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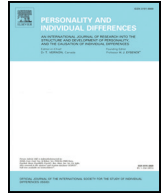
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## Trait anxiety predicts the emotional valence of meaning-making in life stories: A 10-year prospective study



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### ABSTRACT

Individuals interpret events in positive and negative ways, creating positive and negative meaning in their life stories. We hypothesized that higher trait anxiety measured 10 years earlier would predict more negative meaning-making in life stories and that negative meaning-making would be related to more concurrent depressive symptoms. Participants were 272 women who had undergone fertility treatment and completed measures of trait anxiety 10 years earlier. In the present study, they described five life story events and rated these on emotional tone and meaning-making. A path analysis showed that higher trait anxiety predicted more negative meaning-making 10 years later and that negative meaning-making predicted more concurrent depressive symptoms after adjusting for baseline depressive symptoms, trait anxiety, and education. The results suggest that life stories are important to well-being.

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Individuals may gain meaning from experiences in very different ways and the meaning they construct may relate to their well-being. Some individuals focus on how events led to positive consequences and changed them in positive ways, while others emphasize how events were followed by negative outcomes (Lilgendahl & McAdams, 2011). What may predict who will construct more negative life stories and experience lower well-being? To answer this question, we capitalized on a previous study where women in fertility treatment had completed a measure of trait anxiety and examined whether this predicted the emotional valence of meaning-making in life stories and depressive symptoms 10 years later. We also examined whether the emotional valence of meaning-making was associated with concurrent depressive symptoms.

### 1. Life stories and meaning-making

Life stories refer to internalized stories about one's past, present, and future life, constructed to achieve temporal, causal, and thematic coherence (Habermas & Bluck, 2000; McAdams, 2001). Life stories are constructed through autobiographical reasoning, where individuals reflect

on selected events from their lives, thereby organizing and interpreting events in the overall context of their lives (Habermas & Bluck, 2000).

A particular important aspect of autobiographical reasoning is the construction of causal coherence, which refers to establishing causal links between events in individuals' lives and creating causal links between events and selves. Such links are crucial for establishing coherent life stories, which are central to making meaning in one's life; if there are no causal connections, life seems random (Habermas & Bluck, 2000; McAdams, 2001). While meaning-making has generally been conceptualized as adaptive (Adler, Lodi-Smith, Philippe, & Houle, 2015), the causal links individuals create can be both positive and negative, leading to either positive coherent life stories or negative coherent life stories (e.g., romances and tragedies) (Gergen & Gergen, 1988). Thus, a negative event may be interpreted as having caused other negative events and as having changed the individual in negative ways, for example by becoming more insecure. However, a negative event may also be interpreted as having had positive consequences and having changed the individual in positive ways, for example becoming a more sensitive person. The latter sequence has been termed a redemption story and is prominent in life stories of individuals experiencing high degree of well-being (McAdams, Reynolds, Lewis, Patten, & Bowman, 2001).

While studies on redemption testify to the adaptiveness of meaning-making, studies showing that negative meaning-making may be

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associated with reduced well-being are beginning to emerge. [Lilgendahl and McAdams \(2011\)](#) showed that a greater tendency to interpret life story events negatively was associated with poorer well-being. Similarly, [Banks and Salmon \(2013\)](#) found that participants reported more negative affect when their life stories included descriptions of how important events had affected them negatively. Based on this analysis, we conceptualized meaning-making as being potentially both positive and negative, and examined how positive and negative meaning-making in life stories was related to trait anxiety and depressive symptoms.

