions away from positive future thoughts. Alternatively, it may also increase one's cognitive reactivity to mood fluctuations, defined as the ease by which maladaptive cognitive processes are triggered by minor mood fluctuations (Ingram, Miranda, & Segal, 1998). In Study one, therefore, we investigated whether brooding may interfere with one's ability to generate PFT when mood is low.

In Study two, we focused on the concomitant effects of defeat and entrapment on positive future thinking as previous research has shown that both of these constructs is implicated in psychological distress (Gilbert & Allan, 1998; O'Connor et al., 2013; Taylor, Gooding et al., 2011; Taylor, Wood, Gooding, & Tarrier, 2011; Williams, Duggan, Crane, & Hepburn, 2011) and they are correlated with positive future thinking (Rasmussen et al., 2010). To do so, we experimentally induced defeat in healthy participants and investigated whether changes in PFT pre- vs post-induction changed as a function of individual differences in self-reported baseline entrapment beliefs. Consistent with research which suggests that the co-existence of defeat and entrapment is most pernicious (O'Connor, 2011), we postulated that the most marked reductions in PFT post-defeat induction would be evident among those who also reported high levels of entrapment prior to the defeat induction.

Taking both studies together, we formulated two hypotheses. In Study one, we hypothesized that brooding rumination would predict PFT following the negative mood induction (after controlling for pre-induction PFT and depressive symptoms) such that the relationship between brooding and positive future thinking would be stronger and negative post the negative mood induction compared to pre-induction (hypothesis one). In Study two, we hypothesized that reductions in PFT following the defeat induction would be significantly greater among those who reported high levels of entrapment and such reductions would be less evident in those with low levels of entrapment (hypothesis two). As the majority of research on positive future thinking has been conducted in the context of low mood (MacLeod et al., 1997; O'Connor et al., 2008; Williams et al., 2008), all participants were subject to a negative mood induction before the defeat manipulation in Study two.

2. Method study one

2.1. Participants

Thirty-nine healthy young adults were recruited from a Scottish University. All participants were first informed that participation was voluntary and confidential and even after giving initial consent, they were free to withdraw at any stage. Participants were aged between 18 and 39 years with a mean age of 23.2 years (SD = 5.62). In total, 28 females and 11 males participated in the study and the men and women did not differ in age, $t(37) = .60$, *ns*.

2.2. Measures

2.2.1. Depressive symptoms

The Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996) was employed to assess the presence of depressive symptoms in the past 2 weeks. Cronbach's α was .88.

2.2.2. Brooding rumination

Brooding, defined as the extent to which individuals passively focus on the reasons for their distress, was measured using the five items from the Response Styles Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991; Treynor et al., 2003). Cronbach's α was .77.

2.2.3. Positive future thinking (PFT)

Positive future thinking was assessed following MacLeod et al.'s (1997) procedure before and after the mood induction. Participants were given four time intervals (next week, next month, next year and next 5–10 years) and asked to think of as many events as possible that they were looking forward to. Participants were randomly allocated to receive two time intervals before the mood induction and two time intervals following the mood induction such that the four time intervals were completed by each participant. Each time interval lasted 1 min. The pre-and post-induction responses were aggregated separately to yield a total positive future thinking score pre- and post-induction, respectively.

2.2.4. Negative mood induction

The negative mood induction task followed Moore and Oaksford's (2002) procedure where an adaptation of the Velten mood induction procedure (Velten, 1968) was combined with music and a specific request to participants to try to alter their mood state. Statements such as 'Just when I think things are going to get better, something else goes wrong' were accompanied by Barber's Adagio for Strings. The induction procedure takes 8 min. Mood was measured pre- and post-induction using a 100 m Visual Analogue Scale indicating how sad the participant is feeling at that moment. After completion of the second positive thinking task, all participants completed a positive mood induction which consisted of Mozart's Einekleine Nachtmusik, alongside statements including 'I have complete confidence in myself'.

2.2.5. Visual analogue scale (VAS) mood rating

Participants were asked to rate their mood in terms of sadness on a 100 mm VAS immediately before the first future thinking task and again immediately following the mood induction. Participants were asked to rate as follows: "At this moment I feel…" and sadness was printed above the 100 mm line which was anchored on a scale of not at all to extremely.

