



Self appraisal and behavioural activation in the prediction of hypomanic personality and depressive symptoms

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ABSTRACT

Hypomanic personality is characterised by increased positive mood and energy but also more depression and greater risk of bipolar disorder. It is linked with positive self-appraisals for hypomania-relevant events and Behavioural Activation System (BAS) sensitivity such that hypomanic individuals tend preferentially towards goal-related activities. This study investigated relationships between positive and negative self-appraisal and BAS functioning and hypomanic personality and depressive symptoms. Participants ($N = 231$) completed measures of hypomanic personality, mood symptoms, dysfunctional attitudes, self-appraisal and behavioural activation/inhibition.

Positive but not negative self-appraisal contributed to prediction of hypomanic personality as did higher BAS fun seeking and lower Behavioural Inhibition System (BIS) scores. Conversely, negative self-appraisal was positively predictive of current depressive mood, whilst BAS reward responsiveness was negatively predictive. There are specific relationships between positive and negative appraisal styles and hypomanic personality and depressive mood, respectively. The findings of complimentary contributions from appraisal style, BAS and BIS to prediction of hypomanic personality are relevant to developing a better understanding of risk factors for bipolar disorder.

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1. Introduction

Hypomanic personality is characterised by increased positive mood, sociability and energy (Akiskal, 1996; Eckblad & Chapman, 1986). Disturbances of the sleep/wake cycle, and other markers of circadian functioning such as social rhythms, are widely reported for bipolar disorder (Grandin, Alloy, & Abramson, 2006; Jones, 2001). Similarly, undergraduates scoring highly on measures of hypomanic personality or diagnosed with bipolar spectrum disorders exhibit disrupted sleep/wake patterns and reduced stability of social rhythms (Ankers & Jones, submitted for publication; Shen, Alloy, Abramson, & Sylvia, 2008). Hypomanic personality is also linked to more ambitious achievement-related life goals (Johnson & Carver, 2006). Negative outcomes associated with hypomanic personality include higher rates of substance and alcohol use, more depressive episodes, and lower work-related task engagement (Eckblad & Chapman, 1986; Krumm-Merabet & Meyer, 2005; Meyer, Rahman, & Shepherd, 2007). Furthermore, hypomanic personality predicts transition to bipolar disorder and substance use disorders over 13 years (Kwapil et al., 2000), hence increasing interest in hypomanic personality as a risk factor for bipolar disorder. Several studies have demonstrated psychological similarities between

hypomanic personality and bipolar disorder. Both groups have similar information processing biases towards depression-relevant stimuli (Bentall & Thompson, 1990; Lyon, Startup, & Bentall, 1999) and similar patterns of more unstable self-esteem and maladaptive (ruminative) coping styles for negative mood (Bentall, Highfield, & Smith, in press; Knowles et al., 2007). Researchers have also argued that two appetitive and aversive motivational systems characterised by Gray (1982), behavioural activation (BAS) and behavioural inhibition (BIS), are disturbed in hypomanic personality and bipolar disorder. BAS responds to reward signals, triggering approach behaviour and positive affect, BIS responds to threat signals, triggering inhibition and negative affect. Studies have explored relationships between (hypo)mania and BIS/BAS, typically using the Carver and White (1994) scale measuring BAS activity across three subscales (drive, fun seeking and reward responsiveness) and BIS across a single subscale. Meyer, Johnson, and Carver (1999) reported BAS fun seeking predicted current mania symptoms in a behavioural-risk sample. A later study found BAS reward responsiveness predicted subsequent increases in manic symptoms in a bipolar sample (Meyer, Johnson, & Winters, 2001). Johnson also found that goal attainment life events (hypothesized to be BAS activating) predicted increases in manic symptoms in a longitudinal study of bipolar patients (Johnson et al., 2000). Depue and Iacono (1989) argued BAS dysregulation is crucial to both depression and mania in bipolar disorder. Although a recent longitudinal study found BAS predicted

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time to (hypo)mania, BIS predicted time to major depression (Alloy et al., 2008) indicating relevance of both systems in bipolar disorder.

