

Response styles, bipolar risk and mood

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Abstract

Objectives: An Integrative Cognitive Model of mood swings and bipolar disorder proposes that extreme positive and negative appraisals about the internal states trigger ascent and descent behaviours, contributing to the onset and maintenance of mood swings. This study investigated the reliability and validity of a new inventory, the Behaviours Checklist, by measuring associations with appraisals, responses styles to positive and negative affect, bipolar risk, mania, and depression.

Design: Correlational analogue study.

Methods: Students (n=134) completed the Behaviours Checklist alongside measures of appraisals, response styles to positive and negative mood, mania, depression, and hypomanic personality (bipolar risk).

Results: The Behaviours Checklist was of adequate reliability and showed good validity. Ascent behaviours and appraisals predicted bipolar risk, while descent behaviours and appraisals were associated with depression.

Conclusions: Appraisals, ascent and descent behaviours may play an important role in the development and maintenance of mood swings. Limitations and research recommendations are outlined.

Practitioner points:

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- Extreme positive and negative appraisals of internal states, and subsequent behavioural responses (ascent and descent behaviours), are associated with bipolar risk and bipolar mood symptoms in a student sample.
- These processes are involved with mood dysregulation in clinical populations as well as bipolar risk in students, with implications for mood management.

Recent psychological models of bipolar disorder (BD) have emphasised the importance of interpreting everyday experiences as having personal meaning, and subsequent behavioural responses such as goal-directed activity (Jones, 2001; Mansell et al, 2007). An Integrative Cognitive Model (ICM; Mansell et al, 2007) proposed that mood dysregulation is driven by extreme self-relevant appraisals relating to cognitive, physiological, affective or behavioural internal states. This also applies to mood swings in non-clinical populations (Dodd, Mansell, Morrison & Tai, 2011a; Dodd, Mansell, Bentall & Tai, 2011b; Dodd, Mansell, Beck & Tai, 2013). These appraisals can be positive (“When I feel activated I will excel in whatever I’m doing”) or negative (“My activated mood means I’m going to have a breakdown”), as opposed to normalising (“I feel activated because I have a lot on at the moment and need to wind down”; Mansell et al, 2007). These appraisals trigger attempts to control or enhance internal states, which drive mood and activation levels upwards and downwards, respectively. These are ascent behaviours (e.g. risk taking) and descent behaviours (e.g. withdrawal). Subsequent changes to internal states brought about by engaging in these behaviours then reinforce appraisals, as the internal states are again appraised in a personally meaningful way. This cycle of appraisal, response, and re-appraisal disrupts self-regulation (Mansell et al, 2007).

The Hypomanic Attitudes and Positive Predictors Inventory (HAPPI; Mansell, 2006) was developed in tandem with the ICM to measure appraisals of internal state. In previous research, these appraisals distinguished individuals with BD from those with

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unipolar depression and non-clinical controls (Alatiq, Crane, Williams & Goodwin, 2010; Mansell, Paszek, Seal, Pedley, Jones, Thomas, Mannion, Saatsi & Dodd, 2011; Mansell, 2006; Mansell & Jones, 2006). Appraisals were also associated with bipolar risk and mood in non-clinical samples (Dodd et al, 2011a, 2011b; Dodd, Mansell, Beck & Tai, 2013). In a naturalistic prospective study of individuals with BD, appraisals measured at baseline predicted heightened bipolar symptoms and lower functioning after 4 weeks (Dodd, Mansell, Morrison & Tai, 2011c). In further support of the ICM, positive self-appraisals of hypomania-relevant experiences, such as flight of ideas, and negative self-appraisals of depression-relevant experiences, were related to behavioural high-risk of BD, as measured by the Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986; Jones, Mansell & Waller, 2006; Jones & Day, 2008). Hypomanic personality is characterised by traits that resemble the symptoms of diagnosed BD, such as grandiosity (Eckblad & Chapman, 1986; Kwapil et al, 2000).