2.3. Procedure

Prior to the collection of any data, ethical approval was obtained from the University Psychology Department's ethics committee. At Time one, a few days before the mood induction, participants completed the BDI-II and the measure of brooding via an online survey system. To ensure anonymity and confidentiality, participants generated a unique identifier by answering four questions and this identifier was then used to anonymously link participants' online responses to their performance in the laboratory-based phase of the study. Approximately 1 week later, all participants attended a laboratory-based session and completed the mood induction procedure and the PFT task. Participants also rated their mood immediately before the first half of positive future thinking task and again immediately following the negative mood induction. The experimental session ended with a positive mood induction

and an oral debriefing. All participants also received a list of support organisations.

2.4. Statistical analyses

Hierarchical regression analysis was employed to determine whether brooding predicts post-induction PFT. To control for their effects, pre-induction PFT and depression were entered into the regression first. Correlations between PFT (pre- and post-induction) and brooding are reported and the differences between the brooding-future thinking correlations pre- and post-induction are tested. To illustrate the relationship between brooding and future thinking before and after the mood induction, we dichotomised brooding (above/below median) into high and low brooding (but this was only for illustrative purposes, all statistical analyses were conducted using the dimensional variables). A *t*-test was employed to determine whether the mood induction was effective.

3. Results

3.1. Participant characteristics

The sample mean scores for depressive symptoms and brooding were 9.9 (SD = 8.1) and 10.7 (SD = 2.9), respectively. There was no significant correlation between baseline mood score and pre-induction PFT (r = −.142, ns)

3.2. Manipulation check

The mood manipulation was successful, as it significantly increased VAS sadness from pre- to post-manipulation (M = 14.31, SD = 15.32 and M = 31.77, SD = 17.02 for sadness ratings pre- and post-manipulation, respectively), $t(38) = 7.95$, $p < .0001$.

3.3. Positive future thinking

To test the study hypothesis, we regressed pre-induction PFT, baseline depressive symptoms and brooding on to post-induction PFT. This analysis revealed that in addition to pre-induction PFT (β = .645, $p < .0001$), brooding also predicted post-induction PFT in the final model (β = −.298, $p < .05$). Depressive symptoms was a non-significant predictor (β = −.091, *ns*). As predicted, the relationship between brooding and PFT changed as a function of the mood induction. PFT was not significantly correlated with brooding pre-induction (r = .064, *ns*) whereas it was post-induction (r = −.308, $p < .05$) and this difference was significant (Z = 2.69, p = .007; see Fig. 1).

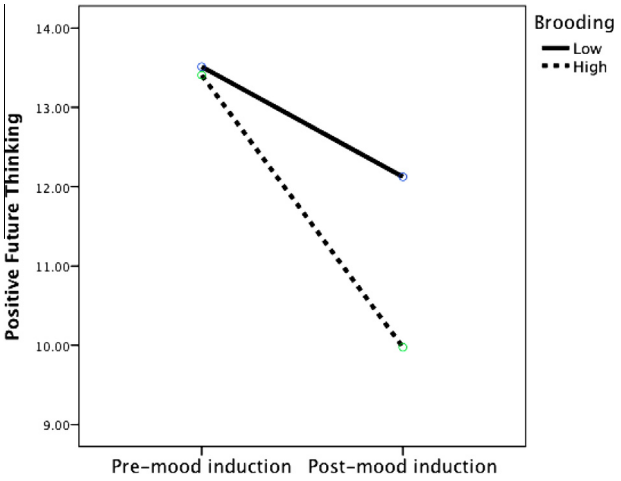

Fig. 1. Positive future thinking (pre- and post-mood induction) as a function of brooding (controlling for baseline depressive symptoms).

4. Method study two

4.1. Participants

Seventy healthy young adults were recruited from a Scottish University similar to Study one. Participants were aged between 18 and 53 years with a mean age of 22.6 years (SD = 6.6). In total, 40 females and 30 males participated in the study and the men and women did not differ in age, $t(68) = .63$, *ns*.

4.2. Measures

4.2.1. Depressive symptoms

The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) provided a measure of depressive symptoms. This measures the frequency with which participants experienced depressive symptoms over the past week on a four-point scale. The CES-D is widely used with student populations (Radloff, 1991). Cronbach's α is .89 in this sample.