Additionally, Fowles (1994) argued that elevated BAS is particularly associated with mania-like symptoms in the context of reduced BIS activation, a proposal consistent with Corr's joint-system perspective on BAS/BIS functioning (Corr, 2002). There is little clinical evidence for reduced BIS in the prediction of mania, although Alloy et al. (2008) did observe reduced BAS reward responsiveness (together with increased BIS as noted above) predicted time to depressive onset.

Research has also explored whether abnormal appraisals escalate symptom development following reward experiences or circadian disturbance. Hypomanic personality and bipolar disorder are both associated with increases in positive appraisals (measured using the Hypomania Interpretations Questionnaire: HIQ) for hypomania-relevant events (e.g., an individual who feels alert, active and has a reduced need for sleep explains this as due to their personal characteristics, "I am back to my intelligent, dynamic self again"; Jones, Mansell, & Waller, 2006). This pattern induces individuals to take on new challenges, work harder, achieve more and take less rest and thus increase risk of affective episode onset (Jones, 2001) which may help explain how individuals with subsyndromal symptoms transition to illness. Clinically, identification of risky appraisals might indicate targets for psychological therapy. However, such appraisals might only contribute one element to the understanding of hypomanic personality. For instance, Jones et al. (2006) reported HIQ scores (positive self-appraisal and experience of hypomania-relevant events) explain 34% of variance in hypomanic personality; whilst BAS functioning explained 20.7% of hypomanic personality variance in another study (Jones, Shams, & Liversidge, 2007): BIS functioning was not a significant predictor. The present report will explore the relative contributions of BAS functioning and self-appraisal in the prediction of hypomanic personality.

Another unresolved issue is whether it is *positive* self-appraisals that characterise hypomanic personality. As HIQ measures positive and normalising appraisals, the role of negative self-appraisals in response to depression-related experiences (which could exacerbate initial downward changes in mood and energy) is unknown. A new measure (the Interpretations of Depression Questionnaire) was developed in this study to evaluate such negative self-appraisals, as there was no current measure able to tap both normalising and negative self-appraisals in a manner comparable to assessment of positive appraisals in the HIQ. This question is pertinent given evidence for preferential processing of depression relevant information and elevated levels of dysfunctional attitudes in bipolar disorder (Jones et al., 2005; Lyon et al., 1999) and for predictive associations between hypomanic personality and unipolar depression (Kwapil et al., 2000).

The current study, therefore, explored the contributions of self-appraisal and behavioural activation/inhibition to prediction of hypomanic personality and current depressive symptoms. A priori predictions were: (1) positive, but not negative, self-appraisals will be positively associated with hypomanic personality; (2) negative, but not positive, self-appraisals will be positively associated with depression; (3) behavioural activation will be associated positively with hypomanic personality and negatively with depression and (4) behavioural inhibition will be associated negatively with hypomanic personality and positively with depression.

2. Method

2.1. Participants and procedure

A convenience sample of 231 participants (183 female; mean age 28.52 years, SD 10.27) was assessed: 43 were University staff.

Measures were completed on-line by university students and staff and by respondents to advertisements placed with two psychological research sites.¹

2.2. Measures

2.2.1. Interpretations of Depression Questionnaire (IDQ)

Modelled on the structure of the HIQ, the initial version of IDQ contained 30 candidate items confirmed as plausible and comprehensible by five experienced academic clinical psychologists as explanations for depression-relevant situations. For each item participants rated both; (1) negative self-dispositional (IDQ-D); and (2) normalising appraisals (IDQ-N). An example item is:

If I felt cut off from other people I would probably think it was because:

(IDQ-D) I am an insensitive person.

(IDQ-N) Things are difficult at the moment and I have little energy for other things.

Participants completed a yes/no scale indicating whether they had experienced each situation in the preceding three months (IDQ-Experience).

2.2.2. Hypomania Interpretations Questionnaire (HIQ; Jones et al., 2006)

HIQ evaluates appraisals for 10 common hypomania-relevant experiences each followed by two explanations; (1) positive self-dispositional appraisals (HIQ-H) and (2) normalising appraisal (HIQ-N). Participants also indicated using a yes/no scale whether they had experienced each situation in the preceding three months (HIQ-Experience). HIQ has good psychometric properties.

2.2.3. Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986)

This is a 48 item measure of hypomanic personality. High HPS scores are associated with elevated hypomania scores on clinical interview (Eckblad & Chapman, 1986) and greater likelihood of bipolar disorders over extended follow-up (Kwapil et al., 2000).