## 2. Life stories and trait anxiety

Life stories can be viewed as dynamic aspects of individuals' personalities that develop as new events are incorporated and interpretations of past events change through autobiographical reasoning ([Habermas & Bluck, 2000](#); [McAdams, 2001](#)). This autobiographical reasoning process may be affected by more stable aspects of personality, such as personality traits ([McAdams & Pals, 2006](#)). Trait anxiety refers to "a predisposition to appraise stimuli as threatening and respond with anxiety" (p. 647, [Elwood, Wolitzky-Taylor, & Olatunji, 2012](#)) and has been associated with depressive symptoms ([Elwood et al., 2012](#)). While, to the best of our knowledge, no previous studies have examined relations between trait anxiety and meaning-making in life stories, there are reasons to expect that trait anxiety may be related to more negative meaning-making. First, trait anxiety has been found related to a negative bias in information processing ([Elwood et al., 2012](#)) and this may also extend to negative interpretations in life stories. Second, trait anxiety is highly correlated with neuroticism ([Scheier, Carver, & Bridges, 1994](#)), and individuals high in neuroticism have been shown to have more negative life stories ([McAdams et al., 2004](#); [Thomsen, Olesen, Schnieber, & Tønnesvang, 2014](#); [Rubin, Boals, & Hoyle, 2014](#)). However, prospective studies examining whether trait negative affect, such as trait anxiety and neuroticism, predict emotional qualities in life stories are lacking (but see [Lodi-Smith, Geise, Roberts, & Robins, 2009](#)).

## 3. Life stories and depressive symptoms

Life stories have been shown to be important to well-being. A recent review found that positive emotional tone and more redemption sequences were related to higher well-being and that life stories explained variance in well-being beyond personality traits ([Adler et al., 2015](#)). Patients with depression have also been shown to describe their life stories more negatively than healthy controls ([Dalgleish, Hill, Golden, Morant, & Dunn, 2011](#)). The link between negative life stories and depression is consistent with the general idea that depression is associated with negative self-schemata (e.g., "I am worthless") leading to a negative bias in information processing, including negative interpretations of events ([Beck, 1976](#)). Such biased interpretations may include negative meaning-making in life stories. Examining life stories may provide information about how depressive symptoms are related not just to self-schemata but also to interpretations of how the self and events unfold over time. We expected that more negative valence of events and meaning-making in life stories would be associated with more depressive symptoms.

## 4. The present study

We capitalized on a previous study of women undergoing fertility treatment where participants had completed measures of trait anxiety and depressive symptoms. Approximately 10 years after the first study, we invited these women to take part in a study that included a questionnaire on life stories. Our hypotheses were 1) that higher trait anxiety would predict more negative meaning-making in life stories and more depressive symptoms 10 years later, and 2) that more negative meaning-making in life stories would be associated with more concurrent depressive symptoms even after controlling for trait anxiety.

We examined these relationships using a path analysis, where we controlled for relevant demographic variables and depressive symptoms at baseline.

## 5. Method

### 5.1. Participants and recruitment

The participants were 272 women with a mean age of 41.26 years ( $SD = 3.99$ ). Most women were married or co-habiting (89.3%); 2.6% had a partner they did not cohabit with; 7.4% were divorced; 0.4% were single; and 0.4% were widowed. Their educational background was as follows: 21.3% had 4 years or more post-high school education; 47.8% had 3–4 years post-high school education; 11.4% had 1–3 years of post-high school education; 14.7% had manual work education; and 1.5% reported no further education after elementary school (3.3% reported "other education" or "don't know"). Most of the women had children, including adopted children and step children (6.3% had no children; 20.6% had one child; 46.0% had two children; 21.7% had three children; and 5.4% had 4 or more children).

The participants were recruited from a sample of 837 women who participated in a study on psychological aspects of fertility treatment ([Ebbesen et al., 2009](#)). The data for this study were collected between 2001 and 2006. For the present study, 782 women with available addresses were mailed a letter reminding them of their participation in the previous study and inviting them to take part in a follow-up study. We also included women who had initially indicated an interest in the baseline study, but did not complete the baseline study for different reasons. The letter included a link to an online questionnaire. Two-hundred-and-seventy-two participants (35%) completed the part of the questionnaire concerned with depressive symptoms and life stories. Of these, 230 and 228 participants had completed measures of depressive symptoms and trait anxiety at baseline.

The 272 responders were more likely to be highly educated and had higher income ( $\chi^2(4) = 31.06$  and  $\chi^2(4) = 9.99$ ,  $ps < 0.05$ ), and responders tended to score lower on trait anxiety and depressive symptoms at baseline, compared with non-responders ( $ts(779$  and  $780) = 1.91$  and  $1.93$ ,  $ps = 0.06$  respectively). There was no age difference between responders and non-responders.