4.2.2. Entrapment

Entrapment was assessed via a brief version of the entrapment scale (Gilbert & Allan, 1998) used in Study one. This four-item measure of entrapment is comprised of the items that were most strongly related to internal (e.g., I feel trapped inside myself) and external entrapment (e.g., "I feel trapped by other people") in Gilbert and Allan's (1998) original study (depressed sample). Cronbach's α was high (Cronbach's α = .86)

4.2.3. Mood induction and defeat/no defeat inductions

In advance of the defeat/no defeat induction, all participants completed a negative mood induction. The negative mood induction task followed Moore and Oaksford's (2002) procedure as described in Study one.

Defeat/no defeat was induced following the procedure adapted from Pegg, Deakin, Anderson, and Elliott (2006) by Johnson, Tarrier, and Gooding (2008). The no defeat condition was the control condition. The induction was comprised of two computerized tasks (an anagrams task and a 'before and after task' each comprising 30 trials) which run on e-prime software. In the anagrams task, participants were required to form new words using all the letters in target words (e.g., 'melon' could be created from 'lemon'). In the 'before and after' task, participants were instructed to select a word from a list which would fit between two target words to make a new word of each (e.g., if presented with 'data____ball', selecting the word 'base' would make a new word of each target word (database and baseball). There were two versions of each task, one which was solvable and one which was impossible. Participants in the defeat condition received the impossible version of the tasks and those in the no defeat (control) condition received the achievable version. Participants were informed that to pass the task they had to achieve a score of over 23 out of the 30 trials for each task in the defeat condition (and encouraged to try to exceed this) and a score of 10 out of 30 in the control condition.

4.2.4. Visual analogue scale (VAS) mood ratings

Participants were asked to rate their mood separately in terms of defeat and sadness on two 100 mm VAS immediately before the first future thinking task, immediately following the negative mood induction and again immediately following the defeat/no defeat induction. Participants were asked to rate as follows: "At

this moment I feel…" and defeated or sad was printed above the 100 mm line which was anchored on a scale of *not at all* to *extremely*.

4.2.5. Positive future thinking

Positive future thinking was assessed following MacLeod et al.'s (1997) procedure before and after the mood induction as described in Study one.

4.3. Procedure

The procedure for ethical approval, anonymity and confidentiality is the same as that reported for Study one. A few days before the mood induction, participants completed the measures of depression and entrapment via an online survey system. All participants attended a laboratory-based session and completed the negative mood induction procedure, the defeat/no defeat induction and the positive future thinking task. Participants also rated their mood in terms of defeat and sadness immediately before the first half of positive future thinking task, again following the negative induction and a third time following the defeat/no defeat induction. Debriefing was the same as in Study one.

4.4. Statistical analyses

We used Hayes and Matthes (2009) MODPROBE regression macro for SPSS 19.0 to investigate whether positive future thinking varied as a function of experimental group and entrapment scores. To probe the interaction, the relationship between PFT pre- and post-induction was investigated at 1 standard deviation above and below the entrapment mean as a function of experimental group (defeat vs no-defeat). Entrapment and pre-induction PFT were mean centred before entry into the regression. In short, pre-induction PFT, baseline depression, entrapment, experimental group (defeat vs no defeat) and the group by entrapment interaction were regressed on to post-induction PFT. ANOVA was employed to determine whether the manipulations were effective.

5. Results

5.1. Participant characteristics

The two groups (defeat vs control) did not differ in terms of gender distribution (18 and 22 females in the defeat and control groups, respectively, *Chi* (1) = .93, *ns*, age (M = 22.63, SD = 7.23 and M = 22.51, SD = 5.94 for the defeat and control group, respectively), $t(68)$ = .07, *ns*, baseline depressive symptoms (M = 35.69, SD = 9.71 and M = 35.11, SD = 9.72 for the defeat and control group, respectively), $t(68)$ = .45, *ns*, or entrapment (M = 3.00, SD = 3.64 and M = 3.23, SD = 4.45 for the defeat and control group, respectively), $t(68)$ = .69, *ns*.