2.2.4. Dysfunctional Attitudes Scale (DA; Weissman & Beck, 1978)

This was devised as a measure of assumptions underlying depression. The 40 item scale consists of statements intended to reflect depression relevant dysfunctional beliefs. Each item is rated on a seven point scale from 1 (disagree totally) to 7 (agree totally). Recent research has indicated elevated levels of dysfunctional attitudes in both at-risk and diagnosed bipolar participants (Jones et al., 2005; Reilly-Harrington, Alloy, Fresco, & Whitehouse, 1999).

2.2.5. Internal States Scale (ISS; Bauer et al., 1991)

This is a self-report questionnaire assessing manic and depressive symptoms. Its 15 items contribute to four subscales: Activation (ISS-A), Well-Being (ISS-W), Perceived Conflict (ISS-PC) and Depression (ISS-D). Each item relates to the preceding 24 h. Ratings are made on a 100 mm visual analogue scale with anchor descriptions of 'Not at all/Rarely' and 'Very much so/Much of the time'. ISS is widely used and has good internal reliability and validity. ISS-A score above 200 indicates possible mania; ISS-WB below 125 is indicative of possible depression (Bauer et al., 1991).

¹ Details from author. Following informed consent, participants completed the questionnaires, presented in random order. Research was conducted in accordance with ethical approval from the University Senate Ethics Committee.

2.2.6. Behavioural Inhibition and Activation Scale (BIS/BAS; Carver & White, 1994)

The 24-item BIS/ BAS scale measures behavioural inhibition and behavioural activation system function. The former is assessed on a single subscale and the latter on three subscales (measuring reward responsiveness, drive and fun seeking). All scales have adequate internal reliability.

2.2.7. The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1991)

CES-D is a 20-item self-report depression scale which detects current depressive symptoms. A score above 16 indicates possible depression (Radloff, 1991).

2.3. Procedure for outliers and missing data

For individual questionnaires a maximum of two missing items were permitted and replaced with a prorated value based on individual mean score. If no more than two questionnaires had missing data the participant record was retained. All participants completed IDQ, the highest non-completion rate was for DAS (7%), for all other scales data was at least 96% complete. No significant outliers were identified from histograms or case-wise diagnostic data.

3. Results

3.1. Factor analysis of IDQ

All IDQ items were subjected to principal components factor analysis with varimax rotation resulting in 12 factors with an eigenvalue greater than 1, namely: Factor 1: 20 normalising items. Factor 2: 13 negative items. Factor 3: 4 negative items concerning organic/sexual-problems/dangerousness. Factor 4: 3 negative items on intelligence/sociability. Factor 5: 2 normalising items on tiredness. Factor 6: 2 negative items on insomnia. Factor 7: 1 normalising item on tiredness. Factor 8: 1 normalising item on illness. Factor 9: no unique items. Factor 10: 1 negative item on deserving to feel low. Factor 11: 1 negative item on indecisiveness. Factor 12: 2 unrelated items 1 negative/1 normalising. The scree plot however indicated a change in gradient after factor 2 with both factors having an eigenvalue >3. These two factors account for 35% of variance and were conceptually consistent with the intended separation of items tapping negative self-appraisals and normalising appraisals. The 10 item IDQ-10 was formed from this analysis by selecting those questions for which: (a) negative self-appraisal loaded >0.5 on factor 1; and (b) normalising appraisal loaded >0.5 on factor 2 for each chosen item. There were no cross-loadings >0.17 across the two subscales for any item. Cronbach's α for the scales were both adequate (see Table 1).

3.2. IDQ-10 relationships with HPS and other measures²

Mean values and Cronbach's α for all scales are presented in Table 1. Medians and interquartile ranges are provided for non-parametric data. ISS and CES-D scores fell below clinical cut-offs. Relationships between IDQ subscale scores and HPS, HIQ, DAS, BIS/BAS, CES-D and ISS are illustrated in Table 2. IDQ-D score was positively associated modestly but significantly with HPS and highly significantly with CES-D score. There were small positive relationships with ISS-A and HIQ-N and significant correlations with ISS-D, ISS-PC, DAS (positive) and ISS-W (negative).