### 5.2. Materials

At baseline, the women completed several questionnaires (see [Ebbesen et al., 2009](#)). Only the measures of trait anxiety and depressive symptoms are relevant for the present study. When completing the follow-up 8–13 years later (in 2014), the participants again completed a packet of questionnaires, including measures specifically addressing issues related to infertility and treatment. The packet took approximately 2 h to complete, but only the measures of depressive symptoms and life stories are relevant to the present study.

Trait anxiety (completed at baseline): Trait anxiety was measured using the trait subscale of the State-Trait Anxiety Inventory ([Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983](#)). The scale consists of 20 items that are answered on 1–4 point scales, with higher scores indicating higher degree of trait anxiety. The scale is widely used and has been shown to have good internal reliability and convergent validity as well as relatively high test-retest reliability ([Elwood et al., 2012](#)). In the present study, Cronbach's alpha was 0.91.

Depressive symptoms (completed at baseline and follow-up): Depressive symptoms were measured using Beck's Depression Inventory, second edition (BDI-II, [Beck, Steer, & Brown, 1996](#)). The scale consists of 21 items focusing on cognitive-affective and somatic symptoms of depression. Each item is answered using one of several options (scored 0–3) with increasing severity of the specific symptom. Thus higher scores indicate higher degree of depressive symptoms. The BDI-II is widely used to measure depressive symptoms and has been shown to

have excellent internal reliability and convergent validity (Beck et al., 1996). In the present study, Cronbach's alphas were 0.71 (baseline; Ebbesen et al., 2009) and 0.93 (follow-up).

Life stories (completed at follow-up): participants read the following instruction: "This part is about your life story. Please decide which events are most central in the story of your life. There are no right or wrong answers. You know best what has been central in your life. Imagine telling your life story to a new friend that you have met recently and who don't know anything about your past. It is an (imaginary) friend that you trust completely and whom you can be completely honest with. Your task below is to describe the five events, from your birth till today, that you believe have been most central to your life story. Write the events in the order they come to mind. Describe for each event what happened, what you thought and felt, and what the event has meant to you, and answer the questions for each event". For each event, participants gave a brief description, indicated their age at the event, and rated the event on the following questions: 1) how would you describe the event emotionally?, rated on a 7 point scaled with 1 = extremely negative; 4 = neutral/mixed; and 7 = extremely positive; 2) did the event mean that you changed as a person? Rated on a 7 point scale with 1 = yes, an extremely negative change; 4 = not at all; and 7 = yes, an extremely positive change; and 3) did the event cause other events? Rated on a 7 point scale with 1 = yes, some extremely negative events; 4 = not at all; and 7 = yes, some extremely positive events. The questions were developed for the present study based on the idea that meaning-making includes establishing causal links between events (event A caused event B) and causal links between events and selves (event A caused changes in the self) (Habermas & Bluck, 2000; Pasupathi, Mansour, & Brubaker, 2007). Since meaning-making may be both positive and negative, we constructed the questions to address the notion that caused events and self-changes could be both positive and negative.

To illustrate the event descriptions and the ratings, we have included two abbreviated examples.

**Example 1:** "Two children in very short time span. A struggle for me to find a job that fits with my expectations and family life situation. I haven't had a stable job since my first child – have been fired and had stress. I have changed, as I compensate for my past and my previous childlessness. I have become more private, distanced, and focused on work rather than giddiness with my colleagues. My time is sparse and I don't feel that I have the same resources as before and it is difficult for me to accept that family life demands so much of us". This participant rated her life story event 3 for valence (slightly negative), 3 for self-change (slightly negative change) and 3 for caused later events (some slightly negative events).

**Example 2:** "To be allowed to have a child with my loved one is the second most important event. It was a long and hard struggle to get there: My husband's decision to have his sterilization reversed and the whole "project" with fertility treatment. But we succeeded and we never doubted that it was worth it, because we had the loveliest girl. That I, along with my husband, can give her a secure starting point in life has been an enormous gift. To see how complete you can become as a person, never having to doubt your worth or wonder whether love may be withdrawn, is a great

happiness to witness". This participant rated her life story event 7 for valence (extremely positive), 6 for self-change (very positive change) and 6 for caused later events (some very positive events).