Ascent and descent behaviours, which are also central to the ICM, have not been explored in detail. These goal-focused behaviours are ways in which people respond directly to appraisals of their internal states, in order to regulate their mood. However, they are maladaptive coping strategies such that they disrupt effective mood regulation. The importance of how individuals respond to their own mood was first proposed by Nolen-Hoeksema (1991) in relation to depression, whereby rumination has been robustly associated with onset, severity and longevity of depression. With relevance to BD, there is evidence that responses to both positive and negative mood impact upon emotion regulation. This includes response styles towards low mood such as negative rumination, distraction, and risk-taking, and responses to positive mood such as emotion-focused and self-focused rumination (positive rumination) and dampening

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(Dempsey, Gooding & Jones; 2011; Feldman, Joorman & Johnson, 2008; Gilbert, Nolen-Hoeksema & Gruber, 2013; Johnson, MacKenzie & McMurrich, 2008; Knowles et al, 2005; Thomas & Bentall, 2002; Thomas, Knowles, Tai & Bentall, 2007; Van der Gucht et al., 2009). Active coping in response to depression was associated with elevated hypomania and less depression, perhaps forming a protective factor against depressed mood (Knowles et al, 2005).

The ascent and descent behaviours outlined in the ICM (Mansell et al, 2007) are not responses specifically to positive or negative affect. They are applicable to a more heterogeneous symptom profile encompassing, for example, activation, irritability and energy. Taken together, the cognitive and behavioural components of the ICM can help to explain mixed states, with an individual experiencing conflicting positive and negative appraisals and engaging in behaviours which push and pull mood and activation levels. This is also relevant to sub-syndromal presentations and mood swings in non-clinical populations as per our sample (Mansell, 2007).

To explore the model in more detail, a Behaviours Checklist (BC; Dodd et al, 2011b) was developed from the ICM (Mansell et al, 2007) in order to measure behaviours engaged in while pursuing everyday goals. In the initial version (Dodd et al, 2011b), there were only two subscales representing ascent behaviours (e.g. ignoring attempts from others to stop them or slow them down) as well as normalising behaviours, which were constructive responses to goal attainment (e.g. having regular breaks). In this initial study, ascent behaviours were associated with increased activation and bipolar risk in students. Normalising behaviours were not associated with bipolar risk (Dodd et al, 2011b). For the current study, the BC was expanded to include a

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descent behaviours subscale (e.g. limited their activities) in order to measure both the activating and deactivating behaviours triggered by the extreme appraisals outlined in the ICM (Mansell, 2007). This measure therefore complements the HAPPI (Mansell, 2006) which measures the cognitive constructs outlined in the model.

The primary aim of this study was to explore the psychometric properties of the extended BC. To assess convergent validity, correlations with existing, valid measures of response styles (e.g. positive and negative rumination, risk-taking) were explored; the Response Styles Questionnaire (RSQ; Nolen-Hoeksema, 1991, revised by Thomas & Bentall, 2002) and the Responses to Positive Affect questionnaire (RPA; Feldman, Joormann, & Johnson, 2008). Hypotheses 1-3 outline expected findings.

To further test the convergent validity of the BC, this study also assessed whether ascent and descent behaviours had theory-driven associations with extreme appraisals. The ICM would predict that these behaviours are triggered by these appraisals, therefore we would expect associations between these constructs (hypothesis 4). Further, we assessed whether ascent and descent behaviours had predicted associations between bipolar risk and symptoms in a student sample, in line with the ICM (hypotheses 5 and 6). Finally, in a test of incremental validity, associations were tested in direct comparison with appraisals and existing measures of response styles, to assess the unique contribution of ascent and descent behaviours to bipolar risk and symptoms (hypothesis 7).

To test the validity of the BC, specific theory-driven hypotheses were made in line with relationships we would theoretically expect in line with the ICM:

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1. Ascent behaviours would correlate with activating response styles, dangerous activities and positive rumination.
2. Descent behaviours would correlate with deactivating responses styles, negative rumination and dampening.
3. Normalising behaviours would be associated with active coping.
4. Ascent and descent behaviours will be positively associated with appraisals.
5. Ascent behaviours would be positively associated with bipolar risk and mania, and negatively associated with depression.
6. Descent behaviours would be positively correlated with bipolar risk and depression, and negatively correlated with mania.
7. Ascent and descent behaviours and mania, depression, and bipolar risk would make a unique contribution to the variance in outcome variables, controlling for appraisals and response styles to positive and negative mood.