² Staff/student and gender comparisons across measures. For staff/student comparisons there were no significant differences on any of the measures. For gender there was one significant difference with higher BIS score in female participants ($Z = 3.62$, $p < 0.05$).

Table 1
Scores on self-report measures

	Mean	SD	Median	Interquartile range	α
IDQ10-D	16.21	6.21	15	8	0.90
IDQ10-N	27.96	6.82			0.91
HIQ-H	23.04	5.99			0.72
HIQ-N	24.43	5.13			0.70
HPS	15.84	8.50			0.88
DAS	131.64	32.46			0.91
ISS-W	145.34	66.36			0.82
ISS-Act	150.92	91.13			0.73
ISS-D	61.20	54.95	50	80	0.73
ISS-PC	138.81	98.95	120	140	0.80
BAS-D	10.37	2.61	11	3	0.79
BAS-RR	16.58	2.68	17	4	0.77
BAS-FS	11.44	2.53	12	3	0.71
BIS	22.17	4.01	23	5	0.79
CES-D	13.73	7.40	12	10	0.89

Key: IDQ-D, Interpretation of Depressive Situations – Negative self-appraisal scale; IDQ-N, Interpretation of Depressive Situations – Normalising scale; HIQ-H, Hypomania Interpretations Questionnaire – Hypomanic internal scale; HIQ-N, Hypomania Interpretations Questionnaire – Normalising scale; HPS, Hypomanic Personality Scale; DAS, Dysfunctional Attitudes Scale; ISS-W, Internal States Scale Well Being subscale; ISS-Act, Internal States Scale Activation subscale; ISS-D, Internal States Scale Depression subscale; ISS-PC, Internal States Scale Perceived Conflict subscale; BAS-D, Behavioural activation system Drive scale; BAS-RR, Behavioural Activation System Reward Responsiveness scale; BAS-FS, Behavioural Activation System Fun Seeking scale; BIS, Behavioural Inhibition System scale; CES-D, Centre for Epidemiological Studies Depression Scale.

There were modest relationships with BAS scales (negative) and BIS (positive). IDQ-N was significantly associated with HIQ-H and HIQ-N, but unrelated to HPS, CES-D or any of the ISS subscales. There were small but significant positive correlations between IDQ-N and BAS subscales and no correlation with BIS. HPS was additionally modestly positively associated with CES-D, ISS-PC, ISS-A, HIQ-H and all BAS scales, and negatively with BIS. CES-D was negatively associated with BAS reward responsiveness (small correlation) and ISS-W and positively with BIS, DAS and ISS-D.

3.3. Regression of predictors of HPS and CES-D

To explore which measures uniquely contributed to prediction of hypomanic personality a multiple regression analysis with block entry was conducted. Each variable with a significant bivariate correlation with HPS was entered into this equation. The regression equation was significant ($F_{(12,190)} = 116.17$, $p < 0.001$) accounting for 52% of variance in HPS. Controlling for ISS mood symptoms, CES-D score and recent experience of HIQ/ IDQ events, HIQ-H (standardised $B = 0.19$, $t = 3.07$, $p < 0.002$), BAS fun seeking (standardised $B = 0.23$, $t = 3.38$, $p < 0.001$) and BIS (standardised $B = -0.16$, $t = -2.55$, $p < 0.01$) significantly contributed to variance in HPS.

To explore which measures uniquely contributed to the prediction of depressive symptoms, a similar multiple regression was conducted. Each of the variables with a significant bivariate correlation with CES-D (except ISS-D as this is also a depressive symptom measure) were entered. The regression equation was significant ($F_{(8,197)} = 33.05$, $p < 0.001$) accounting for 57% of variance in CES-D score. Controlling for ISS symptoms, HPS score and recent experience of HIQ/IDQ events, IDQ-D (standardised $B = 0.22$, $t = 3.74$, $p > 0.001$), and BAS reward responsiveness (standardised $B = -0.14$, $t = -2.52$, $p > 0.001$) contributed to variance in CES-D.

