The role of positive appraisal style and positive expectations in student emotional resilience

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A B S T R A C T

Emotional resilience is an individual difference dimension, reflecting variation in the degree to which people show better or worse emotional well-being relative to what is predicted based on stressor exposure. Given that young adults commencing university studies commonly encounter a broad range of potential stressors, understanding the mechanisms that underpin emotional resilience could inform strategies for optimising student emotional well-being. While emotional reactivity is proximally associated with resilient outcomes, the factors that temporally precede and predict such reactivity are incompletely understood. In a serial mediation model, we sought to test the capacity of positive appraisal style and positive expectations to predict subsequent resilient outcomes. The present study assessed a sample of 95 young adults commencing a new year at university in a longitudinal design across the first semester. Using Partial Least Squares Structure Equation Modelling, the observed pattern supported the hypothesis under test. Specially, relatively positive appraisal style early in semester predicted relatively positive expectations mid-semester, which in turn predicted the late semester measure of emotional reactivity that was proximally associated with emotionally resilient outcomes. We discuss how the advances to understanding enabled by this study could potentially be exploited to enhance emotional well-being in young adults.

1. Introduction

Experiencing adversity is common and can be an antecedent to the development of emotional problems (Milojevich et al., 2021). However, people differ in the degree to which they sustain emotional well-being in the wake of adversity. This individual difference dimension is termed emotional resilience. Emotional resilience can be measured by expressing the degree to which an individual demonstrates greater emotional well-being (often obtained using a composite measure of such well-being), than would be expected given the level of adversity to which they have recently been exposed (Kalisch et al., 2021; Walters et al., 2024). Young adults attending university are at a heightened risk of developing emotional problems, plausibly reflecting the wide variety of potential stressors associated with student life (Browne et al., 2017; Porru et al., 2022). Thus, in order to advance theoretical understanding of resilience, and to develop well-informed cognitive interventions to

promote emotionally resilient outcomes in young adults attending university, it is important to understand the cognitive factors that contribute to the individual differences in resilience exhibited by this cohort.

Perhaps unsurprisingly, one temporally proximal factor that has been shown to predict more resilient outcomes is relatively positive emotional reactivity, reflected by more positive relative to negative emotional reactions to acute emotional events (Tugade & Fredrickson, 2004). Emotional reactivity can be measured using self-report scales, such as the Perth Emotional Reactivity Scale (PERS), which assesses the activation, intensity, and duration of one's positive and negative emotional reactions to events (Becerra et al., 2017). However, while previous research indicates that relatively positive emotional reactivity is positively associated with more resilient outcomes (Notebaert et al., 2024), little is known about the factors that precede and predict this pattern of emotional reactivity. The present study was designed to

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empirically test plausible accounts concerning such factors, in order to illuminate the pathway to resilient outcomes in young adults studying at university.

One candidate factor considered in the present study is the presence of relative positive prior expectations. Such a pattern of expectations can be indexed by expressing the degree to which individuals expect certain aspects of an upcoming potentially stressful event to be more positive than negative (Mazidi et al., 2025). It has been theorized that the emotional valence of expectations held concerning an upcoming event may contribute to the emotions experienced in the wake of such events (Castelfranchi & Miceli, 2011). Moreover, there is empirical evidence that expecting a potentially stressful event to be a positive experience rather than a negative experience, is associated with higher levels of subsequent emotional well-being (Arampatzi et al., 2020; Hephsebha & Deb, 2024). For example, Arampatzi et al. (2020) have shown that people who report relatively more positive than negative expectations about an upcoming stressful event also tend to report greater emotional well-being after the event. As yet however, no studies have directly examined the possibility that relatively positive expectations predict the heightened emotional reactivity known to be associated with more resilient emotional outcomes following exposure to potential stressors. The first aim of the present study is to test this possibility by examining the relationship between relatively positive expectations, subsequent emotional reactivity, and resilient outcomes, in young adults completing a semester of university study.