Method

Participants

There are 10 predictor variables (including subscales of the Response Styles Questionnaire, Responses to Positive Affect Questionnaire, Behaviours Checklist, and HAPPI). The software G*Power (Faul, Erdfelder, Lang & Bucher, 2007) recommended a minimum sample size of $n = 55$. This was triangulated using the rule of thumb for a minimum sample based on Green's (1991, cited in Field, 2005) formula of $50 + 8k$ ($k =$ number of predictors), this is $n = 130$. Our aim was to recruit 150 based on this larger sample size, allowing for attrition. A convenience sample of one hundred and seventy

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four students consented to take part in this study (112 females). The sample varied in age range from 18 to 40+, with 75% aged 18 to 25.

Predictor Measures

Demographic measures. Age (18-21, 22-25, 26-30, 31-40 and 40+ years) and gender were asked at the beginning of the survey.

Behaviours Checklist (adapted from Dodd et al, 2011b). The BC is a self-report measure of frequency of engagement in Ascent, Descent and Normalising Behaviours while trying to achieve personal goals. The original 14-item questionnaire (Dodd et al, 2011b) assessed Ascent Behaviours ('Hyped myself up as much as possible') and Normalising Behaviours ('Planned and structured my time'). A 21-item version was used in this study, including a Descent Behaviours subscale ('Withdrew from other people'). The novel 7 items were derived from the behaviours outlined in the ICM (Mansell et al, 2007). Behaviours are coded from 1 ('Not at all') to 4 ('Nearly all the time'). In previous work, Ascent and Normalising subscales were of adequate internal consistency (Cronbach's $\alpha = .67$ and $.62$, respectively; Dodd et al, 2011b).

Response Styles Questionnaire (Nolen-Hoeksema, 1991; revised by Thomas & Bentall, 2002). The RSQ was developed to measure responses to depressed mood. A revised 48-item version (Thomas & Bentall, 2002) was found to have three distinct subscales (Knowles et al, 2005): Rumination ("Analyse recent events to try to understand why you are depressed"), Dangerous Activities ("Take recreational drugs"), and Active Coping ("Do something that has made you feel better in the past"). Participants rated items on how often they respond to low mood in the way described,

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from 0 ('Almost never') to 3 ('Almost always'). Each RSQ subscale had good internal reliability in a large student sample ($\alpha = 0.68$ to 0.91 ; Knowles et al, 2005). In this study, $\alpha = 0.93$ for rumination, 0.84 for active coping, and 0.77 for dangerous activities.

Responses to Positive Affect Questionnaire (Feldman et al, 2008). The RPA is a 17-item self-report measure of responses to positive affect. Participants rated each item on how often they would respond in the way described, from 1 ('Almost never') to 4 ('Almost always'). Subscales are Emotion-focused Rumination, Self-focused Rumination, and Dampening. The RPA is valid with adequate internal consistency in a large student sample ($\alpha = 0.69$ to 0.79 ; Feldman et al, 2008). In this study, $\alpha = 0.72$ for emotion-focused rumination, 0.87 for dampening, and 0.74 for self-focused rumination.

Hypomanic Attitudes and Positive Predictions Inventory (Mansell 2006).

The HAPPI assesses extreme positive and negative self-appraisals about internal states ('When I feel good, I know that whatever I do, I could do no wrong'), from 0 ('I don't believe this at all') to 100 ('I believe this completely'). An abridged 29-item version (based on the 61-item HAPPI; Dodd et al, 2010) was used to reduce participant burden. Internal consistency was $\alpha = 0.91$ in this sample.

Outcome Measures

Altman Self-Rating Mania Scale (ASRM; Altman et al, 1997). The ASRM is a five-item scale rating manic symptoms experienced during the past week from 0-4 e.g. 'I do not feel happier or more cheerful than usual' to 'I feel happier or more cheerful than usual all the time'. The ASRM had good validity and test-retest reliability in a

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clinical population (Altman et al, 1997) and has been used in similar research (e.g. Johnson, McKenzie & McCurrich, 2008). In this sample, $\alpha = 0.69$.

Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986). The HPS is a 48-item true/false questionnaire of hypomanic personality traits (e.g., ‘When I feel an emotion, I usually feel it with extreme intensity’). The HPS is valid and reliable among students ($\alpha = 0.87$; test-retest $r = 0.81$; Eckblad & Chapman, 1986). Hypomanic personality predicted diagnosis of BD after 13 year follow-up (Kwapil, Miller, Zinser, Chapman, Chapman & Eckblad, 2000), and was associated with higher rates of bipolar-relevant psychopathology, such as risky behaviour (Kwapil et al, 2011). This scale was therefore used to assess bipolar risk, in line with previous research (Kwapil et al, 2000). Cronbach’s $\alpha = 0.64$ in this sample.

Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a 20-item self-report scale of depressive symptoms experienced over the previous week. Participants rated each item (e.g. ‘I was bothered by things that usually don’t bother me’) from 0 (‘Rarely or none of the time (less than 1 day)’) to 4 (‘Most or all of the time (5–7 days)’). The CES-D is a reliable measure in depressed populations ($\alpha = 0.85$; Radloff, 1977) and has been used in student studies using similar research designs to the current research (e.g. Jones & Day, 2008). In this study, $\alpha = 0.92$.

Procedure

Ethical approval was obtained from the Department of Psychology at the university. Students were provided with the details about the study in university lessons and social learning areas, where information slips were distributed, and online via

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university-related social web pages and emails. This information included a web link which directed students to the online participant information sheet. Before being able to access with the questionnaires, informed consent was obtained from all participants, who had to check a box on the screen indicating that they agreed to take part before proceeding to the first questionnaire. After completion, all participants were debriefed via a web page detailing the aims of the study and researcher's details should they have further questions.

Results

Catch items

In an attempt to ensure that responses were valid, catch items were included in the online survey e.g. 'Please select 'sometimes' as your response to this question'. Five participants who did not answer these questions correctly were excluded from the study, as the accuracy of their responses was questionable.

Missing data

Thirty five participants were excluded from the final analysis as they had not completed the survey through to the end. The sample size for analysis was therefore $n = 134$. SPSS expectation maximisation algorithm applied substitute values for missing data; no participants omitted more than 2 responses.

Descriptive statistics

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Descriptive statistics are shown in Table 1 ($N = 134$). One-way analysis of variance revealed a significant difference of age on depression ($F(4,129) = 4.6, p < 0.05$), with the participants in the 18-21 years age category scoring higher.

[INSERT TABLE 1 HERE]

Reliability of the Behaviours Checklist.

Internal consistency for the BC was $\alpha = 0.66$. Internal consistency of the Ascent, Descent and Normalising behaviour subscales were poor; $\alpha = 0.59, \alpha = 0.60, \alpha = .57$, respectively. Reliability analysis indicated that there were no items where removal would have improved reliability.

Convergent Validity of the Behaviours Checklist.

Associations with responses to positive and negative affect. Pearson's correlations with responses to negative mood (negative rumination, dangerous activities, and active coping) and to positive mood (positive emotion-focused and self-focused rumination and dampening) were conducted to investigate the convergent validity of the BC (Table 2). A conservative probability level of $p < 0.01$ was utilised to reduce the possibility of Type 1 error in accordance with the Bonferroni correction. Ascent behaviours were positively related to active coping and dangerous activities in response to negative mood, and emotion-focused and self-focused rumination in response to positive mood. Descent behaviours were positively associated with ruminating or engaging in dangerous activities in response to negative mood, and dampening of positive mood. Normalising behaviours were positively correlated with active coping.

[INSERT TABLE 2 HERE]

Associations between behaviours and appraisals. Pearson's correlations were conducted to investigate relationships between appraisals, ascent, descent and normalising behaviours. Both ascent and descent behaviours were significantly associated with appraisals (see Table 2).

Associations between behaviours, response styles, appraisals and outcome variables. Pearsons correlations were conducted to test associations between behaviours, bipolar risk, and current symptoms of mania and depression (see Table 3). Correlations with appraisals and with responses to negative and positive mood were also explored to assess which of these variables should be included in subsequent regression analyses, in order to assess the unique contribution of ascent and descent behaviours to outcome variables.

Bipolar risk was positively associated with ascent behaviours, self-focused and emotion-focused positive rumination, and dampening in response to positive mood, engaging in dangerous activities in response to negative mood, and appraisals. Mania was positively associated with ascent behaviours. Depression was positively associated with descent behaviours, ruminating on negative mood, dampening positive mood, and appraisals. Depression was inversely related to active coping.