5.2. Manipulation check

The specificity of the defeat/control manipulation was investigated using two ANOVAs, one to test for changes in ratings of defeat across the study and the other testing for changes in sadness (sadness ratings are sensitive to negative mood inductions). First, a group (defeat vs control manipulation) by time (pre-mood induction vs post-mood induction vs post-defeat/control manipulation) ANOVA was conducted on the VAS defeat ratings. This yielded a main effect of Time, $F(2, 136) = 23.00$, $p < .001$, $\eta_p^2 = .25$ and a significant time by group interaction, $F(2,136) = 3.44$, $p < .01$, $\eta_p^2 = .05$. As anticipated, following the negative mood induction, self-rated defeat increased significantly in both groups (*ps* at least <.01) with a further significant increase in defeat following the defeat manipulation ($p < .05$) which did not occur in the control group (*ns*) (see Fig. 2).

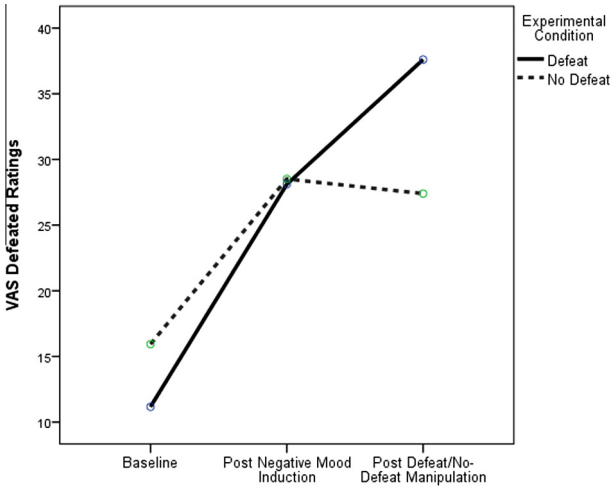

Fig. 2. Visual analogue scale (VAS) defeat ratings at baseline, post-negative mood induction and post-defeat/no defeat manipulation (Study two).

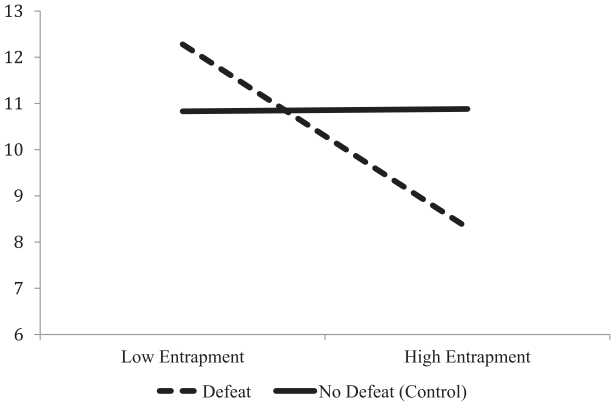

Fig. 3. Positive future thinking post mood/defeat induction (controlling for pre-induction positive future thinking and depressive symptoms).

Second, a group (defeat vs control manipulation) by time (pre-mood induction vs post-mood induction vs post-defeat/control manipulation) ANOVA was conducted on the VAS sadness ratings. This yielded a main effect of Time, $F(2, 136) = 46.09$, $p < .001$, $\eta_p^2 = .40$ but the time by group interaction was not significant, $F(2,136) = 1.22$, *ns*, $\eta_p^2 = .02$. Post-hoc t-tests on the sample as a whole confirmed that the mean ratings increased significantly from pre-mood induction to post-mood induction (M = 14.11, SD = 17.51 to M = 38.69, SD = 25.65, $p < .001$) and then decreased significantly post defeat/control induction (to M = 28.97, SD = 22.25, $p < .001$). As a result, we are confident that any reduction in PFT following the defeat/control manipulation is attributable to this manipulation and not the negative mood induction.

5.3. Positive future thinking

The MODPROBE procedure for probing interactions revealed that pre-induction PFT (β = .681, $p < .0001$), depressive symptoms (β = .109, $p < .05$), entrapment (β = −.262, $p < .05$) and the group by entrapment interaction (β = .535, $p < .01$), predicted post-induction PFT.[2] In the defeat condition, as levels of entrapment increased,

[2] Although the depressive symptoms beta coefficient is positive, this is likely to be conditional on other effects as the univariate correlations between depressive symptoms and PFT pre- and post-induction are not significant.

post-induction PFT decreased significantly ($\beta = -.530$, $CI = -.82$ to $-.24$, $p < .001$; while controlling for pre-induction PFT and depressive symptoms). In the control condition, there is no conditional effect of entrapment on post induction PFT ($\beta = .006$, $CI = -.22$ to .24, *ns*; see Fig. 3).