Given the possibility that relatively positive expectations may contribute to the patterns of emotional reactivity associated with heightened emotional resilience, it becomes important to also identify the cognitive factors that precede and predict such expectations. The present study considers the possibility that relatively positive expectations may be the downstream consequence of a positive appraisal style, construed as the predisposition to appraise situations in a benign or positive manner. Positive appraisal style can be measured through self-report instruments such as the Positive Appraisal Style Contents Scale (PASS-c), which assesses the extent to which respondents endorse positive appraisals of potentially stressful situations (Petri-Romão et al., 2024). According to the Positive Appraisal Style Theory of Resilience (PASTOR), positive appraisal style is the key factor that drives all other mechanisms contributing to emotionally resilient outcomes (Kalisch et al., 2015, 2024). This suggests that positive appraisal style may be a factor that precedes and predicts the development of the relatively positive expectations that may, in turn, predict the pattern of emotional reactivity associated with more emotionally resilient outcomes. The second aim of the present study is to test this possibility by examining whether young adult students who are characterized by a more positive appraisal style, as assessed early in a new semester, develop greater positive, relative to negative, expectations about university, as subsequently assessed later in the semester.

Combining the above two ideas invites an integrated hypothesis concerning the sequential steps in the pathway that leads to more emotionally resilient outcomes. Specifically, according to this hypothesis, positive appraisal style is an early precursor which serves to promote the development of relatively positive expectations, which in turn gives rise to the pattern of emotional reactivity that is known to be proximally implicated in the determination of more emotionally resilient outcomes. This hypothesis aligns with the Conceptual Utility Model for the Management of Stress and Psychological Wellbeing (CMMSPW™), which is designed to integrate regulatory antecedents, mediating competencies and distal outcomes of stress and wellbeing (de la Fuente & Martínez-Vicente, 2024). Our sequential pathway - with early positive appraisal style as a predictive (presage) variable, subsequent positive expectations and emotional reactivity as mediating (process) variables, and resilient outcomes as the product variable - maps directly onto the CMMSPW™ taxonomy of predictive regulatory factors, mediating competencies, and adaptation outcomes. Moreover, the CMMSPW™ framework has been applied in university settings to

enhance understanding of student resilience and academic stress (de la Fuente, 2021; de la Fuente et al., 2021, 2022), demonstrating its utility in identifying how regulatory dispositions and process-competencies buffer stress and promote wellbeing.

The overarching aim of the present study is to test this integrated hypothesis that positive appraisal style fosters relatively positive expectations, which shape emotional reactivity and, in turn, promote emotionally resilient outcomes. To do so, we examined the temporal association between these various measures in young adults completing the first semester of a new university year. Specifically, we took a measure of positive appraisal style early in this new semester, followed by the assessment of the degree to which participants subsequently reported relatively positive expectations mid-semester. Then, towards the end of semester, we assessed emotional reactivity, and computed an index of resilient outcomes that expressed the degree to which each student participant demonstrated greater (or lesser) emotional well-being than would be anticipated on the basis of the adversity to which they had been exposed.

There are two key statistical predictions arising from our hypothesis under test: 1. A more positive appraisal style will be associated with more resilient outcomes; and 2. This relationship will be serially mediated by our measure of relatively positive expectations and our measure of emotional reactivity.

2. Methods

2.1. Participants

The present study, which was part of a larger longitudinal research program (the Perth Resilience Project), required a sample of university students. Participants were recruited from a large Australian university. Inclusion criteria required that participants were enrolled in a first-year psychology unit, while the exclusion criterion was being over the age of 25. After exclusions based on incomplete data as described in the Results section, the final sample comprised 95 such participants, with a mean age of 18.85 (SD = 1.61) years. There were 75 women, 19 men, and one non-binary participant. In terms of ancestry, most participants described their ancestry as either Australian (19 %), mixed Australian (18 %), Asian (32 %), or British (9 %).

2.2. Measures

2.2.1. Index of resilient outcomes

This index assessed the degree to which each individual experienced greater emotional wellbeing than would be expected given their recent exposure to potential stressors (Kalisch et al., 2021). Therefore, to compute the index of resilient outcomes, measures of both emotional wellbeing and recent stressor exposure were required. Each type of measure described in turn.

2.2.1.1. Emotional wellbeing assessment. Each individual's emotional wellbeing was expressed by a composite score calculated from the following widely used and well validated measures.

2.2.1.1.1. Generalised Anxiety Disorder Assessment (GAD-7; Spitzer et al., 2006). A seven-item measure of anxiety symptoms, this measure was reverse scored, with higher scores representing lower anxiety symptomology. This measure showed excellent internal consistency (McDonald's ω = 0.92).

2.2.1.1.2. Patient Health Questionnaire (PHQ9; Kroenke et al., 2001). The nine-item depression subscale of the Patient Health Questionnaire, this measure was reverse scored, with higher scores representing lower depressive symptomology. This measure showed excellent internal consistency (McDonald's ω = 0.90).

