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# Is Meaning in Life a Positive Resource When Adjusting to Stressful Life Events?

Login S. George
*University of Connecticut - Storrs,* login.george@uconn.edu

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Login S. George, PhD

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Having a sense of meaning in life is often considered to be a positive resource that can facilitate better adjustment to major stressors. However, few studies have directly and adequately examined this idea. The present study addresses this question by examining 1) if meaning predicts trajectories and changes in key distress-exacerbating factors and distress 2) if meaning buffers negative effects of distress-exacerbating factors on distress, and 3) if the different dimensions of meaning are differentially important in adjustment. The sample consisted of 180 undergraduates prescreened to have had a recent stressor that they found stressful at prescreening. Participants were assessed at four time points over a 9-week period with three weeks in between each time point. At baseline, participants completed a measure of meaning; at all time points, participants completed measures of key distress-exacerbating factors and distress. Overall, results provided some evidence of meaning as a positive resource in adjustment. HLM analyses of adjustment trajectories showed that those with higher baseline meaning had better adjustment at baseline, although those with lower meaning seemed to catch up over time. Residual change regression models showed meaning to predict favorable changes in distress-exacerbating factors and distress. Moderation analyses showed meaning to buffer the negative effects of distress-exacerbating factors on distress. Finally, the meaning dimension of comprehension appeared to be relatively more important in adjustment than were purpose and mattering. These results have implications such as greater support for clinical interventions aimed at fostering meaning, and the need for more multidimensional examinations of meaning.

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Login S. George


B.A., Rutgers University, 2009

M.A., William Paterson University, 2011

M.A., University of Connecticut, 2015


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Presented by

Login S. George, B.A., M.A.

Major Advisor

_____
Crystal L. Park

Associate Advisor

_____
Dean G. Cruess

Associate Advisor

_____
Dev Dalal

University of Connecticut
2017

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Meaning in life is often theorized to be a protective factor for individuals adjusting to highly stressful life events such as illnesses and traumas (e.g., Breitbart et al., 2010; Frankl, 1959/2006; Winger, Adams, & Mosher, 2015). However, researchers have not, to date, adequately examined this notion of meaning as a positive resource. The present study attempts to fill the gaps in the literature by examining if meaning predicts changes in key distress-exacerbating factors and distress, if meaning buffers negative effects of distress-exacerbating factors on distress, and if the different dimensions of meaning are differentially important in the context of adjustment.

**Meaning in Life as a Positive Resource When Adjusting to Stressful Life Events**

A sense of meaning in life is thought to help individuals better adjust to and stay resilient in the face of major stressors (Frankl, 1959/2006; Winger, Adams, & Mosher, 2015). Those with high meaning are thought to be less impacted by stressors and better able to return to baseline functioning and well-being. Frankl (1959/2006) brought widespread attention to this resiliency-conferring function of meaning through his accounts of the experiences at the concentration camps at Auschwitz. He noted that those who were able to maintain a sense of meaning were able to persist through the severe hardships and survive, while those who lost meaning perished.

Since Frankl, the idea of meaning in life as a positive resource seems to have gained widespread acceptance (e.g., McKnight & Kashdan, 2009; Steger, 2012). For example, an entire clinical treatment protocol, meaning-centered psychotherapy, has been developed based on this notion (Breitbart et al., 2010). This treatment protocol was developed for use with cancer patients, care-givers, and other dealing with major stressors, with the idea that enhancing meaning will improve resiliency and well-being. Contemporary models of stress and coping

(e.g., Park, 2010) have adopted a similar position, suggesting that meaning is a positive resource. For example, the revised stress and coping model (Folkman, 2008) implicates meaning as having a positive role. This model highlights numerous adaptive coping efforts in which people engage, such as drawing on one's spiritual beliefs, benefit-finding, and adaptive goal processes, all of which are closely tied to a sense of meaning in life.

The meaning-making model (see Park, 2010 for a review), another model of adjustment that is central to the present paper, similarly accords meaning an important role in the adjustment process. The meaning-making model suggests that stressors are distressing because they violate individuals' important beliefs and goals — in other words, stressors are inconsistent with the beliefs and goals people hold, resulting in distress (e.g., being diagnosed with cancer may violate the belief in a just world and the goal to live a healthy life, resulting in anxiety and depression). Successful adjustment requires reducing violations of beliefs and goals by stressors by 1) changing one's appraisals regarding the stressor so that the stressor is more in line with beliefs and goals (e.g., "the cancer happened to make me more attentive to my long-term health") or 2) making adjustments to one's beliefs and goals (e.g., "the world is *not* just"). The model hints that having a sense of meaning in life may buffer the extent to which one perceives violations and/or aid in reducing violations.

**Meaning in Life as a Positive Resource: Empirical Support**

Numerous studies relevant to the notion of meaning as a positive resource have been conducted in recent years. The first line of empirical evidence suggesting that meaning may play a favorable role in adjustment pertains to studies documenting associations between meaning and general well-being variables. For example, meaning has been favorably linked to positive affect and hope (Burrow & Hill, 2011), life satisfaction (Bronk, Hill, Lapsley, Talib, & Finch, 2009),

internal locus of control (Pinquart & Fröhlich, 2009) and self-rated heath (Scheier et al., 2006) and inversely to anxiety (Debats, Van Der Lubbe & Wezeman, 1993), depression (Mascaro & Rosen, 2005), and hopelessness (Harris & Standard, 2001). Longitudinal studies have found meaning to prospectively predict suicidal ideation (Kleiman & Beaver, 2013), myocardial infarctions (Kim, Sun, Park, Kubzansky, & Peterson, 2013), sleep quality (Kim, Hershner, & Strecher, 2015), mortality (Hill & Turiano, 2014), and daily levels of positive and negative affect (Burrow & Hill, 2011).  A review of the meaning-wellbeing literature concluded that "there appear to be abundant links between meaning in life and a very wide range of other indicators of well-being" (Steger, 2012, p. 172).

Research among individuals dealing with difficult life experiences also replicate the close association between meaning and better well-being. For example, among samples of osteoarthritis patients, spouses of osteoarthritis patients, and women with breast cancer, meaning has been linked to higher levels of life satisfaction and lower levels of depression and perceived stress (Scheier et al., 2006).  A meta-analysis summarizing results from 44 studies of cancer patients found meaning and distress to be moderately inversely associated ($r = -.41$; Winger et al., 2015). Longitudinal studies have also replicated the meaning-well-being link among individuals coping with significant stressors. For example, in a three-wave, two-year study among chronic pain patients, cross-lagged panel analyses showed that meaning predicted changes in depressive symptoms over time (Dezutter, Luyckx, & Wachholtz, 2015). Another study of individuals undergoing total knee replacement surgery found that meaning assessed prior to surgery predicted six month post-surgery well-being outcomes (such as depression, anxiety, and positive affect) even after controlling for relevant covariates (Smith & Zautra, 2004).

In addition to studies examining general well-being variables, a small number of studies have examined more specifically the relationship between meaning and *adjustment* to a stressor. Such studies are more specific in that rather than measuring general well-being (e.g., depression, life satisfaction), they measured variables that are directly related to adjustment to the stressor (e.g., intrusive thoughts regarding the stressful event). Results from these studies have shown meaning to be positively linked to post-traumatic growth and the ability to make sense of the stressor and negatively linked to distressing intrusive thoughts and other post traumatic stress disorder symptoms (Lancaster & Carlson, 2015; Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2012). Such results are consistent with a view of meaning as a positive resource.

**Meaning in Life as a Positive Resource: Gaps in the Literature**

Unfortunately, the question, is meaning a positive resource in adjustment, cannot be adequately answered based on existing research. Four gaps in the literature hinder our ability to adequately address this question.

**A lack of studies directly addressing the question.** Despite being a commonly held idea, surprisingly, very few researchers have directly examined the role of meaning as a positive resource among individuals dealing with stressors. Most relevant studies examined the relationship between meaning and well-being variables in samples who were not dealing with stressors (e.g., Bronk et al., 2009). In the few studies that do examine meaning in the context of major stressors (e.g., Smith & Zautra, 2004), the examined variables reflect general well-being (e.g., positive affect), rather than constructs specific to adjustment to the stressor (e.g., violations of beliefs or goals). Examining relationships with general well-being variables does not address whether meaning facilitates better adjustment per se. That is, an association between meaning and positive affect among cancer patients does not directly indicate whether meaning facilitates

adjustment to the cancer. A more direct answer  requires examining how meaning relates to key variables identified in the adjustment literature as crucial to distress and positive adjustment.

Violations of one's beliefs and goals, intrusive thoughts regarding the event, and a low sense of resolution regarding the event, are several key variables that have been implicated in the meaning-making model as central to distress in the adjustment process (Park 2010). It is important to assess how these variables (referred to collectively here forth as *distress-exacerbating factors*) relate to meaning. As these distress-exacerbating factors are central to adjustment, to adequately address the resilience conferring functions of meaning, it is necessary to examine how meaning relates to the distress-exacerbating factors.

**Lack of examination of a moderating role of meaning**. In addition to examining how meaning relates to key distress-exacerbating factors, addressing the role of meaning as a resilience factor would require studies that examine how meaning may moderate the link between distress-exacerbating factors and distress variables, such as experienced distress related to the stressor, anxiety, and depression. The beneficial effects of meaning may not be in conferring more favorable levels of the distress-exacerbating factors (e.g., fewer violations). Rather, the beneficial role of meaning may be in buffering the impact of the distress-exacerbating factors on distress (Krause, 2007; McKnight & Kashdan, 2009; Steger, 2012). For example, experiencing violations may not be as distressing and may result in less depression and anxiety for someone with a higher sense of meaning. Currently, examinations of such a moderating role of meaning is virtually nonexistent.

**Need for studies examining trajectories.** Another gap in the literature is that existing studies have mostly used a cross-sectional study design (e.g., Lancaster & Carlson, 2015; Triplett et al., 2012). The cross-sectional nature of such studies limits the conclusions that can be

generated from them as they are open to numerous confounds and alternative explanations. Further research using more sophisticated designs is needed in order to yield more robust evidence regarding the meaning-adjustment link. Specifically, designs that capture trajectories and changes in distress-exacerbating factors and distress are crucial. In the aftermath of stressors, participants can be expected to have improved adjustment as indicated by lowered violations of beliefs and goals, lowered intrusive thoughts, lowered depression and anxiety, and an increase sense of resolution regarding the event (Park, 2010). Modeling trajectories of relevant variables over time and examining if meaning predicts such trajectories would provide a more robust assessment of the resiliency-conferring functions of meaning.

**Conceptualization and measurement of meaning.** The fourth major gap in the literature pertains to meaning conceptualization and measurement (George & Park, 2016a, 2016b). Among relevant research studies, meaning is conceptualized and measured in varying ways. In some studies, the measures are conceptually narrow, assessing only a specific aspect of meaning. For example, some of the aforementioned studies used the Purpose subscale of the Psychological Well-Being Scales (Ryff, 1989), which focuses on only one aspect of meaning, having goals. In other studies of meaning, the measures are conceptually broader but treat meaning in a unidimensional manner. For example, the Perceived Personal Meaning Scale (Wong, 1998) asks participants to rate items such as, "At present, I find my life very meaningful" and "My life as a whole has meaning," combining their responses into a single score. Both of these measurement approaches are limited in that they either do not comprehensively assess meaning nor allow for examining the differential roles played by different dimensions of meaning (George & Park, 2016a, 2016b).