Incremental Validity of the BC

A series of hierarchical multiple regression analyses were performed to test whether ascent and descent behaviours made a unique contribution to the outcome variables; bipolar risk, mania, and depression. Each model is reported separately. For

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each, the assumption of no multicollinearity was satisfied; Variance Inflation Factors (VIF) were not considerably > 1 and the tolerance statistics were $> .2$ (Field, 2005). The assumption of independent errors was plausible (Durbin-Watson statistics > 1 and < 3 ; Field, 2005). Standardised residuals were normal and residual plots suggested that the assumptions of random errors and homoscedasticity were met (Field, 2005). See Table 4 for results.

Independent associations with bipolar risk. Bipolar risk was entered as the outcome variable. Appraisals, mania, depression, dangerous activities, emotion-focused and self-focused positive rumination and dampening were entered in step 1. Current symptoms were included to control for the possibility of construct overlap between the behaviours and response styles with symptomatology. Ascent behaviours were added in step 2, to investigate their independent contribution to the variance. Ascent behaviours and appraisals were independently associated with bipolar risk.

Independent associations with mania. Mania was entered as the outcome variable. Bipolar risk and depression were entered in step 1. Ascent behaviours were added in step 2 to investigate their independent contribution, which was not significant. Mania was positively associated with bipolar risk and negatively associated with depression.

Independent associations with depression. Depression was entered as the outcome variable. Age, appraisals, dampening, negative rumination, mania, and bipolar risk were entered in step 1. Descent behaviours were added in step 2 to explore their independent contribution. Descent behaviours and negative rumination were positively associated with depression. Age and mania were negatively associated with depression.

[INSERT TABLE 4 HERE]

Discussion

There is increasing evidence that responses to mood play a key role in mood fluctuation (Knowles et al, 2005; Gilbert et al, 2013). The Behaviours Checklist (BC) was designed to assess ascent and descent behaviours, which are proposed to confer risk to mood fluctuations (Mansell et al, 2007). This measure is the behavioural counterpart to the Hypomanic Attitudes and Positive Predictions Inventory, which measures the positive and negative appraisals central to the ICM (Mansell et al, 2007). In the ICM, these appraisals would trigger behavioural attempts to enhance or control internal states relating to mood, cognition, and physiology. Both appraisals and ascent/descent behaviours therefore play a role in the development and maintenance of bipolar symptoms.

The BC complements existing response style measures, which focus on emotion regulation responses to negative or positive mood only (Knowles et al 2005; Feldman, Johnson & Joorman, 2008), by focusing on behaviours that are engaged in when pursuing everyday goals, and not in response to specific mood states. Ascent and descent behaviours are responses to extreme appraisals of internal state changes from cognitive and physiological domains, such as racing thoughts or activation, as well as mood domains including activation and irritability. The measure also encapsulates behaviours relating to goal attainment, in line with evidence that heightened goal setting (such as very ambitious expectations of fame, wealth and political influence) is associated with BD (Johnson & Carver, 2006). The BC is therefore relevant to the range of symptom expression in BD, which goes beyond negative and positive affect to

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include irritability, mood lability, dysphoria/depression, elevated mood, and highly activated and energised states (a key component of BD; Benazzi, 2007).

As the BC was expanded in this study, we first tested its reliability. Internal consistency alphas for the ascent, descent and normalising behaviours subscales were inadequate, so findings must be interpreted cautiously. The BC showed convergent validity, as the predicted associations with existing measures of response styles were found, namely the Response Styles Questionnaire (Nolen-Hoeksema, 1991; revised by Thomas & Bentall, 2002) and Responses to Positive Affect questionnaire (Feldman, Johnson & Joorman, 2008). Ascent behaviours correlated with active coping and dangerous activities in response to negative mood, and with emotion-focus and self-focused rumination in response to positive mood. According to the ICM, ascent behaviours are strategies people engage in to increase activation; therefore, the observed associations between ascent behaviours and attempts to elevate mood when feeling down, as well as attempts enhance positive mood, are encouraging.