2.2.1.1.3. Perceived Stress Scale (PSS10; Baik et al., 2017). A 10-item questionnaire used to assess stress levels, this measure was

reverse scored, with higher scores indicating less perceived stress experience over the last month. This measure showed excellent internal consistency (McDonald's ω = 0.87).

2.2.1.1.4. Dispositional Positive Emotion Scales (DPES; Shiota et al., 2006). This study employed an adapted version of the DPES, shortened to 3 items per subscale, resulting in a total of 21 items. Additionally, to assess experience of positive emotions as an acute dispositional state, items were adapted to measure positive emotions as a transient state with participants rating items on a scale of 0 ("not at all") to 3 ("nearly every day") regarding how often they had experienced each item over the past 2 weeks, with higher scores indicating greater positive emotion. This measure showed excellent internal consistency (McDonald's ω = 0.96).

Scores on these four measures were standardised and averaged to create the Emotional Wellbeing Score, such that higher scores represented greater emotional wellbeing.

2.2.1.2. Stressor exposure assessment. Each individual's recent exposure to potential stressors was expressed by two separate scores, respectively assessing microstressors and negative life events. These two stressor exposure scores were computed as follows.

2.2.1.2.1. MIMIS score. The MIMIS score was obtained using an adapted version of the Mainz Inventory of Microstressors (MIMIS; Chmitorz et al., 2020) which assesses exposure to daily microstressors (hassles and annoyances) over the preceding week. This adapted inventory contained the ten most severe items, and the ten most frequently reported items. As two items overlapped (were both most severe and most frequently reported) the final score was calculated from 18 items. Higher MIMIS score indicates greater exposure to microstressor over the past week.

2.2.1.2.2. Negative Life Events Score. The Negative Life Events Score was obtained by adding together scores on the Negative Life Events Scale for Students (NLESS; Buri et al., 2018) and the Trauma Health Questionnaire (THQ; Hooper et al., 2011). These scales respectively assess the degree to which participants recently experienced adverse life events relevant to students and potentially traumatic life events. Higher Negative Life Events Scores represent a greater recent exposure to negative life events.

2.2.2. Index of emotional reactivity

The study also required an index of the degree to which each participant was high in positive relative to negative emotional reactivity. The Perth Emotional Reactivity Scale (PERS; Becerra et al., 2017) was used to compute this index. The PERS, a 30-item self-report measure, yields two subscales, respectively assessing the activation, intensity, and duration of positive, and of negative, emotional responses to events. We computed the difference score between these subscales, reflecting the degree to which positive reactivity was high relative to negative reactivity. Thus, higher scores indicate greater positive, relative to negative, emotional reactivity. This measure showed excellent internal consistency (McDonald's ω = 0.96).

2.2.3. Index of relatively positive expectations

To test the hypothesis of interest, this study also required an index of the degree to which each participant developed relatively positive, compared to negative, expectations concerning the experiences they would have as a student during the first semester. We employed a custom-designed 16-item instrument measure to assess the degree to which participants reported expecting that various aspects of university life would be good, as opposed to bad, (e.g. meeting classmates, lecture content). Responses to each item were scored on a scale ranging from 0 ('All Bad') to 100 ('All Good'). Participants' responses were averaged across items to produce their Index of Relatively Positive Expectations score, with higher scores indicating relatively greater positive as opposed to negative expectations. This measure showed excellent

internal consistency (McDonald's ω = 0.91).

2.2.4. Index of positive appraisals

Finally, the study required a measure of positive appraisal style. For this purpose, we employed the Perceived Positive Appraisal Style Scale – Content (PASS-C; Petri-Romão et al., 2024), which assesses tendency to appraise potential stressors positively. This 14-item self-report instrument measures the degree to which participants endorse positive appraisals of emotional events, with a higher score indicating a more positive appraisal style. This measure showed good internal consistency (McDonald's ω = 0.85).

2.3. Procedure

The study was conducted across the first semester of a new academic year (lasting 12 weeks). Participants completed the assessments using their personal devices. There were three assessment points over the course the semester, and each assessment session began when the participant provided informed consent. At Time 1 (Start of semester; weeks 1–3), in addition to providing demographic data, participants completed the PASS-C to yield the Index of Positive Appraisal Style. At Time 2 (middle of semester; weeks 5–6), participants completed the assessment yielding the Index of Relatively Positive Expectations, to reveal the degree to which they had by then developed relatively positive expectations about academic life. At Time 3 (late semester; weeks 8–9), by which point participants had been exposed to a variety of potential stressors including at least one major assignment, students completed the assessments from which we computed the Index of Emotional Reactivity and Index of Resilient Outcomes. Participants were debriefed at the end of the study, which was approved by the institution's Human Resource Ethics Committee (approval number 2021ET000074) and was performed in accordance with their guidelines and regulations. Deidentified data are available publicly via this link: https://osf.io/xbz39/?view_only=a61fe42d66e84c42ac37c7902369b0b3.