Recently, a tripartite view of meaning (George & Park, 2016a; Heintzelman & King, 2014; Martela & Steger, 2016), and a corresponding measure, the Multidimensional Existential Meaning Scale (MEMS; George & Park, 2016b), have been developed to address such conceptual and measurement problems. This view highlights the importance of a comprehensive and multidimensional approach to meaning. The tripartite view notes that 1) variations in how meaning is defined could result in varying conclusions and 2) a multidimensional approach is important as different dimensions of meaning may play differential roles in various phenomena. The tripartite approach defines *meaning in life as the extent to which one's life is experienced as making sense, as being directed and motivated by valued goals, and as mattering in the world* (George & Park, 2016a). It conceptualizes meaning as consisting of three dimensions: comprehension, purpose, and mattering. *Comprehension refers to the degree to which individuals perceive a sense of coherence and understanding regarding their lives. Purpose conveys the extent to which individuals experience life as being directed and motivated by valued life goals*. And finally, *mattering refers to the degree to which individuals feel that their existence is of significance, importance, and value in the world*. Studies using the MEMS (George & Park, 2016b), which was developed to assess the tripartite aspects of meaning, have illustrated the importance and utility of the tripartite approach, demonstrating that comprehension, purpose, and mattering are not identical and, in fact, differentially relate to other variables (George & Park, 2016b).

The tripartite approach to meaning in life highlights this fourth limitation with the meaning-adjustment literature (George & Park, 2016a; Heintzelman & King, 2014; Martela & Steger, 2016). It suggests that studies that examine meaning in a comprehensive, multidimensional manner are needed. Such studies would be beneficial as they can show if 1)

meaning, conceptualized comprehensively, is a positive resource in adjustment and 2) whether the different dimensions of meaning play differential roles in adjustment. It may be that not all dimensions are a positive resource in adjustment and that one is relatively more important than the others. In fact, in discussions of meaning and stressors, the comprehension dimension is usually implicated (e.g., Park, 2010; Janoff-Bulman, 1992). Individuals with high comprehension have a high sense of understanding and coherence regarding their life, which may better equip them to deal with the uncertainty, chaos, and anxiety that accompanies stressors (George & Park, 2016a). In the face of major stressors, people are faced with questions about who they are, what their experiences mean, and how to move forward (Janoff-Bulman, 1992; Hirsh et al., 2012). Those with a higher sense of comprehension may be better equipped to deal with such questions and challenges.

**Present Study**

The present study aimed to address these identified gaps in the literature and further the understanding of whether meaning is a positive resource in the context of adjustment. It sought to examine links between meaning and key distress-exacerbating factors and distress, using a more sophisticated longitudinal design than what has been used typically. The current study had three broad aims.

**1) Does meaning predict trajectories or changes in key distress-exacerbating factors and distress variables?** We were interested in four key distress-exacerbating factors: violations of beliefs and violations of goals by the stressor, intrusive thoughts regarding the stressor, and a sense of lack of resolution regarding the stressor. These four variables are centrally implicated in the meaning-making model as related to adjustment (Park, 2010). Violation of one's beliefs and goals are thought to be the key aspect of a stressor that makes it distressing. The occurrence of

major stressors violates people's implicit and explicit beliefs and goals, resulting in distress. Intrusive thoughts and a sense of resolution or its lack are two key variables closely tied to violations. Intrusive thoughts, involuntary thoughts and feelings about the stressor that intrudes on one's experience (Weiss & Marmar, 1997), are thought to be driven by the inconsistency between the stressor and one's beliefs and goals. A sense of resolution, the sense that the stressor is resolved, is also thought to be tied to the perceived discrepancy between stressor and belief and goals, with a sense of resolution staying low if meaning-making and coping efforts are not successful in reducing the perceived discrepancy (Williams, Davis, & Millsap, 2002).

In terms of distress variables, we were interested in the following: experienced distress related to stressor (referred to here on as *stressor-related distress*), anxiety, and depression. The former reflects the extent to which individuals experience their stressor as "distressing" to them. The latter — anxiety and depression — reflect commonly experienced psychological difficulties in the face of stressors (Park, 2010).

In the aftermath of stressors, people are typically able to effectively cope (Bonanno, 2004), so we expected favorable trajectories in each of the above variables across time. More specifically, we expected to see decreasing levels of violations of beliefs and goals, intrusive thoughts, stressor-related distress, anxiety, and depression; and increasing levels of resolution. More importantly, based on the notion of meaning as a positive resource (Frankl, 1959/2006), we predicted that meaning in life would predict *more favorable* trajectories characterized by faster improvements in these variables (e.g., higher baseline meaning would be related to faster declines in violations over time). We reasoned that those with higher meaning would be more likely to show favorable changes in the variables.

**2) Does meaning buffer the effect of distress-exacerbating factors on distress variables?** Consistent with the meaning-making model (Park, 2010), we expected violations of beliefs and goals, intrusive thoughts, and resolution to be unfavorably contributing to distress. Specifically, we expected that greater belief and goal violations and intrusive thoughts would be positively associated with stressor-related distress, anxiety, and depression; in contrast, resolution will be negatively associated. However, based on the idea of meaning as a positive resource (McKnight & Kashdan, 2009; Steger, 2012), we hypothesized that meaning would favorably moderate these relationships. For example, the positive effect of violations on anxiety may decrease with higher levels of meaning, as violations may not result in as much anxiety for those higher on meaning.

**3) Are the three dimensions of meaning differentially important?** Comprehension, purpose, and mattering may not be equally important in the context of adjustment, in terms of their predictive power; one or two of the dimensions may be relatively more important (George & Park, 2016a; Martela & Steger, 2016). We hypothesized that comprehension would show the strongest prediction of study variables and their trajectories and show the strongest buffering role; mattering, on the other hand ,would have the weakest role. We based this hypothesis on the fact that comprehension is the dimension most implicated in discussions of stress and coping (Park, 2010; Janoff-Bulman, 1992). Comprehension refers to a sense of understanding and coherence regarding one's life. Stressors violate beliefs and goals, thereby generating uncertainty and confusion regarding how to proceed. Those with high comprehension, in lieu of their higher sense of understanding and coherence, may be better equipped to deal with such uncertainty. In contrast to comprehension, relatively speaking, we expected mattering to have the least important role. Mattering refers to a sense of significance regarding one's existence (Becker,

1973/1997), which is not as centrally implicated in models of adjustment. We expected purpose to play a more key role than mattering. Purpose, which refers to having valued and committed goals and aims in life, may motivate coping efforts and maintain positive mood, thereby conferring more resiliency (McKnight & Kashdan, 2009).

The present study used a longitudinal design to address some of the gaps in the existing literature that pertain to the use of study designs with only one or two assessment points. Further, participants were prescreened to have a recent stressful life event that they found at least "somewhat" stressful. Prescreening in this manner, and following participants longitudinally across four timepoints, allowed us to capture the adjustment phenomenon as it occurred.

**Methods**

The sample for this study was recruited through the psychology participant pool at a large university in the Northeastern United States. Participants were screened during mass testing at the beginning of Spring 2014, Fall 2014, and Spring 2015 semesters. Participants were screened using the following two questions: "Have you had a very stressful event or situation happen to you in the last three months?" and "If you answered 'Yes', how stressful is this event or situation to you now?" For the first question, participants responded *yes* or *no*; for the second question, they responded using a 7-point scale ranging from 1 (*not at all stressful*) to 7 (*extremely stressful*). Participants who indicated experiencing a stressor, and rated it at least a 3 (*somewhat stressful*) were allowed to participate in the present study. In addition to the above two questions, during prescreening, participants were also given the opportunity to indicate in an open-ended format, what their stressor was.

The present study was described to participants as a study on the relationship between life events and well-being. Participants were given course credit in exchange for participation.

Participants signed up for the study online, and all data was collected via online surveys. Participants were emailed the survey on the data collection days and were given 24 hours to participate. The emails were sent out to each participant on four different data collection days, with three weeks in between each data collection day.

A total of 180 participants were enrolled in the study. Attention check items embedded in the survey and time taken to complete the survey were used to remove data from timepoints where inadequate attention appeared to be given to the survey. For Time 1, 2, 3, and 4, valid data was present for 177, 164, 155, and 148 participants respectively. The majority of participants were female (76%) and mean age was 18.84 ($SD =1.34$).  Approximately 75% of the sample was white/Caucasian, 11% Asian/pacific islander, 6% Latino/Latina, 3% black/African American, and 4% "other."

For descriptive purposes, participants' reported stressors were coded using a categorization scheme previously developed and used among undergraduates (Park et al., 2016, Study 3). Each participant stressor was coded as falling into one of seven thematic categories based on the type of stressor. The percentage of reported stressors that fell into each category were as follows: 27.5% college, academics, extracurricular activities, or transition/moving; 21% illness, injury, or accident; 11.5%  death and loss; 7% social conflict; 5.5% abuse, domestic violence, or intimate relationship issues; 0.5% legal problems; 15.4% other (more than one reported stressor; or a stressor that did not fall into the other categories); and 11.5% did not have sufficient information for coding.

**Materials**

The MEMS (George & Park, 2016b), which was used to measure meaning in life, was administered to participants only at Time 1; all other measures were administered at all time

points. The 15-item MEMS, developed based on the tripartite model of meaning, measures the extent to which one's life is experienced as making sense, as being directed and motivated by valued goals, and as mattering in the world. The scale consists of three subscales — comprehension, purpose, and mattering — with five items on each subscale. Sample items on comprehension include, "My life makes sense" and "Looking at my life as a whole, things seem clear to me;" purpose includes "I have certain life goals that compel me to keep going" and " My direction in life is motivating to me;" and mattering includes, "Whether my life ever existed matters even in the grand scheme of the universe" and "I am certain that my life is of importance". Participants rated the items on a 7-point scale from 1 (*very strongly disagree*) to 7 (*very strongly agree*). The 15 items were averaged to get an overall meaning score, and the items from each subscale were averaged to get a comprehension, purpose, and mattering score. Psychometric properties regarding the MEMS can be found in George and Park (2016b). The scale has shown good test-retest reliability and convergent validity with existing meaning measures, and factor analyses have supported its three-factor structure. The MEMS subscales have also shown differential, theoretically consistent relationships with other variables. Cronbach's alpha in the current sample for the overall MEMS scale and the Comprehension, Purpose, and Mattering subscales were .93, .87, .90, and .89 respectively.