Most participants (91.2%) described five events. The remaining participants described 4, 3, 2, or 1 events (2.2%, 3.3%, 0.3%, and 2.9% participants respectively). The participants' ratings for each of the three questions were summed, and divided by the number of events rated, yielding three life story measures: Mean scores for event valence, valence of self-change, and valence of caused events.

In the baseline measures of depressive symptoms and trait anxiety, missing items were replaced by the mean values for the remaining items, when the proportion of missing items was 50% or below (Ebbesen et al., 2009). For the follow-up measure of depressive symptoms, only one participant had missing data and was excluded from the analyses. Because the life story measures were calculated as means (rather than totals), no replacement of missing values was necessary.

## 6. Results

The means, standard deviations, and range for the variables in the study as well as correlations between variables are shown in Table 1. The scores for trait anxiety approximated a positively skewed normal distribution. The mean for depressive symptoms indicate that the participants generally scored low: 84.6% scored between 0 and 13 indicating no depression. However, some participants did fall within ranges indicating the presence of depression: 7.0% scored between 14 and 19 (mild); 6.3% scored between 20 and 28 (moderate); and 1.8% scored above 28 (severe) (Beck et al., 1996). The life story event scores indicated that most events were viewed as positive and interpreted as having changed the self in a positive way and as causing other positive events. In all, 22.8% of participants had mean valence scores below neutral (4), suggesting that they generally viewed events in their life stories as negative, whereas the remaining 77.2% generally viewed events in their life stories as positive. Consistent with our conception of meaning-making as including both positive and negative causal connections, the range indicates that some events were interpreted as having caused negative changes in the self and negative events. In fact, 13.2% and 12.9% of participants in general interpreted their life events as having caused negative changes in the self or other negative events (scores below 4) whereas 86.8% and 87.1% reported that their life story events had changed them in a positive way and caused other positive events (scores of 4 and above).

We examined whether the life story measures and depressive symptoms were related to demographic variables. This was done in order to identify possible demographic variables that would need to be controlled for in examining relationships between the life story measures, trait anxiety, and depressive symptoms. We calculated a series of correlations that examined associations between demographic variables on the one hand and depressive symptoms and life story measures on the other hand (all measured at follow-up). Higher age was associated with less positive events in life stories ( $r(270) = -0.17, p < 0.05$ ) and

**Table 1**  
Means and correlations among variables.

	M (SD)	Range	N	2	3	4	5	6
1. STAI, trait anxiety (baseline)	33.44 (8.12)	20–61	228	0.68*	0.35*	−0.30*	−0.34*	−0.35*
2. BDI-II, depressive symptoms (baseline)	6.51 (5.78)	0–32	230	–	0.37*	−0.26*	−0.27*	−0.27*
3. BDI-II, depressive symptoms (follow-up)	6.32 (7.88)	0–46	271	–	–	−0.34*	−0.51*	−0.53*
4. Valence of event (follow-up)	4.75 (1.34)	1–7	272	–	–	–	0.67*	0.66*
5. Valence of self-change (follow-up)	5.08 (1.00)	1.67–7	272	–	–	–	–	0.80*
6. Valence of caused events (follow-up)	5.13 (1.05)	1.67–7	272	–	–	–	–	–

\*  $p < 0.001$ .



less positive self-change ( $r(271) = -0.15, p < 0.05$ ), but there were no significant relations with depressive symptoms and causing less positive events. Higher education was related to fewer depressive symptoms ( $r(260) = -0.16, p < 0.05$ ), more positive self-change ( $r(261) = 0.17, p < 0.05$ ), and causing more positive events ( $r(261) = 0.14, p < 0.05$ ), but there was no association with positivity of events in life stories. To examine the relation with marital status, we collapsed those with a partner (whether married/co-habiting or not cohabiting) and contrasted these with divorced women (leaving out single and widowed women, because there were so few cases). The divorced women rated their life stories as less positive on all three parameters ( $ts(268) = 2.34$  to  $3.31, ps < 0.05$ ), but there was no relation with depressive symptoms. Finally, we examined the association with number of children. Because initial analyses indicated that differences were between those with no children and those with children (regardless of number of children), we collapsed all women with children into one group and compared this group to women with no children. The women with no children reported less positive scores on all three life story measures ( $ts(270) = 2.31$  to  $3.00, ps < 0.05$ ), but there was no statistically significant difference for depressive symptoms. All in all, being older, less educated, divorced, and having no children was associated with less positive life stories. Being less educated was also, as the only demographic variable, related to more depressive symptoms. Below, we report the main analysis. Because the 17 women who did not have children may be considered special cases, they were excluded from these analyses. However, the pattern of results was largely similar when including these 17 women.