2.4. Data analysis

To calculate the required Index of Resilient Outcomes, this study adopted the FRESHMO approach (Kalisch et al., 2021). This approach assumes a negative linear relationship between stressor exposure and emotional wellbeing, which was confirmed by the finding that both the MIMIS Score and the Negative Life Events Score significantly predicted Emotional Wellbeing Score in the current study ($R^2 = 0.32$). The Index of Resilient Outcomes score was obtained by extracting the residual for each participant, which conveyed the degree to which that participant's Emotional Wellbeing Score was higher than would have been predicted by the Stressor Exposure Scores. Thus, higher scores on the Index of Resilient Outcomes indicate more resilient outcomes.

All data were prepared and analysed using R Statistical Software v4.4.1 (R Core Team, 2024). Participants from the initial sample were excluded if they were missing data for one or more measures (27.6 %) or if the speed of their responses suggested careless responding (Ward & Meade, 2018). For the latter, participants with an average response time less than one absolute distance below the median response time for items on each measure were removed (19.9 %) (Leys et al., 2013). In the final sample, 10 participants were identified as having partial data missing completely at random and thus, had missing data replaced by imputed values for the questionnaire measures via the mice package (van Buuren & Groothuis-Oudshoorn, 2011).

Power to detect the predicted serial mediation effect with our sample size of 95, at a significance level of 0.05, exceeded 80 % (inverse square root method, based on the upper boundary of moderate effect range, βmin = 0.30), showed Nmin = 69 (Kock & Hadaya, 2018). We conducted a serial mediation analysis via Partial Least Squares Structure Equation Modelling, a robust approach for testing mediation in small samples (Nitzl et al., 2016), using the SEMinR package v2.3.3 (Ray &

Danks, 2024). The model was bootstrapped with 1000 repetitions. An indirect effect was considered significant if the 95 % bias-corrected confidence interval did not include zero.

3. Results

3.1. Correlational analyses

Descriptives statistics for, and bivariate correlations between, our measures are reported in Table 1. Consistent with our first prediction, there was a significant positive association of medium effect size between the Index of Positive Appraisal Style and Index of Resilient Outcomes.

3.2. Mediation analysis

Testing the experimental hypothesis required evaluation of direct and indirect associations between the measures of resilient outcomes, positive appraisal style, relatively positive expectations, and emotional reactivity. In our mediation model, the Index of Positive Appraisal Style was entered as the independent variable, the Index of Relatively Positive Expectancies and the Index of Emotional Reactivity were entered as consecutive mediator variables, and the Index of Resilient Outcomes was entered as the dependent variable. Indirect and direct paths defined between each variable are reported with relevant statistics in Fig. 1.

The results indicated the model predicted 50 % of the variance in the Index of Resilient Outcomes ($R^2 = 0.51$, $R^2_{adjusted} = 0.50$). The results also confirmed a significant direct path between the Index of Emotional Reactivity and the Index of Emotional Resilience (Path c, Fig. 1). Participants who reported greater positive (relative to negative) emotional reactivity also exhibited more resilient outcomes. Consistent with our second prediction, the results revealed a significant indirect path between the Index of Positive Appraisal Style and the Index of Emotional Resilience via the Index of Relatively Positive Expectations and the Index of Emotional Reactivity (Path abc, Fig. 1). As observed, a greater positive appraisal style predicted greater positive (relative to negative) expectancies, which in turn predicted greater positive (relative to negative) emotional reactivity, which, in turn again, statistically predicted more resilient outcomes. Therefore, the results supported the experimental hypothesis of an indirect association between positive appraisal style and resilient outcomes via positive (relative to negative) expectations and emotional reactivity.

4. Discussion

The results of the present study were consistent with the hypothesis under test, according to which a positive appraisal style would predict greater emotionally resilient outcomes indirectly through greater positive expectations and emotional reactivity. These findings have important theoretical and applied implications, which will be considered in

Table 1
Bivariate correlations and descriptive statistics for measures of positive appraisal style, relatively positive expectations, emotional reactivity, and emotional resilience.