4. Discussion

Hypomanic personality is associated with risk for mood disorder and specifically bipolar disorder (Kwapil et al., 2000). Additionally there are similar patterns of psychological functioning

Table 2
Correlations between symptoms, positive and negative self appraisal, BIS/BAS and dysfunctional attitudes

	IDQ-N	HIQ-H	HIQ-N	HPS	DAS	ISS-W	ISS-A	ISS-D	ISS-PC	BAS-D	BAS-RR	BAS-FS	BIS	CES-D
IDQ-D	-.07	.001	.124*	.176**	.380**	-.376**	.135*	.448**	.381**	-.151*	-.147	-.117*	.231**	.528**
IDQ-N		.258**	.400**	.006	-.052	-.022	.050	-.022	-.033	.165*	.182**	.143*	.042	.016
HIQ-H			.532**	.305**	-.107	.135*	.187**	-.092	-.091	.149*	.260**	.267**	-.152*	-.121
HIQ-N				.021	-.067	.081	.182**	.010	.046	.140*	.037	.046	.023	-.077
HPS					.019	.080	.458**	.052	.182**	.289**	.275**	.379**	-.143*	.133*
DAS						-.372**	.102	.465**	.394**	-.029	-.011	-.114*	.346**	.409**
ISS-W							.236**	-.653**	-.433**	.212*	.122*	.191**	-.282**	-.531**
ISS-A								.151*	.363**	.222**	.116*	.184*	-.069	.133*
ISS-D									.708**	-.081	-.066	-.154*	.230**	.656**
ISS-PC										.039	.007	-.031	.182*	.473**
BAS-D											.448**	.532**	-.084	-.107
BAS-RR												.470**	.233**	-.145**
BAS-FS													-.101	-.097
BIS														.235**

Key see Table 1 for definition of terms. Spearman's correlations are in italics, otherwise Pearson.

* $p < 0.05$.

** $p < 0.01$.

in healthy individuals with hypomanic personality and diagnosed bipolar patients, including elevated levels of positive self-appraisals in both groups (Jones et al., 2006). Consistent with previous research the current study replicated the association between hypomanic personality and positive self-appraisal after controlling for mood symptoms. Dysfunctional attitudes, positive appraisal and BIS/BAS scores are similar to previous research (Carver & White, 1994; Jones et al., 2006). As hypomanic personality is associated with elevated risk of depression as well as mania (Eckblad & Chapman, 1986; Kwapil et al., 2000) this study explored the role of negative self-appraisal for depression-relevant experiences using a new measure (IDQ) developed for this purpose. The 10-item IDQ questionnaire was based on factor analysis mirroring the structure of the previous HIQ measure for positive self-appraisal. It has a clear factor structure and acceptable internal consistency. Bivariate correlations were found between negative self-appraisals and higher subsyndromal mood symptoms (particularly depression), more dysfunctional attitudes, higher behavioural inhibition and lower behavioural activation. Consistent with previous associations between HPS and depression (Eckblad & Chapman, 1986; Kwapil et al., 2000), negative self-appraisal has a small but significant positive correlation with hypomanic personality.

Regression analysis controlling for subsyndromal symptoms indicated negative self-appraisal contributed no unique variance to HPS scores. Furthermore, the significant association between hypomanic personality and positive self-appraisal remained when negative self-appraisal was simultaneously entered into the regression equation. Conversely, regression of current depressive symptoms against candidate predictors indicated a significant association with negative but not positive self-appraisal. These findings are therefore consistent with a priori predictions 1 and 2 from the Introduction.

Hypomanic personality was also associated with higher BAS fun seeking and lower BIS. This therefore constitutes the first report of independent roles for BAS and positive self-appraisal in explaining variance in hypomanic personality. Findings indicate neither factor is sufficient, in its own right, to understand variability in HPS, and that further investigation of the relative contributions of these elements to hypomanic personality is indicated. Additionally, neither BAS reward responsiveness nor drive subscales were uniquely associated with hypomanic personality. In contrast, both Alloy et al. (2008) and Meyer et al. (2001) observed that reward responsiveness prospectively predicted time to hypo(mania) and we previously observed a relationship between drive and hypomanic personality (Jones et al., 2007). The association of BIS with hypomanic personality is consistent with Fowles (1994) and Corr (2002) proposals that elevated BAS and low BIS are linked to behaviours associated with hypomanic symptoms although further research is required to evaluate the stability of this association.