6. Discussion

The findings from both studies supported the hypotheses. In short, PFT is affected by mood and defeat inductions and the effects of the latter appear to be moderated by brooding and entrapment. The findings from Study one show that brooding rumination predicted PFT following the negative mood induction (after controlling for pre-induction PFT and depressive symptoms) and that the relationship between brooding and PFT was stronger after the negative mood induction compared to before it. They illustrate how individual differences in brooding may impact upon psychological wellbeing via PFT in the presence of relatively minor fluctuations in mood. It may be that the additional processing capacity which is activated in brooders during low mood interferes with one's capacity to generate positive thoughts for the future.

Hypothesis two was also supported. Following the defeat manipulation, reductions in PFT varied as a function of entrapment thereby elucidating one of the conditions under which risk of psychological distress may become elevated. Importantly, the effect of the defeat manipulation was not universal, it had no discernible impact upon those participants reporting low levels of entrapment. Consistent with Study one, these findings explain, in part, how individual differences in perceptions and beliefs may exacerbate the effects of even minor fluctuations in mood differentially across individuals. An obvious limitation of the present study design is the 'sterile' nature of the defeat manipulation. Future research should also assess defeat that is induced by real world circumstances and events.

6.1. Implications

Taken together, the findings yield indirect support for predominant psychological models of depression and suicidal behaviour. Athough indices of suicidality were not assessed in this study, the variables included herein are postulated to play key roles in the development and course of depression and suicidal thinking (Gilbert, 1992; O'Connor et al., 2013; Taylor, Gooding et al., 2011; Taylor, Wood et al., 2011; Williams et al., 2008). Future research is required, however, to directly test the relationship between these variables within clinical populations.

The findings point to the potential utility of operationalizing defeat and entrapment separately rather than as a single construct (Taylor, Wood, Gooding, Johnson, & Tarrier, 2009). However, as defeat was treated as a state construct and entrapment as a trait, future research is required to address the extent to which defeat and entrapment are separate vs single constructs when both are operationalized as traits or states. Notwithstanding the latter caveat, the present data suggest that although conceptually related, defeat and entrapment are distinct psychological constructs and that their conjoint effects are interactional rather than additive. It would also be useful to investigate whether those with trait vulnerability to defeat are more affected by a defeat manipulation than those low on trait defeat.

6.2. Limitations

Even though the findings from Study one suggest that brooding may increase risk of psychological distress by affecting PFT when mood is low, three further tests of this postulation are required. First, future studies should endeavour to experimentally manipulate brooding rumination (in addition to a negative mood manipulation) to determine whether brooding is causally related to PFT. This is particularly important given that research has found that inducing rumination in a depressed sample can lead to an increase in negative future thinking with some evidence that it may also increase PFT (Lavender & Watkins, 2004). In addition, as we were focused on the induction of mood rather than rumination, we did not check whether the mood induction had also increased levels of rumination. Second, despite controlling for depressive symptoms, it would be helpful to match the groups in terms of current depressive symptoms as well as psychiatric history including past suicide attempts. We also need to directly investigate the extent to which these variables interact to predict depression, anxiety and suicidal thinking and behaviour over time. Third, and overlapping which the latter test, we need to extend the present designs to clinical groups to determine whether the findings are generalizable. Future research should also consider innovative methods to manipulate perceptions of entrapment before we can conclude that entrapment is causally related to PFT.

In summary, the findings describe some of the conditions (defeat, entrapment and brooding) under which minor changes in mood lead to a cognitive deficit, namely a paucity in PFT. They also speak to the cognitive reactivity literature (e.g., Williams et al., 2008) by suggesting that brooding rumination is associated with a deficit in PFT following a mood induction. Future experimental work is required, however, to disentangle the nature of this association, to determine the most parsimonious explanation for the relationship. Does a cognitive reactivity or a limited resources account fit the data better? The role of brooding rumination within the distress pathway also needs further consideration beyond its relationship with PFT. For example, its repetitive nature may increase risk of suicidal behaviour via increasing the accessibility of suicidal thoughts during periods of vulnerability.

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