	1	2	3	4
1. Index of positive appraisal style	–			
2. Index of relatively positive expectations	0.351***	–		
3. Index of emotional reactivity	0.533***	0.474***	–	
4. Index of resilient outcomes	0.401***	0.360***	0.717***	–
M	2.63	916.99	2.39	−0.08
SD	0.43	169.89	20.89	1.04
α₃	0.16	−0.17	0.05	0.12
K	−0.30	−0.32	−0.45	−0.48

*** $p < .001$.

turn.

These new findings advance our theoretical understanding of the mechanisms and factors that may contribute to individual differences in emotionally resilient outcomes. First, the findings support the key premise of the PASTOR model that attributes heightened emotional resilience to positive appraisal style (Kalisch et al., 2015). Second, the present study indicates that positive expectations may be a key mechanism through which positive appraisal style impacts emotional resilience. Third, our findings align with evidence from prior applications of the Conceptual Utility Model for the Management of Stress and Psychological Wellbeing (CMMSPW™) in university contexts (de la Fuente & Martínez-Vicente, 2024). Those studies demonstrated for example that including variables reflecting the teaching–learning process (such as perceived teaching quality and learning climate) significantly increased the explained variance in stress and wellbeing outcomes (de la Fuente, 2021). This supports the notion that the teaching process represents a critical contextual determinant that complements individual cognitive-emotional factors in explaining variance in student wellbeing. Future research should therefore examine the interaction between student-level risk and protective factors and contextual factors to understand how these may jointly operate to influence student outcomes in response to university stress.

In terms of applied implications, our findings suggest that assessing positive appraisal style and expectations about university among students could help identify those at risk of lower emotional resilience. Secondly, emotional resilience may be enhanced in students by seeking to enhance positive appraisal style and taking steps to promote positive expectations about university. Positive appraisal style could be targeted early, though it might be relatively challenging to change given that this has been conceptualized as relatively stable personality trait (Petri-Romão et al., 2024). Expectations may prove to more amenable to manipulation, as it seems plausible that expectations could be influenced by orientation sessions, inductions, or student mentoring programs, while making sure these do not result in overly optimistic expectations which may lead to disappointment (Shepperd et al., 2015). Future research could also examine the potential benefits of simultaneously targeting both positive appraisal style and expectations relative to addressing each factor independently.

Of course, the current study has some limitations that should be acknowledged. The first limitation concerns the constraints on our capacity to draw strong conclusions concerning causality. The applied implications outlined above assume that positive appraisal style causally influences positive expectations, which in turn affect emotional reactivity and resilience. Although our findings are consistent with this proposed causal pathway, the correlational design precludes causal inference (Loh & Ren, 2023). Future research should experimentally manipulate these variables to confirm whether changes in appraisal and expectation processes produce corresponding downstream effects on emotional resilience.

Second, it should be recognized that our relatively small and homogeneous sample limits the variability of responses. As such, findings should be interpreted with caution, as the restricted sample size may reduce the generalisability of the observed effects to broader student populations. More generally, it remains an open question whether similar patterns hold across genders, in more diverse samples, or among individuals facing other life transitions and stressors. Future research should examine these possibilities to determine the broader applicability of our findings. The present framework offers a structured approach for doing so, supporting systematic investigation of how positive appraisal style and expectations contribute to resilience across contexts.

Thirdly, while the current study supports the hypothesis under the test concerning individual differences in emotional resilience, it does not examine whether the measured variables predict the emergence of emotional pathology. Future research designed to improve prediction of such clinical pathology should employ longitudinal designs that include clinical outcome measures, to determine whether positive appraisal