Before completing the below scales specific to the stressor, participants were instructed that they qualified to be in the current study as they indicated on the prescreener that they experienced a "stressful life event or situation" in the past four months. They were directed to answer the subsequent survey questions in relation this event. Violations were assessed using the Belief Violations and Intrinsic Goal Violations subscales of the Global Meaning Violations Scale (GMVS; Park et al., 2016). The GMVS explicitly asks participants the extent to which their

stressor has violated specific commonly held beliefs and goals. The five-item Belief Violations subscale pertained to beliefs about fairness and justice, control, and benevolence and safety (e.g., How much does the occurrence of this stressful experience violate your sense of the world being fair or just?"). The five-item Intrinsic Goal Violations subscale asked participants to indicate how much their stressful experience interfered with their ability to accomplish" the listed goals. The listed goals were "social support and community," "self-acceptance," "physical health," "inner peace," and "intimacy (emotional closeness)." Participants indicated their responses on a 5-point scale from 1 (*not at all*) to 5 (*very much*). The belief items and goals items were averaged separately to arrive at a belief violations and goal violations score, with higher scores indicating greater violations. Cronbach's alpha for the subscales can be seen in Table 1.

The eight-item Intrusions subscale of the Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1997) was administered to measure intrusive thoughts. The IES-R is a widely used self-report measure of symptoms of PTSD. The intrusions subscales measures the extent to which the stressful event intrudes on one's experience, and it assesses intrusions such as nightmares and involuntary thoughts, feelings or images regarding the event. Sample items included "Other things kept making me think about it," "I had waves of strong feelings about it," and "Pictures about it popped into my mind." Participants rated the extent to which they were distressed by the experience described in each item over the past three weeks. The items were rated on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). The eight items were averaged to get an intrusion score.

A sense of resolution was measured using the Resolution subscale from the Cognitive Processing of Trauma Scale (Williams et al., 2002). This subscale assesses the degree to which participants see the stressful event as being resolved. The four items on the scale are: "I have

figured out how to cope," "I have moved on and left this event in the past," "Overall, this event feels resolved for me," and " I have come to terms with this experience." Participants were directed to rate how much each item represented their "current" attitude towards the stressful event. Participants rated the items on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The items were averaged to derive a resolution score, where higher scores represented greater resolution.

Stressor-related distress was assessed using a single item — "How distressful is the stressful event or situation to you now" — rated on a 7-point scale ranging from 1 (*not at all distressful*) to 7 (*extremely distressful*). Similar single-item measures have been used in previous studies (e.g., Park et al., 2016, Study 3).

Depression and Anxiety were assessed using subscales from the widely used Depression, Anxiety and Stress Scales (DASS; Lovibond & Lovibond, 1995). The Depression and Anxiety subscales consist of seven items each that describe various features of depression (e.g., "I felt downhearted and blue") and anxiety (e.g., "I felt scared without any good reason") respectively. Participants rated the extent to which each item applied to them over the past three weeks on a 4-point scale from 1 (never) to 4 (always). We removed one depression item from the Depression subscale ("I felt that life was meaningless") to avoid overlap between the scale and our primary predictor of interest, meaning. Two separate mean scores were computed using the depression and anxiety items.

**Data Analytic Plan**

Hierarchical Linear Modeling (HLM) was used to address the research questions as it allows for the estimation of individual growth trajectories for each participant (Raudenbush & Bryk, 2002). That is, for each participant, how their scores change over time can be modeled

(e.g., reductions in intrusive thoughts over time). Furthermore, HLM allows for the examination of what predicts variation in individuals' trajectories across time (e.g., Does meaning predict faster reductions in individuals' intrusive thoughts). HLM can thus show if those with higher meaning show faster changes in relevant variables.

To address aim one of the study — meaning as a predictor of trajectories in the outcomes — models predicting violations of beliefs and goals, intrusions, resolution, stressor-related distress, anxiety, and depression, were computed. The level 1 models contained an intercept, and a time variable centered at baseline (coded 0, 1, 2, and 3) that captured the effect of time on the outcome. The estimated intercept represented participants' standing on the outcome variables at baseline and the slope represented change over time. At level 2, meaning was entered as the predictor of the level 1 intercept and time slope. The meaning coefficients for the intercept and the slope conveyed whether meaning predicted individuals' standing at baseline and their change over time, respectively.

In all HLM models, estimated, level 1 predictors were person-mean centered and level 2 predictors were grand mean centered, to better tease apart within-person effects. All random effects were initially included and estimated in the model, and were subsequently treated as fixed effects if results showed them to be non-significant. Time was included in all of the models as well, to control for the effects of time, and to more confidently attribute the change in the outcomes to the change in the predictors (Bolger & Laurenceau, 2013).

To address research question two — meaning's moderation of the link between distress-exacerbating variables and distress variables — separate HLM models, with each of the different distress-exacerbating variables as predictors, were estimated for each of the outcomes. At level 1, a distress-exacerbating variable was used as the predictor in addition to the time variable. At

level 2, meaning was used as the predictor of the level 1 intercept, time slope, and slope of the relationship between the distress-exacerbating variable and the outcome. The level 2 meaning coefficient of the impact of meaning on the distress-exacerbating variable slope tested whether there was significant moderation of the within-person association.

To address research question three — differential predictive power of the meaning dimensions — the aforementioned models were repeated but with comprehension, purpose, and mattering as predictors instead of an omnibus meaning score that combines the three dimensions into an overall single score. The coefficients for the three dimensions test whether comprehension, purpose, and mattering all predict adjustment, controlling for one another, or if only one or two emerge as significant unique predictors.

Optimal Design (Raudenbush, Spybrook, Congdon, Liu, Martinez, & Bloom, 2011), a free online software that allows for power calculation of HLM models, was used to estimate the sample size needed for the study. With an intended power of .80, an alpha level of .05, an estimated medium standardized effect size, and four time points, a sample of approximately 150 participants was needed. In the present study therefore, 180 participants were enrolled to have sufficient power after attrition.

Regression analyses supplemented the HLM analyses as they provide additional information regarding the relationships among the variables. While the above mentioned HLM models took advantage of the full complexity of the data (i.e., between- and within-person variance; data from all time points), and examined meaning's prediction of participants' trajectories on the outcomes and meaning's moderation of within-person associations of variables, the regression analyses were used to examine between-person relationships from specific slices of the data. Residual change regression models, where meaning was used to

predict Time 4 scores on study variables, controlling for Time 1 scores on the same variables, were estimated. These models showed how meaning predicted *changes in participants' relative standing to one another* on the study variables across study span (e.g., Did baseline meaning predict negative changes in intrusions relative to those of others, across study span? Selig & Little, 2012).

Regression was also used to examine meaning's moderation of between-person associations between relevant variables at baseline (e.g., Cross-sectionally, was higher meaning associated with an attenuated between-person association between belief violations and depression?). The PROCESS add-on in SPSS (Hayes, 2013) was used to aid in computing regression models examining moderation and probing moderation effects. Regression models examining moderation by the omnibus meaning score were also repeated with the three meaning dimensions as simultaneous moderators instead to determine whether there were unique moderation effects for each meaning dimension, controlling for the others. In these regression models, PROCESS was not used, as it does not allow for examination of three simultaneous moderators. In the moderation analyses, the focal predictor and the moderator(s) were entered as step 1 predictors, and the product term was entered in step 2.

Regression analyses were used to further explore aim three regarding differential roles of the meaning dimensions. Using baseline data, the meaning dimensions were used as simultaneous predictors in regression models predicting distress-exacerbating variables and distress variables. The beta coefficients from these models indicated how each meaning dimension related to the outcome variables *after accounting for the other meaning dimensions —* that is, they showed whether each dimension had unique predictive power relative to one another and how they compared with one another. We further supplemented these regression results with

relative importance analyses (Johnson & LeBreton, 2004). Experts have pointed out that when predictors in a model are correlated, the betas that emerge in regression analyses could paint a distorted picture of the relative importance of the predictors (Tonidandel & LeBreton, 2011). Relative importance analysis addresses this limitation and can partition the overall regression model variance into constituent parts and attribute each part to the different model predictors (Johnson & LeBreton, 2004). This analysis is helpful in the context of aim three as it demonstrates what portion of the overall regression model variance is accounted for by each of the meaning dimensions. For example, it can specify that out of the 10 percent of variance accounted for in stressor-related distress, 20 percent is attributable to comprehension, 10 percent to purpose, and 5 percent to mattering.

Of the two types of relative importance analysis that can computed, here we use the relative weight analysis option (estimates based on bootstrapping with 10,000 replications). All relative importance analyses were conducted in R using syntax generated through a web application (Tonidandel & LeBreton, 2014). In reporting the results below, we provide the raw weights — which represent the percent of the variance in the criterion accounted for by the predictor — and the 95 percent confidence intervals around the raw weights. For ease of interpretation, we also report what percent of the overall regression model was accounted for by each predictor.

## Results

### Descriptives and Intercorrelations

See Table 1 for descriptives of variables across the study span. The mean level of stressor-related distress at baseline was 4.61 — which was rated on a 7-point scale ranging from 1 (*not at all distressful*) to 7 (*extremely distressful*) — indicating that at the beginning of the

study, as a whole, participants found their stressor to be at least "moderately stressful." The mean

stressor-related distress declined to 2.94 by the end of the study, indicating improving adjustment

over time. The mean scores on the other variables painted a similar picture. With the exception

of resolution, scores on the variables appeared to be decreasing over study span; resolution

increased as expected. Thus, recruitment and screening efforts seemed successful in capturing

participants who were actively adjusting to a significant stressor, and who, consistent with

coping models (Park, 2010), showed improved adjustment over time. Intraclass correlation (ICC)

was computed for each variable to see if each had sufficient within-person variance to warrant

using HLM (see Table 1). ICCs indicated that there was sufficient within-person variation in the

variables.

Baseline intercorrelations between study variables can be seen in Table 2. Correlations of

meaning with the other variables were consistent with a view of meaning as a positive resource,

showing that higher meaning was associated with lesser violations of beliefs and goals, intrusive

thoughts, stressor-related distress, anxiety, and depression, and a greater sense of resolution.

**Aim One: Meaning as a Predictor of Trajectories and Changes in Distress-Exacerbating**

**Variables and Distress Variables**

**HLM.** HLM models predicting each of the distress-exacerbating variables and distress

variables were estimated to model change in them over time. Each model consisted of the

intercept and a time variable centered at baseline (coded 0, 1, 2, and 3). Coding the time variable

in this manner allowed for interpreting the intercept as participants' baseline score on the

variable, and the time slope as the change in the baseline score for each passing wave. Results

showed a statistically significant growth curve in all of the variables in the expected direction

(see left side of Table 3). All of the variables, except for resolution, had a significant negative

coefficient for the time variable; resolution, on the other hand, had a significant positive coefficient as expected. Thus, as expected, with passing time, participants seemed to be adjusting better to their stressor. For example, the intercept and time slope for belief violation estimated, respectively, that participants started the study with a score of 2.66 ($p < .01$) and for each passing wave, this score decreased by .10 ($p < .01$).

Next, meaning was entered as a level-2 predictor of the intercept and the time slope for models predicting each of the variables (Table 3, right side). Results showed that meaning was a significant predictor of the intercept of all of the variables in the expected direction. Thus, higher meaning was associated at baseline with lower levels of violations of beliefs and goals, intrusive thoughts, stressor-related distress, anxiety, and depression; and with higher levels of resolution.