Behavioural activation was negatively predictive of depressive symptoms consistent with Depue's proposal that underactive BAS function is associated with low mood (Depue & Iacono, 1989) and with findings of a predictive association between low BAS function and severity of depression in a clinical sample (McFarland, Shankman, Tenke, Bruder, & Klein, 2006). However, in contrast to some previous research (Meyer et al., 1999), we did not find an additional role for elevated BIS functioning and depressive symptoms. In the present study the relationships between BAS and depression are complimented by associations between depression and negative self-appraisal which suggests both elements need to be considered in constructing comprehensive models to explain the occurrence of such symptoms. Taken together the findings for BIS/BAS and depression/hypomanic personality constitute only partial support for a priori predictions (3) and (4).

These results indicate specific roles for both behavioural activation/inhibition and positive self-appraisal in hypomanic personal-

ity with no unique role for negative self-appraisal. Whilst this is relevant to the study of healthy individuals at risk for illness it is not yet clear whether this pattern would be replicated in diagnosed bipolar patients. If it were it would be pertinent clinically as the items endorsed on the HIQ could help therapists to target risky appraisal styles during therapy. The relative contribution of negative appraisal styles in bipolar patients is as yet unknown. It might transpire that, as with the current sample, such a style has little relevance. Further research on this measure with unipolar samples has been planned based on the current findings as the new IDQ items might potentially again aid therapists in targeting cognitive therapy for depression.

This research has some limitations. Firstly, it was conducted in an analogue sample and therefore we are not able to make any strong statements about clinical implications. Secondly, data were collected cross-sectionally and we do not know how each measure would have performed prospectively. Thirdly, BAS and BIS functioning were measured by self-report. Although the scale used is well established it is not a direct measure of these systems. Future studies might supplement the BIS/BAS scale with more direct alternatives such as left frontal cortical EEG activation (Henriques & Davidson, 1990; Sutton & Davidson, 1997). Fourthly, some correlations were numerically modest despite reaching criteria for statistical significance. Finally, this was a convenience sample of participants primarily drawn from University students so it is unclear how generalisable current findings are to the wider population. As the field matures it will be an important challenge for researchers to test to applicability of their findings with more representative normal samples and with clinical populations.

In conclusion, although hypomanic personality is associated with depressive symptoms in the literature, the present study indicates that the psychological processes associated with each are different. Hypomanic personality is associated with both increases in BAS sensitivity and positive self-appraisal whilst depressive symptoms are associated with decreases in BAS sensitivity and increases in negative self-appraisal. These findings are potentially relevant to further development of psychological interventions but require replication in clinical samples.

IDQ-10

1. If I felt I couldn't enjoy life as easily as other people, I would probably think it was because:

^NCurrent pressures are distracting me from my interests

^DI don't get pleasure from anything anymore

2. If I experience guilty feelings even though I may not have done anything particularly wrong I would probably think it was because:

^NI am being hard on myself because I under strain at the moment

^DI am a bad person and deserve to be punished

3. If I have exploded at others and afterwards felt bad about myself I would probably think it was because:

^DI am a nasty person

^NI am under a lot of pressure at the moment

4. If I felt cut off from other people I would probably think it was because:

^DI am an insensitive person

^NThings are difficult at the moment and I have little energy for other things

5. If I had upsetting or bad thoughts going through my mind I would probably think it was because:

^NI am rather low at present but when things improve the thoughts will go

^DI am a worthless person to have these type of thoughts

6. If I felt down on myself I would probably think it was because:

^DI am a bad person, even towards myself

^NCurrent problems are leading me to be rather hard on myself

7. If I felt that the future was bleak and things were unlikely to improve I would probably think it was because:

^NSituations look bleak, but will change as things improve

^DI am a negative pessimistic person

8. If there were times when I struggled to control an urge to cry or found myself crying without really understanding why I would probably think it was because:

^DI am a weak, pathetic, person

^NMy difficulties have affected me just at the moment

9. If I have periods of time when I felt a persistent sense of gloom I would probably think it was because:

^DI am a failure and a burden to others

^NThings are going wrong for me just at present

10. If I felt that nothing was working out for me I would probably think it was because:

^NToo many obstacles are being put in my way at present

^DI struggle to get anything right in my life

Key:

Rating scale

^DNegative self-appraisal; ^NNormalising self-appraisal

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