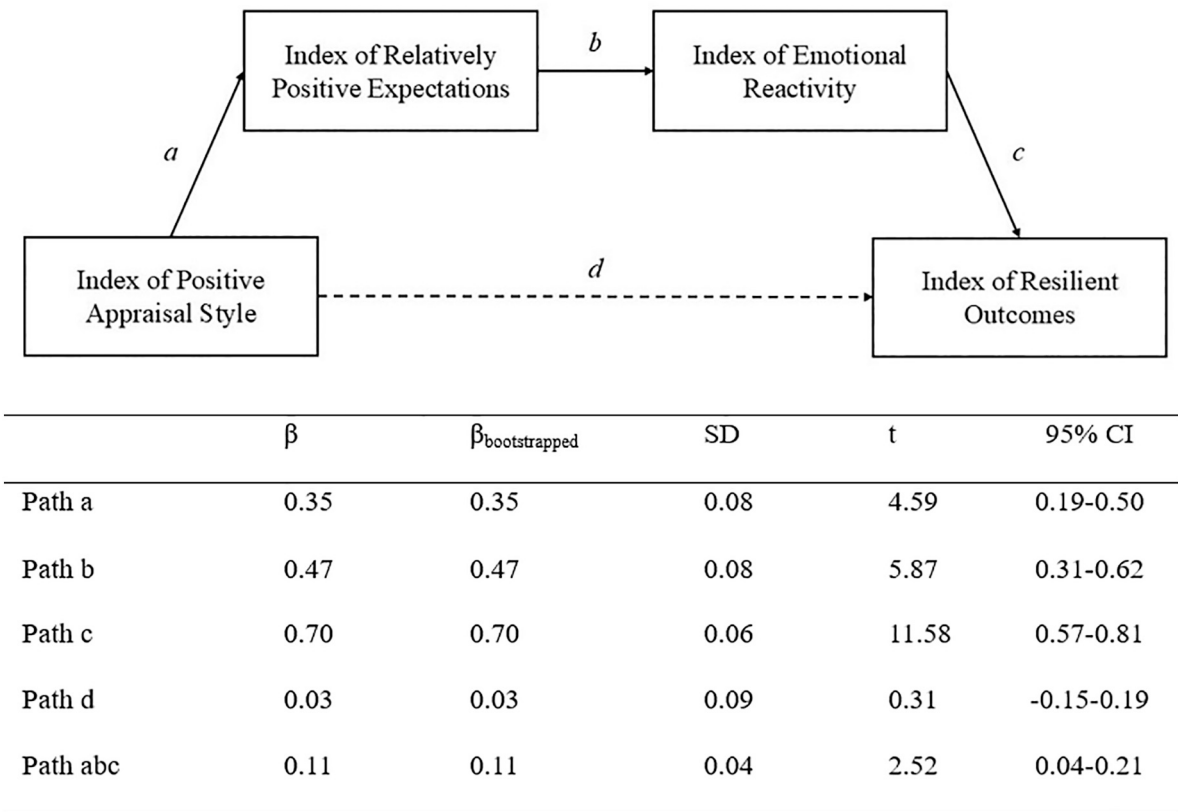|	β	β_{bootstrapped}	SD	t	95% CI
Path a	0.35	0.35	0.08	4.59	0.19-0.50
Path b	0.47	0.47	0.08	5.87	0.31-0.62
Path c	0.70	0.70	0.06	11.58	0.57-0.81
Path d	0.03	0.03	0.09	0.31	-0.15-0.19
Path abc	0.11	0.11	0.04	2.52	0.04-0.21

Fig. 1. Path statistics for fitted model of serial mediation effect of indirect association between Index of Positive Appraisal Style and Index of Resilient Outcomes via Index of Relatively Positive Expectations and Index of Emotional Reactivity. Solid lines indicate significance, and dashed lines indicate non-significance.

style and expectations reduce the likelihood of developing clinical disorders involving emotional pathology (Kalisch et al., 2019). Investigating these relationships could provide valuable insights that could contribute to the prevention and remediation of psychopathology.

While such future research will have the capacity to further expand knowledge and understanding of emotional resilience, the results of the present study permit important conclusions. They show for the first time, that a positive appraisal style and heightened positive expectancies both can precede and predict subsequently observed emotional resilience. Moreover, the observed pattern of results indicates that the impact of the positive appraisal on emotional resilience is fully mediated by positive expectancies. We are optimistic that these findings will be of considerable interest to fellow investigators in this field.

CRediT authorship contribution statement

Lies Notebaert: Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Katie Newton:** Writing – original draft, Project administration, Methodology, Formal analysis. **Hannah A. Razak:** Writing – review & editing, Writing – original draft, Conceptualization. **Josh Gordon:** Writing – review & editing, Writing – original draft, Conceptualization. **Colin MacLeod:** Writing – review & editing, Writing – original draft, Conceptualization. **Mahdi Mazidi:** Writing – review & editing, Writing – original draft, Conceptualization. **Seyran Ranjbar:** Writing – review & editing, Conceptualization. **Amelia Reynolds:** Writing – review & editing, Writing – original draft, Conceptualization. **Raffael Kalisch:** Conceptualization.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the corresponding author used ChatGPT to shorten paragraph length. After using this tool, the author reviewed and edited the content as needed and takes full responsibility for the content of the published article.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The link to the data is provided in the Procedure section.

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