Meaning was a significant predictor of the time slope for all variables except for the belief and goal violations slopes, and it was a marginally significant predictor of the intrusions slope. Examining the significant slopes, however, showed that, contrary to our expectations, meaning appeared to *weaken* the magnitude of the time slopes (i.e., meaning was related to *slower* improvements across time). Based on the idea of meaning as a positive resource, we expected meaning to show the opposite effect — that is, it would be associated with faster declines in variables such as stressor-related distress and faster increases in resolution. However, contrary to this hypothesis, higher meaning appeared to predict slower changes in the variables. For example, in the model predicting distress, the intercept for the time slope was -.54 and the effect of meaning on this time slope was 0.12. Thus, it was estimated that for each passing wave, distress decreased by .54; however, for each one-unit increase in meaning, the decrease in distress was reduced by .12.

To better understand the relationship between meaning and the trajectories, the effects from significant or marginally significant models were plotted for mean levels of meaning and one standard deviation above and below mean levels of meaning (see Figures 1 to 5). The plots showed that for all variables, those with low meaning had faster favorable changes over the study span (i.e., steeper slopes). However, more importantly, those with low meaning started off with *worse* scores on the variables at baseline such that they appeared to have more "room for improvement." Those with low meaning seemed to be simply "catching up" to those with high meaning. In the case of most variables, even at the last time point of the study, those with high meaning continued to have more favorable scores on the variables.

In summary, contrary to our expectation, we did not see faster improvements in the distress-exacerbating variables or distress variables among individuals with higher meaning; in fact, those with lower meaning had faster improvements over the study span. However, those with higher meaning had better scores on all variables at baseline, and those with lower meaning seemed to be catching up to those with higher meaning. The HLM analyses thus failed to find evidence that meaning predicts better adjustment trajectories over time.

**Residual change regression models.** Residual change regression models were estimated to see the effect of baseline meaning on changes in participants' relative standing on the distress-exacerbating and distress variables across time. Time 4 scores on each variable were predicted using baseline scores of the same variable and meaning. Regressing each variable on itself allowed for interpreting the coefficient for meaning as the extent to which baseline meaning predicted subsequent changes in participants' standing on the outcome variable relative to those of others. The models were also repeated with Time 2 scores as the outcome variable instead of Time 4 to preserve power and to serve as a more liberal test (as temporal relationships tend to

weaken over time, it is more challenging to find a temporal effect of meaning that persisted over two months).

Not surprisingly, results showed that models predicting Time 2 scores yielded more significant scores than those examining Time 4 scores (see Table 4). Models predicting Time 2 scores indicated that baseline meaning significantly or marginally predicted changes in belief and goals violations, intrusive thoughts, and depression. The effects were such that higher meaning predicted favorable changes in participants' scores on these variables relative to those of others. For example, the beta coefficient in the model predicting belief violations was -0.16 ($p < .01$), indicating that those with higher meaning had negative changes in their relative standings. These results are consistent with a view of meaning as a positive resource, as those with higher baseline meaning had favorable changes relative to those with lower baseline meaning, across the following three weeks, on their scores on belief and goal violations, intrusive thoughts, and depression.

**Aim Two: Meaning's Moderation of the Effect of Distress-Exacerbating Variables on Distress**

**HLM.** HLM was used to examine possible moderation of the effect of key distress-exacerbating variables on distress variables. Specifically, four models were computed predicting each of the three distress variables, stressor-related distress, anxiety, and depression. In each of the four models, one of the distress-exacerbating variables — belief or goal violations, intrusions, or resolution — was entered as a level one predictor. Time was also included as a level 1 predictor to rule out the possibility that the level 1 within-person associations were simply due to passage of time. Meaning was entered as a level 2 predictor of the intercept, time slope, and the slope of the focal predictor variable.

Almost all of the models showed significant level 1, within-person effects of distress-exacerbating variables on distress variables (see Table 5). Thus, consistent with the meaning-making model (Park, 2010), at waves in which participants experienced more belief and goal violations and intrusions, they experienced more distress, anxiety, and depression; at waves in which they experienced greater resolution, they experienced less distress, anxiety, and depression. It is worth noting that as the level 1 variables were group centered and as time was included in the model, many possible typical confounds of the effect (e.g., individual differences; passage of time) have been accounted for, and these effects provide rather robust evidence in support of adjustment models that suggest that violations, intrusions, and resolutions are crucial aspects of adjustment that can impact distress and positive adjustment.

Of the 12 moderation effects tested, there were two significant and two marginally significant interaction effects (see Table 5). Specifically, in models predicting stressor-related distress, meaning was a significant moderator of the effect of goal violations and resolution and a marginally significant moderator of the effect of intrusions. In the model predicting depression, meaning marginally moderated the effect of intrusions. The moderation effects were such that meaning mitigated the negative effects of distress-exacerbating variables on distress variables. For example, it was estimated that at waves in which participants experienced a one unit increase in goal violations relative to their own average goal violations, they experienced a .42 ($p < .01$) increase in stressor-related distress. However, this effect was reduced by .18 ($p < .05$) for each one unit increase in meaning. Such moderation effects support the view of meaning as a buffer that can prevent stressors from negatively affecting well-being.

**Regression.** Regression models, executed in PROCESS, examined if meaning moderated the between-person associations between distress-exacerbating variables and distress variables at

baseline. Four models were estimated predicting each of the three distress variables. In each of the four models, one of the distress-exacerbating variables — belief and goals violations, intrusions, and resolution — were entered as predictors. Each model also contained meaning as a predictor, along with the interaction term between meaning and the focal predictor.

Results (see Table 6) showed that meaning did not moderate the effect of distress-exacerbating variables on the stressor-related distress variable. However, for the anxiety and depression dependent variables, meaning significantly or marginally moderated the between-person effects of all four of the distress-exacerbating variables. To better understand the moderations effects, simple slope analyses were conducted, where the effect of the predictor at low, average and high meaning were estimated (see Table 7). The follow-up analyses showed that the moderations were in the expected direction of a positive buffering role. With higher levels of meaning, unfavorable associations between distress-exacerbating variables and anxiety and depression became attenuated. For example, the effect of belief violations on anxiety decreased across low ($b = .26$, $p < .01$), average ($b = .12$, $p < .01$), and high levels of meaning ($b = -.01$, $p = .81$). Thus, regression analyses examining moderation of between-person associations, showed evidence of moderation consistent with a view of meaning as a buffer in adjustment.

**Aim Three: Differential Importance of Meaning Dimensions**

Correlation and regression analyses were executed to examine the differential relationships between dimensions of meaning and distress-exacerbating and distress variables (see Table 8). Correlation analyses indicated that compared to purpose and mattering, comprehension had correlations that were the largest in magnitude. Regression analyses painted a similar picture, indicating that only comprehension had unique predictive power in most cases,

while purpose and mattering did not. The major exception to this general finding appeared to be with depression, where all three of the dimensions seemed to have unique predictive power. Relative importance analyses painted a similar picture, showing that much of the model $R$ squared accounted for in the variables was attributable to comprehension (between 48 and 74 percent) and not purpose and mattering (9 to 33 percent). For example, 77 percent of the variance accounted for in stressor-related distress could be attributable to comprehension, whereas only 10 and 12 percent were attributable to purpose and mattering, respectively. Finally, we visually compared the correlations between the study variables and the omnibus overall meaning score and between the study variables and comprehension (recreated in Table 9 for convenience). The comparison showed that in the case of all variables except for anxiety and depression, the magnitude of correlation of the omnibus meaning score was smaller than that of comprehension, but larger than that of purpose and mattering. This set of findings, too, indicated that comprehension generally had the strongest associations with distress-exacerbating and distress variables, and combining comprehension with the other dimensions into a single score seemed to be lowering the strength of the association. Thus, consistent with our expectation, the different dimensions appeared to be differentially important in the context of adjustment, and specifically, comprehension seemed to have more predictive power.

**Comprehension, purpose, and mattering as predictors in HLM growth models.**

Previous HLM models where the omnibus meaning score was used as a predictor of the intercept and time slope for distress-exacerbating and distress variables were repeated with comprehension, purpose, and mattering as the predictors to examine the unique predictive power of each dimension of meaning in predicting growth trajectories (see Table 10). Consistent with results from the regression analyses, overall, comprehension tended to be the only predictor of

the intercept, indicating that comprehension was the only unique predictor of individuals' starting point on all the variables at the beginning of the study. The prediction was in the expected direction of higher comprehension being associated with more favorable scores on the outcomes. Depression, however, again seemed to be an exception to the overall pattern, showing that all three dimensions of meaning predicted the intercept.

In terms of predicting the time slope (i.e., rate of change in the variables across time), comprehension did not stand out as starkly. Nevertheless, comprehension appeared to be the only significant or marginal predictor for outcome variables such as belief violations, resolution, and distress. For intrusions, comprehension and purpose were both marginal predictors, for goal violations, purpose and mattering were both marginal predictors, and for depression, purpose was the only marginal predictor.

**Comprehension, purpose, and mattering as predictors in residual change regression models.** Previous regression models where Time 2 scores of the distress-exacerbating and distress variables were predicted by baseline meaning after controlling for baseline scores on the variables were repeated with baseline comprehension, purpose, and mattering scores as the predictors (see Table 11). Results showed that only one of the effects were significant, where comprehension was a predictor of belief violations ($b = -.20$, $p < .05$), but purpose and mattering were not ($b = .00$, $p = .96$; $b = .00$, $p = .98$, respectively).

Comparing the results from this model to the earlier model, where the omnibus meaning score was used as the predictor instead of the dimensions, showed that when the omnibus score was the predictor of depression, the beta coefficient was -0.16, which compared to beta coefficients of -0.20 for comprehension and 0.00 for purpose and mattering in the current models. The estimated beta coefficient for comprehension was thus larger than that for the

omnibus meaning score. This finding indicated that the variance specific to comprehension — as purpose and mattering were controlled for — may be a better predictor of changes in relative standings on belief violations, than the variance shared with the other dimensions and the variance specific to each of the other dimensions. Such a pattern of results is yet another illustration of why a multidimensional approach to meaning may be important as different dimensions may have different relationships with other variables, and combining them into a single concept or score may result in reduced predictive power.

**Comprehension, purpose, and mattering as moderators in HLM models.** Previous HLM models, where the moderation effects of meaning were examined were repeated with comprehension, purpose, and mattering as the moderators instead of the omnibus meaning score. Specifically, four models were computed for each of the three distress variables, stressor-related distress, anxiety, and depression. In each of the four models, one of the distress-exacerbating variables — belief and goal violations, intrusions, and resolution — was entered as a predictor, in addition to the time variable. Comprehension, purpose, and mattering were entered as level 2 predictors of the intercept, time slope, and slope of the focal predictor variable.

Of the 12 models estimated, significant or marginally significant interactions were found in 4 models (see Table 12). Comparing these models to the earlier omnibus meaning score models showed that three of the four models found significant here were also significant in the earlier models. Two of these models (models of association between intrusive thoughts and distress, and intrusive thoughts and depression) showed that when each dimension of meaning was examined separately as a moderator, comprehension was the only significant moderator of the association. The results were such that with higher comprehension scores, the positive effect of intrusive thoughts on distress and depression were attenuated. Thus, when it came to the

moderation effect of intrusions on distress and depression, the moderation effect of the omnibus meaning score seemed to be attributable only to the unique moderation effect of comprehension, and not to unique effects of purpose or mattering.