To test our hypotheses, we conducted a path analysis using Amos in SPSS (Arbuckle, 2006). We used the three separate life story variables as indicators of overall life story valence, because the correlations showed that they were closely related. We included education as a control variable, because the correlations showed significant relationships between education and depressive symptoms at follow-up. The goodness-of-fit indices indicated an acceptable fit between our model and the data: CFI (0.996), TLI (0.990), and RMSEA (0.030) (Hu & Bentler, 1999). The model can be seen in Fig. 1. Partially confirming our first hypothesis, the path between trait anxiety and life story valence was statistically significant, with higher trait anxiety predicting more negative life story valence. The path from depressive symptoms at baseline to life story valence did not reach statistical significance. Confirming our second hypothesis, the path between life story valence and depressive symptoms at follow-up was statistically significant,

with more positive life story valence being associated with less depressive symptoms. Finally, higher levels of depressive symptoms at baseline significantly predicted depressive symptoms at follow-up, whereas the paths between trait anxiety at baseline and depressive symptoms at follow-up did not reach statistical significance. Likewise, the path between education and depressive symptoms at follow-up was not statistically significant.

## 7. Discussion

We found that women, who ten years earlier scored high on trait anxiety, selected life story events that were more negative and constructed meanings emphasizing negative changes in the self and negative consequences. Sociodemographic variables in terms of lower education, higher age, divorce, and having no children were also related to more negative meaning-making (see also Lilgendahl & McAdams, 2011). In addition, we found that women who constructed more negative meaning reported more depressive symptoms, even when controlling for education and baseline depressive symptoms and trait anxiety. The present study thus adds to the literature showing that meaning-making may be both positive and negative with differential associations with well-being.

The finding that trait anxiety predicted meaning-making in life stories is consistent with previous studies showing relations between neuroticism and life stories (McAdams et al., 2004; Thomsen et al., 2014), but extend these by showing that trait anxiety prospectively predicted meaning-making. Trait anxiety may become related to life stories through the process of autobiographical reasoning, with women high on trait anxiety focusing more on negative events, thereby making them more accessible. Such reasoning may also include more negative meaning-making, creating chains of negative events perceived to change the self in negative ways. As indicated by the results of the path analysis, it is possible that negative meaning-making in life stories mediate the relationships between trait anxiety and depressive symptoms. Thus, anxious individuals may construct more negative life stories, which may then contribute to depressive symptoms. However, we cannot exclude the possibility that women high in trait anxiety experienced more negative events and that this is the reason for the associations between trait anxiety and more negative life stories.

Negative meaning-making in life stories was related to more depressive symptoms, even when controlling for education, baseline depressive symptoms and trait anxiety. Generally, the results are consistent