Descent behaviours correlated with negative rumination on low mood and dampening positive mood. This again supports the concept of descent behaviours as outlined in the ICM, where they are attempts to control or downplay emotions. A correlation between descent behaviours and dangerous activities was unexpected, as dangerous activities are considered a mood activating response (e.g. Knowles et al, 2005). Many of these dangerous activities, such as casual sexual encounters and reckless spending, have the potential for negative outcomes, which could lead to low mood (Knowles et al, 2005). As descent behaviours are also strategies that putatively contribute to low mood and activation, this could explain the convergence between the

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concepts of descent behaviours and dangerous activities. As expected, normalising behaviours were associated with active coping. Divergent validity is indicated by non-significant associations between ‘activating’ ascent behaviours and ‘deactivating’ response styles (dampening positive mood and ruminating on negative mood), and similarly non-significant associations between descent behaviours, active coping in response to low mood, and positive rumination.

In accordance with the ICM (Mansell et al, 2007), ascent behaviours were positively correlated with bipolar risk and mania, and descent behaviours with depression. The expected association between descent behaviours and bipolar risk was not found. Hypomanic Personality may be better construed as a measure of mania risk, specifically, as the traits it measures are primarily hypomania-relevant (e.g. Johnson & Jones, 2009) and there are mixed findings about the association between hypomanic personality and depression (Jones & Day, 2006; Dodd et al, 2011a).

In the regression, expected associations between ascent behaviours, positive rumination, dangerous activities and mania were not significant, in contrast with previous research in students (Dodd et al, 2011a; Feldman et al, 2008) and among individuals with BD (Knowles et al, 2005). However, the association between descent behaviours and depression retained significance in a regression analysis, demonstrating the unique contribution of descent behaviours to the variance in depression. This is potentially partially explained by the prevalence of depression among students (Golberstein, Eisenberg & Gollust, 2008). Rates of major depressive disorder are higher among students compared to rates of bipolar disorder, and mania is the defining feature of the latter (Blanco et al, 2008). Students are also passing through the peak age of onset

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for BD (Merikangas & Pato, 2009). Taking prevalence and age of onset into consideration, we would therefore expect fewer students to have experienced extremes of high mood to the extent that they had developed regulation strategies. The lack of association between activating behaviours and response styles may also be to do with the relatively small sample size, as the association between self-focused positive rumination and the same mania rating scale was significant in previous research in a larger sample reporting a similar mean mania score (Feldman, Johnson & Joorman, 2008). This study did not find significant associations between other responses to positive affect, and attributed this to the ‘rarity’ of mania symptoms in undergraduate students (Feldman, Johnson & Joorman, 2008). The possibility that non-significant findings related to the nature of the sample is bolstered by findings of associations between these types of activating response style and mania in clinical studies, including diagnosed students (Johnson, McKenzie & McCurrich, 2008; Thomas et al, 2007).

Associations between ascent behaviours and bipolar risk retained significance in the regression analysis, whereas there were no unique associations between responses to positive or negative mood with bipolar risk. This provides support for the role of these specific ascent and descent behaviours in bipolar risk, over and above responses made directly in the context of positive and negative mood.

Appraisals of internal states were associated with bipolar risk and depression, as would be expected based on previous research (Dodd et al, 2011a, 2011b; Jones, Mansell & Waller, 2006; Jones & Day, 2006). There was no association between mania and appraisals; again, this may be due to the low sample and prevalence of clinically significant mania in students, who may not have forged extreme appraisals of these

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types of internal states. Previous student studies finding associations between appraisals and manic symptoms have used the Internal States Scale (Bauer et al, 2000), focusing specifically on heightened activation (Dodd et al, 2011a).

Limitations and future directions

The BC had relatively low internal consistency in this sample. These values between 0.5 and 0.6 have been argued as acceptable values for early stages of research (Streiner, 2003), but indicate that the scale needs further work before it can be used as a research tool, and certainly before it can be used as a clinical tool. Additionally, the sample size was inadequate for performing a factor analysis, and this should be addressed in future research using this measure to explore its underlying structure in more detail. We cannot ignore the possibility that the BC does not adequately capture these concepts of ascent and descent behaviours, although results regarding convergent and incremental validity are promising. In addition, the reliability of the ascent and normalising behaviours subscales were adequate in a previous student sample. Therefore, it would be hasty to dismiss the measure, but further work needs to be done. Taking all of this into consideration, this is a provisional validation of the BC.