One of the significant models — the model examining the effect of goal violations on distress – however, showed mattering to be the only significant moderator. Thus, examining meaning dimensions as separate moderators showed that the buffering effect of the omnibus meaning score on the association between goal violations and distress, may be attributable only to the unique moderating role of mattering. Finally, the fourth significant model showed a moderation effect of belief violations on anxiety. This effect, which was not found to be moderated in the omnibus meaning score model, was interestingly found here to be moderated by purpose and mattering in opposite directions. Mattering weakened the effect of belief violations on anxiety, while purpose *strengthened* it. It is possible that this effect of purpose is a statistical artifact, but alternatively, it highlights the possibility that distinct dimensions may have differing relationships, and combining them into a singular score may be problematic.

**Comprehension, purpose, and mattering as moderators in regression models.** Previous regression models examining the moderation effect of distress-exacerbating variables on distress variables were repeated with comprehension, purpose, and mattering as the moderators instead of the omnibus meaning score. As before, four models were estimated for each of the distress variables, and in each of the four models, one of the distress-exacerbating variables — belief and goal violations, intrusions, and resolution — were entered as the predictor. The three dimensions were simultaneously entered as moderators in the models. Unlike before, the models were not computed in PROCESS as that program does not allow for

more than two simultaneous moderators. We mean-centered the variables before creating product terms to assist with interpretation.

Compared to the analyses examining moderation effects of the omnibus score, $R$ squared change values indicated that only five of the previously significant eight models emerged as significant or marginally significant (see Table 13). Inspection of the product term beta coefficients from these significant models showed that, of the five models, only two models had a significant product term beta coefficient. Thus, for three of the models, the $R$ squared change due to the product terms was significant, but the beta coefficients for the product terms were non-significant, indicating that the $R$ squared change was not uniquely attributable to a single meaning dimension. However, two of the models, those examining effect of intrusive thoughts on anxiety, and of resolution on anxiety, showed unique moderation effects of comprehension and mattering, respectively. Thus in both of these models, one of the meaning dimensions stood out as a unique moderator, consistent with the notion that individual dimensions may be relatively more or less important in the context of adjustment.

**Summary of aim three analyses examining differential roles of meaning dimensions.** In summary, the computed analyses together indicated that comprehension appeared to be more important in the context of adjustment than were purpose or mattering. The correlation, regression, and relative importance analyses consistently showed comprehension to be a stronger or unique predictor relative to purpose and mattering. Subsequent analyses examining prediction of trajectories, residual changes, and moderation effects were also consistent with a view of comprehension as more central to adjustment, although contrary to our expectation, mattering emerged as a unique predictor as well. Contrary to our expectation, purpose did not trump

mattering as a predictor in many of the analyses. In fact, the opposite seemed to be the case, with mattering trumping purpose as a predictor in many cases.

Comparing analyses examining the omnibus meaning score to analyses examining the individual dimensions showed changes in the model coefficients. In some cases, significant prediction that was present in the omnibus meaning model was no longer present when examining individual dimensions controlling for one another. In other cases, to the contrary, significant predictions emerged in models that were not significant when the omnibus meaning score was used, or magnitude of coefficient of an individual dimension appeared to be larger than that of the omnibus score. While chance surely contributed to such findings, they may also indicate that, in some instances, the predictive power lies in the shared variance among the dimensions (i.e., the overlapping aspects of the dimensions), whereas in others it lies in the unique variance of a single dimension. The fact that in many of the analyses, one or more of the dimensions emerged as unique predictors supports the importance of a multidimensional approach to meaning, as it shows that the dimensions are not interchangeable and may play distinct roles in adjustment.

## Discussion

The present study examined the notion that meaning is a positive resource in adjustment (Frankl, 1959/2006; Krause, 2007; Winger et al., 2015). Specifically, it examined 1) if meaning predicts trajectories and changes in key distress-exacerbating factors and distress, 2) if meaning buffers negative effects on distress, and 3) if the different dimensions of meaning are differentially important in adjustment. The study aimed to address several gaps in the literature by examining trajectories and changes, meaning's relationship with key distress-exacerbating factors, meaning's moderating role, and a multidimensional conceptualization of meaning,

among individuals actively adjusting to a stressor. The present results provide support for the notion that meaning is a positive resource in adjustment.

The present study appeared successful in capturing individuals experiencing the adjustment process, evidenced by statistically significant trajectory slopes in key distress-exacerbating and distress variables showing improving scores over time. For example, across the course of study, participants experienced their stressor as less distressing and less violating of their beliefs and goals, and experienced fewer intrusive thoughts and a greater sense of resolution regarding the event. Such improving trajectories are consistent with existing research, which shows that among normative populations, following a major stressor, most individuals face only relatively transient difficulties in their functioning and are able to return to healthy functioning in the weeks and months following the stressor (Bonanno 2004). The improving trajectories in violations, intrusions and resolution found in the present study, however, goes further in supporting models of adjustment (e.g., the meaning-making model; Park, 2010) that suggests that in the adjustment process, people strive to experience less violation of their beliefs and goals and achieve a greater sense of resolution regarding the event.

**Aim One: Meaning as a Predictor of Trajectories and Changes in Key Distress-Exacerbating Variables and Distress Variables**

HLM analyses of trajectories showed that baseline meaning was a predictor of participants' starting points on all distress-exacerbating and distress variables. The prediction was such that those with higher meaning had more favorable starting points in their trajectories (i.e., where they were estimated to be at Time 1). However, meaning was only a predictor of the slope of the trajectories for some of the variables, and surprisingly, meaning predicted *slower* improvements in these variables. Thus, it appeared that meaning predicted more favorable scores

on the study variables at baseline, but it predicted a slower rate of improvement across time. However, plotting the effects showed that meaning predicting rate of change in variables in an relatively unfavorable manner was likely due to the fact that those with lower meaning started the study with worse scores on those variables, and therefore, had much more room for improvement. It seemed that the low meaning participants were "catching up," although from the plots, it seemed that even by the end of the study, those with high meaning still had more favorable scores. Such results were not consisted with what we expected. We expected those with higher meaning to have faster improvements across time based on the notion that they may be able to adjust to their stressors faster and more effectively. This unexpected finding appeared to have some empirical precedent. In a study on fear of cancer recurrence among those treated for cancer, it was found that women with higher fear of recurrence at enrollment had faster improvements over time (Dunn et al., 2015). The authors reasoned that this pattern of results was due to these women having "more room" for improvements. In another study of breast cancer survivors (Dupont, Bower, Stanton, & Ganz, 2014), intrusive thoughts predicted more depression at baseline, but surprisingly predicted *more* improvements in depression over time. Such previous findings suggest that the current finding of meaning predicting slower improvements is not likely due to some deleterious effect of meaning, but due to the fact that those with worse distress have more room for improvement.

The fact that meaning was associated with better starting points on the trajectories hints at the possibility that meaning may help people adjust faster and that the present study may have simply missed such effects. Meaning being associated with better starting points suggests that at some point prior to the start of the study, meaning was associated with better adjustment. It is possible that meaning's positive effect on adjustment may have occurred soon after the stressor,

during the stressor, or even prior to the stressor (Folkman, 2008; Park, 2010). For example, meaning has been associated with better autonomic nervous system reactivity in response to watching a video of emotional stimuli (Ishida & Okada, 2006). In the present study, at baseline, participants' stressor had occurred at least two weeks prior, and as much as four months prior (because the prescreening question asked if they experienced a stressful event in the past three months, and there was an approximate two week to one month lag between prescreen and study initiation). It is possible that as soon as within the first two weeks of the occurrence of the stressor, beneficial effects of meaning may have materialized. Alternatively, the beneficial effects may have occurred concurrently with the occurrence of the stressor, and those with higher meaning may not have been as impacted by the stressor to begin with (Hirsh et al., 2012; McGregor, Prentice, & Nash, 2012). If either of these possibilities are true, then, the present HLM analyses were occurring too long after the stressor to show better trajectories for those with high meaning.

The present results highlight the importance of future research using designs that can capture the adjustment process as it begins immediately upon the occurrence of the stressor, or more ideally, assesses participants prior to the occurrence of the stressor (Jayawickreme & Blackie, 2014; Krause, 2007; Park, 2010). Such studies will not be vulnerable to the issue of missing the possible benefits of meaning, thereby allowing for stronger conclusions. Of course, studying individuals prior to the occurrence of a major stressor is difficult, as it is often unknown ahead of time who is going to experience a major stressor. However, by studying populations at risk of experiencing stressors (e.g., military personnel being deployed; patients awaiting medical test results; Jayawickreme & Blackie, 2014), the adjustment process can be more easily captured in its entirety.

Residual change regressions models, examining prediction of changes in participants' relative standing to one another, showed that meaning predicted four of the seven variables. Meaning predicted favorable changes in participants' relative standing on belief and goal violations, intrusive thoughts, and depression, across a three week period between wave 1 and 2. Thus, baseline meaning predicted Time 2 scores on these variables even after accounting for their Time 1 scores. Controlling for Time 1 scores, allows for the ruling out of many of the confounds related to assessing these variables concurrently (Selig & Little, 2012). These cross-lagged effects therefore provide relatively stronger evidence than what is often reported in the literature in support of the view that meaning is a positive resource in adjustment. The present results are consistent with results from an earlier study where meaning negatively predicted depression across a one-year period even after controlling for depression scores from the previous time point (Dezutter et al., 2015).

In summary, aim one examined if meaning predicted more favorable trajectories or changes in distress-exacerbating variables and distress variables. If meaning was in fact a positive resource, it would demonstrate such predictive power (Krause, 2007; Winger et al., 2015). Evidence from residual change models showed that meaning has some such predictive power. HLM models of trajectories were also somewhat consistent with the meaning as a resource notion, although they suggested that examining participants immediately after or prior to the stressor may be necessary to fully examine how meaning predicts positive trajectories in distress-exacerbating variables and distress variables.

**Aim Two: Meaning as a Buffer of the Effect of Key Distress-Exacerbating Factors on Distress**

In addition to examining meaning's prediction of trajectories and changes, the present study examined if meaning buffered the effects of several key distress-exacerbating factors on distress variables (Krause, 2007). The meaning-making model and other theoretical perspectives identify violations of belief and goals, intrusions, and resolution as key factors in the adjustment process that can contribute to distress (Park, 2010). The present results supported this view that these factors are closely tied to distress. Within-person analyses showed that even after controlling for time, at waves in which participants had higher scores on these distress-exacerbating factors (relative to their own averages), their distress was impacted in expected directions. It is worth noting that these results showing within-person effects make a significant contribution to the adjustment literature as few studies have examined within-person effects of concepts such as violations on distress. Such within-person effects are not susceptible to many of the confounding explanations (e.g., individual differences) that afflict between-person effects. Present results, therefore, provide strong support for the assertion of the meaning-model (Park, 2010) that violations, intrusions, and resolutions are crucial factors in the adjustment process that can impact distress.