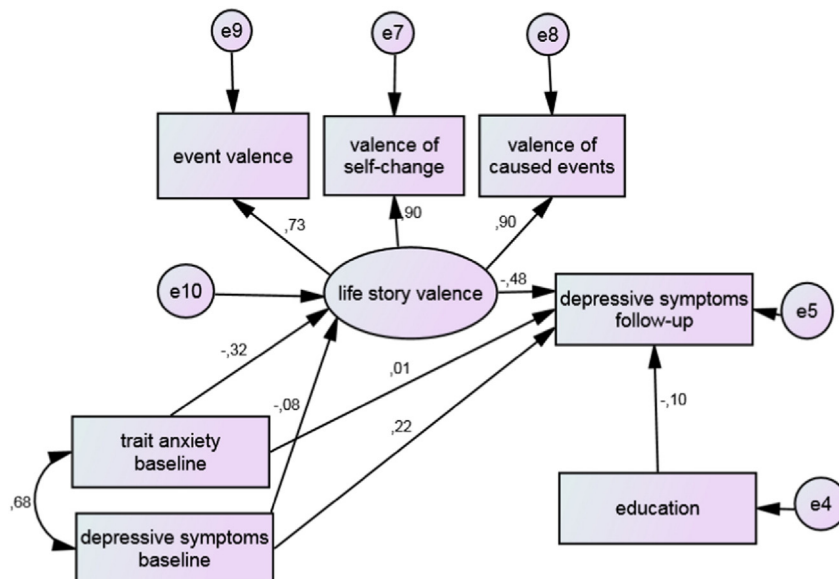


Fig. 1. Path analysis modelling the relationships between depressive symptoms and trait anxiety at baseline, the life story variables, education, and depressive symptoms at follow-up.

with findings of other studies showing relationships between the emotional valence of meaning-making and well-being (Banks & Salmon, 2013; Lilgendahl & McAdams, 2011) and with a study showing that depressed patients had more negative life stories (Dalglish et al., 2011). Previous studies on life stories and well-being have typically relied on coding of verbal descriptions of life stories (Adler et al., 2015). We used a different method, asking participants directly to rate their meaning-making on questions developed specifically for the present study. Although coding of verbal material has the advantage of allowing participants to express their personally experienced meaning freely, it is very time-consuming for both participants and researchers (Adler et al., 2015). In addition, this method may favor individuals who are verbally fluent and very open about their experiences. The fact that we found similar results using a different method (self-report) strengthens the overall confidence in the findings.

Our findings suggest that life stories may be related to the development and maintenance of depressive symptoms. Within cognitive therapy, depressive symptoms are understood as caused by negative self-schemata that bias cognitive processes and shape interpretations of events in negative ways, thus leading to negative emotions (Beck, 1976). We showed that biased interpretations also encompass the construction of negative life stories. Thus, negative self-schemata, cognitive biases, and negative life stories may all be a part of a negative spiral in individuals experiencing high degree of negative affect. Life stories go beyond self-schemata by temporally arranging the different self-schemata and providing explanations for how the self has changed over time (McAdams, 1996). Individuals vulnerable to depressive symptoms (such as individuals high on trait anxiety or neuroticism) construct life stories where events are interpreted in ways that emphasize negative consequences, suggesting that the self can only be expected to degrade further. Such life stories may be related to hopelessness and lack of motivation. However, it may also be that depressive symptoms influence life stories. This would be consistent with the idea that depression biases cognitive processes (Power & Dalglish, 2008). In fact, the correlations showed that depressive symptoms measured 10 years earlier, like trait anxiety, were related to more negative meaning-making in life stories, which is consistent with the idea that depressive symptoms color the emotional meaning in life stories (see also Lilgendahl & McAdams, 2011). However, this relationship did not reach statistical significance in the path analysis, when adjusting for the other variables.

The major limitation of the study is that in spite of the prospective design, cause-effect relationships cannot be determined. Thus, we cannot ascertain whether trait anxiety caused more negative meaning-making in life stories or whether life stories caused more depressive symptoms, irrespective of the events experienced. We also relied exclusively on self-report measures and future studies could include coding of life stories. Another limitation is that the sample only included women who had undergone fertility treatment for childlessness, and the women who participated in the present study had higher educational level and tended to be less depressed and anxious compared to the total baseline sample. It thus remains unknown whether the present results can be generalized to other groups. Very few of the women in the present sample were within the clinical range of depression (only 15%), and it will be important to examine whether the results generalize to clinical samples. In addition, while the BDI-II distinguishes well

between depressed and non-depressed individuals, an operationalization more sensitive to sub-clinical distress levels may have been more appropriate in the present sample.

In conclusion, we found that high trait anxiety, negative meaning-making in life stories, and depressive symptoms were interrelated, suggesting that some vulnerable individuals may be characterized by negativity across domains of emotion and personality.

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