Some expected findings were non-significant. This could have also been explained by the relatively small sample size. Additionally, this was a student sample. While it was appropriate to explore these processes in a non-clinical sample, as the ICM explains mood swings on a continuum, further research in clinical samples is necessary to validate the BC for a number of reasons. Firstly, the symptom measures were designed for clinical populations. Secondly, non-clinical participants may not have had mood experiences that were sufficiently severe to establish extreme appraisals and

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response styles. Longitudinal research in larger, clinical samples is important to explore relationships between clinical outcomes and ascent/descent behaviours over time, and the events and appraisals that may influence the strategies people use.

Participants were not screened for mood disorders, so we cannot ascertain a wholly non-clinical sample. Results were collected using self-report measures comprising a potentially burdensome survey. Catch items were included to identify participants who were not responding accurately, though it is still possible that the concentration may have been poor, reducing validity.

The amount of variance explained by the predictor variables was relatively small, so while they play a potential role in mood swings, other psychological processes such as reward sensitivity, dysfunctional attitudes, goal attainment beliefs, and circadian instability also influence mood regulation (Lam, Wright & Smith, 2004; Johnson, Eisner & Carver, 2009; Johnson & Carver, 2006; Urosevic, Abramson, Harmon-Jones, & Alloy, 2008; Jones, 2001). It is likely that a combination of psychological processes explain the onset and maintenance of BD (Johnson & Jones, 2009).

Conclusion and clinical implications

Despite these caveats, ascent and descent behaviours were both independently associated with bipolar risk, and descent behaviours with depression, over and above responses to positive and negative mood, as well as appraisals. The effect size of regression models (R^2) ranged from 0.23 to 0.63, which is similar to published findings on the variance in bipolar risk, depression and mania explained by psychological processes (e.g. Dodd et al, 2011a; Feldman, Joorman & Johnson, 2008). Therefore, this

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study provides tentative evidence for the role of ascent and descent behaviours in the development and maintenance of mood swings. Although originally developed from the ICM (Mansell et al, 2007), appraisals and resulting behaviours are trans-theoretical in light of general evidence that the way in which people think and behave has consequences for outcomes (Jones, 2001). These tools are potentially applicable to a wide range of clinical settings, to identify appraisals and behaviours that may be interfering with effective mood regulation, although the Behaviours Checklist needs to be explored in further detail.

In addition to implications for BD, improving our understanding of student mental health can support the development of preventative interventions designed specifically for students during a potentially stressful period, where they are often living away from home for the first time (Hunt & Eisenberg, 2010; Tosevski et al, 2010). Many of their activities are within the university setting, giving the potential to disseminate support for mental health and well-being (Hunt & Eisenberg, 2010).

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Table 1: Descriptive statistics

Variable	Mean	SD	Min	Max
HPS	20.70	5.05	0	48
ASRM	4.19	3.31	0	20
CES-D	19.77	11.57	0	60
Ascent	15.54	3.06	7	28
Descent	17.13	3.21	7	28
Normalising	19.47	2.92	7	28
Rumination	31.46	14.40	0	75
Active coping	18.52	7.42	0	45
Dangerous activities	2.78	3.35	0	24
Emotion-focus	12.98	2.90	5	20
Dampening	15.75	5.44	8	32
Self-focus	9.26	2.57	4	16
HAPPI	31.22	15.22	0	100

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Table 2: Correlations between behaviours, response styles, and appraisals

Variable	Rumination	Active coping	Dangerous activities	Emotion- focus	Dampening	Self- focus	Appraisals
	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>
Ascent	.14	.23*	.36*	.32*	.20	.24*	.29*
Descent	.62*	-.21	.26*	.03	.47*	-.01	.35*
Normalising	.09	.35*	-.001	.22	.11	.19	.08

* $p < .01$

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Table 3: Correlations between appraisals, behaviours, response styles and outcome variables

Variable	Bipolar risk <i>r</i>	Mania <i>r</i>	Depression <i>r</i>
Bipolar risk	-	.32*	.004
Mania	.32*	-	-.33*
Depression	.004	-.33*	-
Ascent	.53*	.27*	.03
Descent	.15	-.04	.58*
Normalising	.19	.07	-.02
Rumination	.08	-.13	.68*
Active coping	.22	.12	-.35*
Dangerous activities	.30*	.16	.20
Emotion- focus	.30*	.10	-.001
Dampening	.27*	-.01	.50*
Self-focus	.25*	.15	-.06
Appraisals	.42*	.19	.38*

* $p < .01$