The moderation analyses showed that meaning buffered many of the effects of the distress-exacerbating factors on distress. The HLM analyses and regression analyses showed meaning to moderate several of the within-person and between-person effects, respectively. The moderation effects were such that meaning attenuated unfavorable effects of distress-exacerbating factors on distress. For example, at waves in which participants experienced greater goal violations, they experienced greater stressor-related distress, but this effect was smaller among those with higher meaning. Such results support the notion that meaning is a positive resource in adjustment (Krause, 2007; McKnight & Kashdan, 2009; Steger, 2012). While we are

not aware of any studies that have examined such a moderation effect of meaning among individuals adjusting to a stressor, the present results are consistent with results from a study among the elderly, where the effect of lifetime trauma on depression was favorably moderated by meaning (Krause, 2007). Thus, meaning appears to be very promising as a potential buffer of the effect of stressors and traumas.

The buffering effects of meaning found here have clinical implications. They suggest that fostering a sense of meaning among individuals coping with major stressors and traumas may be helpful. Several current interventions incorporate this idea into treatment. For example, meaning-centered psychotherapy (Breitbart et al., 2010) aims specifically to enhance a sense of meaning in life among individuals dealing with stressors (e.g., cancer patients, caregivers, bereaved), with the idea that fostering meaning will improve adjustment and well-being. Acceptance and commitment therapy similarly has components that aim to increase the extent to which people live a more meaningful life by helping them behave in ways consistent with their core values (Hayes & Lillis, 2012). In research evaluating the efficacy of such treatments, they have been found to be helpful in reducing distress (Breitbart et al., 2010). The present research, however, adds more basic research evidence demonstrating why meaning may be helpful, showing specifically that higher meaning may buffer the impact of key distress-exacerbating factors on distress levels. Future research can further advance this literature by elucidating the specific mechanisms by which meaning may buffer the impact of distress-exacerbating factors.

**Aim Three: Differential Importance of Meaning Dimensions**

The third aim of the present study was to examine if the three dimensions of meaning are differentially important in adjustment, and if a multidimensional view of meaning is beneficial. Existing literature on meaning has largely been based on a unidimensional approach to meaning

(George & Park, 2016b), and recently it has been suggested that a multidimensional conceptualization of meaning as consisting of comprehension, purpose, and mattering is crucial, as the dimensions may be distinct and may play distinct roles in different contexts (Martela & Steger, 2016). Consistent with this multidimensional view of meaning, we found that the dimensions played distinct roles, as evidenced by unique effects of dimensions, controlling for one another, and differences in magnitude of effects.

Consistent with our expectation, comprehension emerged in many analyses as the most relevant predictor and moderator. Our expectation was based on the adjustment literature, which often implicates comprehension in the adjustment process more so than the other dimensions (Janoff-Bulman, 1992; Park, 2010). Evidence that comprehension may be more relevant was seen in regression and relative importance analyses of baseline data, where comprehension was the only unique predictor and accounted for the larger part of the variance in most distress-exacerbating and distress variables. Analyses examining prediction of changes in variables and moderation effects were also roughly consistent with a view that comprehension may be a relatively more important predictor in adjustment, as it emerged as the sole unique predictor in several cases.

To our surprise though, purpose did not stand out as being more important than mattering, and they were both found to have unique predictive power in a few instances when predicting changes or moderation effects. This was surprising as in discussions of adjustment, purpose is sometimes identified as the most important aspect of meaning (e.g., perspective on how having committed goals can confer resilience; McGregor et al., 2012; see also Thompson & Janigian, 1988), though not as often as comprehension, and far more so than mattering. In contrast, mattering has been a relatively understudied topic, and has more often been implicated

in the literatures on death anxiety and spirituality (e.g., Becker, 1973/1997; Vail et al., 2010),

than in adjustment. Purpose's underperformance as a predictor may mean that purpose is

relatively less important in adjustment that what is commonly believed (Frankl, 1959/2006).

Another possibility is that many of the benefits of having clear valued goals (i.e., the key

characteristic of purpose), may overlap with benefits of comprehension. For example, it has been

suggested that having clear goals would be beneficial as it provides clarity on how to behave,

thereby minimizing uncertainty and anxiety (Hirsh et al., 2012). It is likely that this benefit of

improved clarity may be shared with comprehension — as comprehension is characterized by

having greater clarity regarding one's life —  and therefore, in analyses controlling for

comprehension, purpose's effect would disappear.

Current results highlight some disadvantages associated with the prevalent

unidimensional approach to meaning, where the dimensions are combined into a single concept

and score (George & Park, 2016b; Martela & Steger, 2016). The present analyses showing that

different dimensions may be relatively more or less important in specific contexts suggest that an

approach where the dimensions are combined may result in lost predictive power. Such a loss in

predictive power was demonstrated in the present results where the predictive power of

comprehension was found to be larger than that of the omnibus meaning score. Thus, a

multidimensional approach could be of value in future research.

To our knowledge, the present study is the first examination of the tripartite view of

meaning in the context of adjustment to stressful events. Results support the value of a

multidimensional approach to meaning, showing that different dimensions may be differentially

important in adjustment and may carry unique predictive power (George & Park, 2016b; Martela

& Steger, 2016). Specifically, comprehension appeared to be more important than purpose and

mattering. Future research should further explore the roles of the individual dimensions in adjustment.

**Limitations & Future Research**

The present study has several notable limitations. One, we used a sample of undergraduates, who were mostly white and female, and who self-selected into the study, all of which may pose issues with generalizability of present findings. Two, we started assessing individuals only several weeks after the occurrence of their stressor, missing an important time window in the adjustment process: the occurrence of the event and the immediate aftermath. Three, we did not collect any data on whether the stressor is ongoing or completed, which may be an important determinant of the adjustment process (Park, 2010). Adjustment trajectories for a stressor that is resolved compared to a stressor that is ongoing would be very different, and future research should take this issue into consideration. Finally, we conducted numerous significance tests, which likely increased our chance of committing a type 1 error. Due to the large number of analyses, the present study and results are perhaps best seen as exploratory and preliminary, and studies replicating the specific relationships found here are needed.

Another set of limitations pertain to the broad nature of the current study's aims. Aim two, for example, asked if meaning acts as a moderator of several fundamentally different relationships (e.g., relationship between belief violations and stressor-related distress; intrusive thoughts and anxiety; resolution and depression). These relationships may exist for very different reasons, and broadly viewing meaning as a moderator of all of them, without specifying the exact reasons why meaning may moderate each specific relationship, is suboptimal. A similar breadth is characteristic of aim three, where it was uniformly expected that comprehension would have more predictive power when predicting variables, changes in variables, and

moderation effects. However, uniformly expecting that comprehension is more important across different types of analyses (e.g., regressions examining concurrent relationships vs. predictions of trajectories in HLM) and different types of variables (e.g., violations vs. resolution) is suboptimal, and more targeted and nuanced consideration of each construct within each situation is needed. The present study is therefore best considered exploratory, aiming to establish basic ideas that need to be further broken down into more specified and nuanced relationships and understandings. Considering the relatively nascent state of the literature on meaning and adjustment, the exploratory nature of this study with broad aims seem developmentally appropriate. As discussed, there is limited research specifically examining the role of meaning in life in adjustment (Steger, Owens, & Park, 2015). The present study adds stronger evidence to the literature that meaning may be a positive resource in adjustment suggesting that it warrants further attention.

Finally, it is a limitation of the present study that meaning was only measured at baseline and conceptualized as a relatively stable variable that impacts study variables in a unidirectional way. Comprehension, purpose, and mattering have been found to be relatively stable with test-retests scores over two weeks of .75, .75, and .85 respectively (George & Park, 2016b). However, since the inception of the present study, a bidirectional relationship has been found between violations and meaning in cross-lagged panel analyses of congestive heart failure patients (George & Park, 2016c). Therefore, it is possible that meaning may impact adjustment variables and they may in turn impact meaning (Steger et al., 2015). Although the meaning dimensions have been found previously to be relatively stable with test-retest scores of at least .75, these results were found among participants who were not experiencing specific stressors (George & Park, 2016b). Amongst individuals dealing with specific stressors, there may be

greater variation in meaning. Therefore, future research should assess meaning at all time points. Such repeated measurements would allow for the examination of bidirectional relationships with relevant variables, and of between and within associations. Being able to demonstrate within-person effects of meaning on other variables could further provide more robust evidence regarding the role of meaning as a positive resource.

**Summary & Conclusions**

Despite its limitations, the present study makes a significant contribution to the literature as it is one of only a small number of studies examining meaning's association with adjustment. Further, many of the issues addressed in the present study — for example, meaning's prediction of trajectories, buffering of the effect of key distress-exacerbating factors on distress, and the tripartite view — have not been addressed before. The present results provide stronger support for the widespread idea that meaning may be a positive resource in adjustment (Frankl, 1959/2006; McKnight & Kashdan, 2009; Steger, 2012). This support came in the form of meaning predicting favorable changes across time in key distress-exacerbating and distress variables, and buffering the unfavorable effects on distress variables. Further research on this topic is warranted as it has implications for understanding successful adjustment and clinical interventions. Future research should further tease apart the different meaning dimensions, specifying the exact relationships with specific variables relevant in adjustment.

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Table 1

*Descriptive Statistics, Reliabilities and Intraclass Correlations*

| | Mean (SD) | | | | Cronbach's alpha | Intraclass correlations |
|---|---|---|---|---|---|---|
| | Time 1 | Time 2 | Time 3 | Time 4 | | |
| 1) Meaning | 4.99 (.88) | - | - | - | .93 | - |
| 2) Belief violations | 2.67 (.98) | 2.52 (.98) | 2.56 (1.02) | 2.28 (.95) | .84 | 0.65 |
| 3) Goal violations | 2.70 (.97) | 2.57 (1.05) | 2.47 (1.02) | 2.25 (.95) | .79 | 0.57 |
| 4) Intrusions | 2.98 (.98) | 2.51 (1.03) | 2.35 (1.00) | 2.10 (.97) | .91 | 0.48 |
| 5) Resolution | 3.79 (1.55) | 4.13 (1.61) | 4.29 (1.58) | 4.67 (1.48) | .87 | 0.51 |
| 6) Stressor-related distress | 4.61 (1.42) | 3.67 (1.61) | 3.37 (1.66) | 2.94 (1.57) | - | 0.36 |
| 7) Anxiety | 1.80 (.62) | 1.69 (.54) | 1.68 (.62) | 1.59 (.59) | .82 | 0.70 |
| 8) Depression | 1.90 (.68) | 1.81 (.66) | 1.79 (.66) | 1.68 (.61) | .89 | 0.64 |

*Note.* SD = standard devation; no Cronbach's alpha available for distress as it is a single-item measure.

Table  2

*Intercorrelations From Time 1*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1) Meaning | 1 | -.214** | -.368** | -.272** | .384** | -.187* | -.460** | -.647** |
| 2) Belief violations | | 1 | .398** | .454** | -.298** | .262** | .301** | .394** |
| 3) Goal violations | | | 1 | .584** | -.347** | .323** | .397** | .529** |
| 4) Intrusions | | | | 1 | -.467** | .518** | .485** | .471** |
| 5) Resolution | | | | | 1 | -.502** | -.224** | -.324** |
| 6) Stressor-related distress | | | | | | 1 | .225** | .251** |
| 7) Anxiety | | | | | | | 1 | .680** |
| 8) Depression | | | | | | | | 1 |

*p<0.05
**p<0.01

Table 3

*HLM Growth Curve Models and Growth Curve Models With Meaning as Predictor*

| Outcome | Level 2 Predictor | Time Only Models | | | | Time and Meaning Models | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Intercept | *p* | Time Slope | *p* | Intercept | *p* | Time Slope | *p* |
| **Belief violations** | Intercept | 2.66 | <0.001 | -0.10 | <0.001 | 2.66 | <0.001 | -0.10 | <0.001 |
| | Meaning | - | - | - | - | -0.27 | <0.001 | 0.01 | 0.71 |
| **Goal violations** | **Intercept** | 2.71 | <0.001 | -0.14 | <0.001 | 2.70 | <0.001 | -0.14 | <0.001 |
| | Meaning | - | - | - | - | -0.40 | <0.001 | 0.04 | 0.21 |
| **Intrusions** | **Intercept** | 2.90 | <0.001 | -0.28 | <0.001 | 2.89 | <0.001 | -0.28 | <0.001 |
| | Meaning | - | - | - | - | -0.32 | <0.001 | 0.08 | 0.07 |
| **Resoultion** | **Intercept** | 3.80 | <0.001 | 0.28 | <0.001 | 3.81 | <0.001 | 0.28 | <0.001 |
| | Meaning | - | - | - | - | 0.67 | <0.001 | -0.18 | <0.001 |
| **Stressor-related distress** | **Intercept** | 4.45 | <0.001 | -0.55 | <0.001 | 1.89 | <0.001 | -0.06 | <0.001 |
| | Meaning | - | - | - | - | -0.48 | <0.001 | 0.06 | <.01 |
| **Anxiety** | **Intercept** | 1.78 | <0.001 | -0.06 | <0.001 | 1.78 | <0.001 | -0.06 | <0.001 |
| | Meaning | - | - | - | - | -0.28 | <0.001 | 0.04 | 0.04 |
| **Depression** | **Intercept** | 1.89 | <0.001 | -0.06 | <0.001 | 1.89 | <0.001 | -0.06 | <0.001 |
| | Meaning | - | - | - | - | -0.48 | <0.001 | 0.06 | <.01 |

*Note. p* = significance value.

Table 4

*Residual Change Regression Models*

| | Time 2 | | Time 4 | |
|---|---|---|---|---|
| | *β* | *p* | *β* | *p* |
| DV: Belief violations | | | | |
| Belief violations Time 1 | .636 | <.001 | .557 | <.001 |
| Meaning Time 1 | -.159 | .008 | -.079 | .264 |
| Model $R^2$ | .475 | <.001 | .336 | <.001 |
| DV: Goal violations | | | | |
| Goal violations Time 1 | .536 | <.001 | .380 | <.001 |
| Meaning Time 1 | -.135 | .050 | -.134 | .101 |
| Model $R^2$ | .359 | <.001 | .199 | <.001 |
| DV: Intrusions | | | | |
| Intrusions Time 1 | .607 | <.001 | .305 | <.001 |
| Meaning Time 1 | -.112 | .079 | -.028 | .739 |
| Model $R^2$ | .418 | <.001 | .099 | <.01 |
| DV: Resolution | | | | |
| Resolution Time 1 | .572 | <.001 | .339 | <.001 |
| Meaning Time 1 | .044 | .525 | -.054 | .533 |
| Model $R^2$ | .349 | <.001 | .104 | <.001 |
| DV: Stressor-related distres | | | | |
| Distress Time 1 | .456 | <.001 | .274 | .002 |
| Meaning Time 1 | -.064 | .387 | .057 | .506 |
| Model $R^2$ | .224 | <.001 | .072 | <.01 |
| DV: Anxiety | | | | |
| Anxiety Time 1 | .729 | <.001 | .646 | <.001 |
| Meaning Time 1 | .053 | .413 | .011 | .878 |
| Model $R^2$ | .496 | <.001 | .410 | <.001 |
| DV: Depression | | | | |
| Depression Time 1 | .613 | <.001 | .432 | <.001 |
| Meaning Time 1 | -.145 | .048 | -.181 | .049 |
| Model $R^2$ | .513 | <.001 | .321 | <.001 |

*Note.* DV = dependent variable; *β* = beta coefficient; *p* = significance value.

Table 5

*Moderation Effect of Meaning: HLM Analyses*

| Outcome | Level 1 Predictor | Level 2 Predictor | Intercept | *p* | Time Slope | *p* | Level 1 Predictor Slope | *p* |
|---|---|---|---|---|---|---|---|---|
| Stressor-related distress | Belief violations | Intercept | 4.40 | <0.001 | -0.50 | <0.001 | 0.36 | <0.001 |
| | | Meaning | -0.34 | <.01 | 0.09 | 0.08 | -0.14 | 0.20 |
| | Goal violations | Intercept | 4.36 | <0.001 | -0.48 | <0.001 | 0.42 | <0.001 |
| | | Meaning | -0.31 | <.01 | 0.08 | 0.19 | -0.18 | 0.04 |
| | Intrusions | Intercept | 4.09 | <0.001 | -0.28 | <0.001 | 0.89 | <0.001 |
| | | Meaning | -0.23 | 0.069 | 0.01 | 0.87 | -0.15 | 0.10 |
| | Resolution | Intercept | 4.28 | <0.001 | -0.42 | <0.001 | -0.37 | <0.001 |
| | | Meaning | -0.22 | 0.059 | 0.01 | 0.83 | 0.13 | 0.01 |
| Anxiety | Belief violations | Intercept | 1.77 | <0.001 | -0.05 | <0.001 | 0.05 | 0.130 |
| | | Meaning | -0.27 | <0.001 | 0.03 | 0.07 | -0.03 | 0.35 |
| | Goal violations | Intercept | 1.77 | <0.001 | -0.05 | <0.001 | 0.06 | 0.013 |
| | | Meaning | -0.28 | <0.001 | 0.03 | 0.07 | 0.01 | 0.77 |
| | Intrusions | Intercept | 1.74 | <0.001 | -0.03 | 0.045 | 0.10 | <0.001 |
| | | Meaning | -0.26 | <0.001 | 0.02 | 0.25 | -0.02 | 0.38 |
| | Resolution | Intercept | 1.76 | <0.001 | -0.04 | 0.002 | -0.03 | 0.021 |
| | | Meaning | -0.26 | <0.001 | 0.02 | 0.34 | 0.03 | 0.15 |
| Depression | Belief violations | Intercept | 1.88 | <0.001 | -0.05 | 0.002 | 0.10 | <0.001 |
| | | Meaning | -0.48 | <0.001 | 0.06 | <.01 | -0.03 | 0.39 |
| | Goal violations | Intercept | 1.77 | <0.001 | -0.05 | <0.001 | 0.06 | 0.013 |
| | | Meaning | -0.28 | <0.001 | 0.03 | 0.07 | 0.01 | 0.77 |
| | Intrusions | Intercept | 1.82 | <0.001 | -0.01 | 0.587 | 0.17 | <0.001 |
| | | Meaning | -0.44 | <0.001 | 0.03 | 0.09 | -0.07 | 0.07 |
| | Resolution | Intercept | 1.87 | <0.001 | -0.04 | 0.005 | -0.05 | 0.012 |
| | | Meaning | -0.45 | <0.001 | 0.04 | 0.02 | 0.04 | 0.12 |

*Note. p* = significance value.

Table 6

*Moderation Effect of Meaning: Regression Analyses*

| | DV: Stressor-Related Distress | | DV: Anxiety | | DV: Depression | |
|---|---|---|---|---|---|---|
| | *b* | *p* | *b* | *p* | *b* | *p* |
| **Focal predictor: Belief violation** | | | | | | |
| Belvio | .77 | .19 | .90 | < .01 | .66 | < .01 |
| Meaning | .01 | .97 | .12 | .31 | -.20 | .08 |
| Interaction term | -.09 | .44 | -.16 | < .01 | -.10 | .02 |
| $\Delta R^2$ | .00 | .44 | .05 | < .01 | .02 | .02 |
| Model $R^2$ | .09 | < .01 | .31 | < .01 | .50 | < .01 |
| **Focal predictor: Goal violation** | | | | | | |
| Goalvio | 1.34 | .03 | .72 | .00 | .89 | .00 |
| Meaning | .33 | .34 | .04 | .78 | -.06 | .58 |
| Interaction term | -.18 | .14 | -.11 | .02 | -.13 | < .01 |
| $\Delta R^2$ | .01 | .14 | .02 | .02 | .03 | < .01 |
| Model $R^2$ | .12 | < .01 | .29 | < .01 | .54 | < .01 |
| **Focal predictor: Intrusions** | | | | | | |
| Intrusions | 1.39 | .01 | .77 | .00 | .84 | < .01 |
| Meaning | .31 | .39 | .07 | .60 | -.06 | .64 |
| Interaction term | -.13 | .23 | -.10 | .01 | -.12 | < .01 |
| $\Delta R^2$ | .01 | .23 | .02 | .01 | .03 | < .01 |
| Model $R^2$ | .28 | < .01 | .37 | < .01 | .54 | < .01 |
| **Focal predictor: Resolution** | | | | | | |
| Resolution | -.59 | .11 | -.32 | .04 | -.36 | .02 |
| Meaning | -.12 | .69 | -.52 | < .01 | -.71 | < .01 |
| Interaction term | .03 | .71 | .06 | .06 | .06 | .03 |
| $\Delta R^2$ | .00 | .71 | .02 | .06 | .02 | .03 |
| Model $R^2$ | .25 | < .01 | .23 | < .01 | .44 | < .01 |

*Note.* DV = dependent variable; *b* = unstandardized regression coefficient; *p* = significance value.

Table 7

*Simple Slopes Analyses*

| Predictor | Meaning | DV: Anxiety | | DV: Depression | |
|---|---|---|---|---|---|
| | | *b* | *p* | *b* | *p* |
| Belief violations | Low | .26 | < .01 | .27 | < .01 |
| | Average | .12 | < .01 | .18 | < .01 |
| | High | -.01 | .81 | .10 | .08 |
| Goal violations | Low | .28 | < .01 | .37 | < .01 |
| | Average | .18 | < .01 | .25 | < .01 |
| | High | .09 | .13 | .14 | .01 |
| Intrusions | Low | .34 | < .01 | .34 | < .01 |
| | Average | .25 | < .01 | .23 | < .01 |
| | High | .16 | < .01 | .12 | .02 |
| Resolution | Low | -.08 | .06 | -.10 | .01 |
| | Average | -.03 | .39 | -.04 | .13 |
| | High | .03 | .49 | .01 | .70 |

*Note.* DV = dependent variable; *β* = beta coefficient; *p* = significance value.

Table 8

*Correlation, Regression, and Relative Importance Analyses From Time 1*

| | r | β | p | RW[CI] | R-RW[%] |
|---|---|---|---|---|---|
| **Belief violations** | | | | | |
| Comprehension | -.299** | -.385 | <.001 | 0.07976[0.021685, 0.16728] | 73.79 |
| Purpose | -.078 | .183 | .065 | 0.010445[-0.010617, 0.04071] | 9.66 |
| Mattering | -.175* | -.041 | .686 | 0.017887[-0.003285, 0.070443] | 16.55 |
| Model $R^2$ | - | .11 | <.001 | - | - |
| **Goal violations** | | | | | |
| Comprehension | -.412** | -.388 | <.001 | 0.1130[0.0404, 0.2027] | 64.35 |
| Purpose | -.235** | .064 | .502 | 0.0196 [-0.0156, 0.0527] | 11.16 |
| Mattering | -.309** | -.099 | .312 | 0.0430 [0.0001, 0.1010] | 24.49 |
| Model $R^2$ | - | .18 | <.001 | - | - |
| **Intrusions** | | | | | |
| Comprehension | -.297** | -.262 | .010 | 0.0568 [0.0106, 0.1323] | 58.45 |
| Purpose | -.156* | .080 | .416 | 0.0088 [-0.0174, 0.0329] | 9.07 |
| Mattering | -.249** | -.129 | .207 | 0.0316[-0.0003, 0.0893] | 32.48 |
| Model $R^2$ | - | .10 | <.001 | - | - |
| **Resolution** | | | | | |
| Comprehension | .400** | .327 | .001 | 0.0963 [-0.0105, 0.1640] | 56.12 |
| Purpose | .256** | -.036 | .706 | 0.0224 [-0.0738, 0.0383] | 13.06 |
| Mattering | .336** | .149 | .131 | 0.0529 [-0.0389, 0.1055] | 30.82 |
| Model $R^2$ | | .17 | <.001 | | - |
| **Stressor-related distress** | | | | | |
| Comprehension | -.294** | -.405 | <.001 | 0.0853 [0.0308, 0.1675] | 77.40 |
| Purpose | -.048 | .190 | .051 | 0.0114 [-0.0050, 0.0478] | 10.32 |
| Mattering | -.142 | -.001 | .988 | 0.0135 [-0.0024, 0.0508] | 12.28 |
| Model $R^2$ | - | .11 | <.001 | - | - |
| **Anxiety** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Comprehension | -.453** | -.320 | .001 | 0.1125 [0.0491, 0.2077] | 49.98 |
| Purpose | -.344** | -.060 | .504 | 0.0448 [0.0089, 0.1111] | 19.88 |
| Mattering | -.393** | -.151 | .108 | 0.0679 [0.0245, 0.1391] | 30.14 |
| Model $R^2$ | - | .23 | <.001 | - | - |
| Depression | | | | | |
| Comprehension | -.627** | -.423 | <.001 | 0.2092 [0.1289, 0.2819] | 47.82 |
| Purpose | -.515** | -.160 | .038 | 0.1094 [0.0450, 0.1627] | 25.00 |
| Mattering | -.536** | -.167 | .038 | 0.1189 [0.0546, 0.1702] | 27.18 |
| Model $R^2$ | - | .44 | <.001 | - | - |

*Note.* $r$ = correlation coefficient (asterisks indicate significance; * = p < .05; ** = p < .01); $\beta$ = regression beta coefficient; $p$= significance value for beta coefficient; RW[CI] = relative weight and associated confidence interval; R-RW = relative weight rescaled as a percentage of the total model variance.

Table 9

*Correlations Between Study Variables and Meaning and Meaning Dimensions from Time 1*

| | Meaning | Comprehension | Purpose | Mattering |
|---|---|---|---|---|
| Belief violations | -.214[**] | -.299[**] | -.078 | -.175[*] |
| Goal violations | -.368[**] | -.412[**] | -.235[**] | -.309[**] |
| Intrusions | -.272[**] | -.297[**] | -.156[*] | -.249[**] |
| Resolution | .384[**] | .400[**] | .256[**] | .336[**] |
| Stressor-related distress | -.187[*] | -.294[**] | -.048 | -.142 |
| Anxiety | -.460[**] | -.453[**] | -.344[**] | -.393[**] |
| Depression | -.647[**] | -.627[**] | -.515[**] | -.536[**] |

*p<0.05
**p<0.01

Table 10

*Comprehension, Purpose, and Mattering as Predictors in HLM Growth Curve Models*

| Outcome | Level 2 Predictor | Intercept | p | Time Slope | p |
|---|---|---|---|---|---|
| **Belief violations** | **Intercept** | **2.66** | **<0.001** | **-0.10** | **<0.001** |
| | Comprehension | -0.41 | <0.001 | 0.06 | 0.10 |
| | Purpose | 0.17 | 0.09 | -0.03 | 0.24 |
| | Mattering | -0.02 | 0.79 | -0.02 | 0.46 |
| **Goal violations** | **Intercept** | **2.70** | **<0.001** | **-0.13** | **<0.001** |
| | Comprehension | -0.35 | <0.001 | 0.03 | 0.50 |
| | Purpose | 0.04 | 0.69 | -0.05 | 0.10 |
| | Mattering | -0.09 | 0.23 | 0.05 | 0.07 |
| **Intrusions** | **Intercept** | **2.90** | **<0.001** | **-0.28** | **<0.001** |
| | Comprehension | -0.29 | <.01 | 0.08 | 0.08 |
| | Purpose | 0.11 | 0.27 | -0.07 | 0.06 |
| | Mattering | -0.12 | 0.11 | 0.05 | 0.14 |
| **Resolution** | **Intercept** | **3.81** | **<0.001** | **0.28** | **<0.001** |
| | Comprehension | 0.44 | <.01 | -0.14 | 0.03 |
| | Purpose | 0.01 | 0.94 | 0.00 | 0.98 |
| | Mattering | 0.20 | 0.12 | -0.04 | 0.50 |
| **Stressor-related distress** | **Intercept** | **4.44** | **<0.001** | **-0.54** | **<0.001** |
| | Comprehension | -0.52 | <0.001 | 0.17 | <0.05 |
| | Purpose | 0.20 | 0.12 | -0.06 | 0.43 |
| | Mattering | -0.03 | 0.76 | 0.01 | 0.91 |
| **Anxiety** | **Intercept** | **1.78** | **<0.001** | **-0.06** | **<0.001** |
| | Comprehension | -0.18 | <.01 | 0.00 | 0.79 |
| | Purpose | -0.01 | 0.82 | 0.03 | 0.16 |
| | Mattering | -0.08 | 0.10 | 0.02 | 0.28 |
| **Depression** | **Intercept** | **1.89** | **<0.001** | **-0.06** | **<0.001** |
| | Comprehension | -0.28 | <0.001 | 0.02 | 0.45 |
| | Purpose | -0.10 | 0.04 | 0.03 | 0.09 |
| | Mattering | -0.11 | 0.01 | 0.02 | 0.33 |

*Note. p* = significance value.

Table 11

*Comprehension, Purpose, and Mattering as Predictors in Residual Change Regression Models*

| | β | p |
|---|---|---|
| **DV: Belief violations Time 2** | | |
| Belief violations Time 1 | .61 | <.001 |
| Comprehension | -.20 | <.05 |
| Purpose | .00 | .96 |
| Mattering | .00 | .98 |
| Model $R^2$ | .49 | <.001 |
| **DV: Goal violations Time 2** | | |
| Goal violations Time 1 | .53 | <.001 |
| Comprehension | -.10 | .28 |
| Purpose | -.09 | .33 |
| Mattering | .03 | .78 |
| Model $R^2$ | .36 | <.001 |
| **DV: Intrusions Time 2** | | |
| Intrusions Time 1 | .60 | <.001 |
| Comprehension | -.13 | .13 |
| Purpose | .01 | .87 |
| Mattering | -.01 | .87 |
| Model $R^2$ | .42 | <.001 |
| **DV: Resolution Time 2** | | |
| Resolution Time 1 | .59 | <.001 |
| Comprehension | -.08 | .37 |
| Purpose | .11 | .22 |
| Mattering | .02 | .86 |
| Model $R^2$ | .36 | <.001 |
| **DV: Stressor-related distress Time 2** | | |
| Stressor-related distress Time 1 | ..46 | <.001 |

| | | |
|---|---|---|
| Comprehension | .00 | .97 |
| Purpose | -.09 | .38 |
| Mattering | .01 | .94 |
| Model $R^2$ | .23 | <.001 |
| **DV: Anxiety Time 2** | | |
| Anxiety Time 1 | .72 | <.001 |
| Comprehension | -.04 | .67 |
| Purpose | .07 | .39 |
| Mattering | .02 | .77 |
| Model $R^2$ | .50 | <.001 |
| **DV: Depression Time 2** | | |
| Depression Time 1 | .60 | <.001 |
| Comprehension | -.12 | .15 |
| Purpose | .02 | .82 |
| Mattering | -.07 | .38 |
| Model $R^2$ | .52 | <.001 |

*Note.* DV = dependent variable; $\beta$ = beta coefficient; $p$ = significance value.

Table 12

*Comprehension, Purpose, and Mattering as Moderators in HLM Analyses*

| Outcome | L1 Predictor | Level 2 Predictor | Intercept | *p* | Time Slope | *p* | Level 1 Predictor Slope | *p* |
|---------|-----------|------------|-----------|-----|------------|-----|----------|-----|
| Stressor-related distress | Belief violations | Intercept | 4.39 | <0.001 | -0.50 | <0.001 | 0.35 | <0.001 |
| | | Comprehension | -0.47 | <0.001 | 0.13 | 0.08 | -0.14 | 0.32 |
| | | Purpose | 0.16 | 0.23 | -0.03 | 0.70 | 0.14 | 0.46 |
| | | Mattering | -0.03 | 0.82 | 0.00 | 0.98 | -0.10 | 0.50 |
| | Goal violations | Intercept | 4.36 | <0.001 | -0.48 | <0.001 | 0.40 | <0.001 |
| | | Comprehension | -0.53 | <0.001 | 0.18 | 0.01 | 0.13 | 0.30 |
| | | Purpose | 0.17 | 0.17 | -0.04 | 0.60 | 0.01 | 0.96 |
| | | Mattering | 0.05 | 0.69 | -0.05 | 0.44 | -0.26 | 0.01 |
| | Intrusions | Intercept | 4.08 | <0.001 | -0.28 | <0.001 | 0.91 | <0.001 |
| | | Comprehension | -0.38 | <.01 | 0.07 | 0.28 | -0.20 | 0.07 |
| | | Purpose | 0.13 | 0.35 | -0.02 | 0.80 | -0.01 | 0.93 |
| | | Mattering | 0.01 | 0.95 | -0.02 | 0.71 | 0.06 | 0.50 |
| | Resoultion | Intercept | 4.28 | <0.001 | -0.42 | <0.001 | -0.36 | <0.001 |
| | | Comprehension | -0.43 | 0.001 | 0.11 | 0.12 | 0.12 | 0.11 |
| | | Purpose | 0.18 | 0.18 | -0.06 | 0.51 | -0.05 | 0.60 |
| | | Mattering | 0.02 | 0.88 | -0.03 | 0.65 | 0.06 | 0.34 |
| Anxiety | Belief violations | Intercept | 1.77 | <0.001 | -0.05 | <0.001 | 0.06 | 0.07 |
| | | Comprehension | -0.17 | <.01 | -0.01 | 0.53 | -0.02 | 0.55 |
| | | Purpose | -0.04 | 0.53 | 0.05 | 0.02 | 0.10 | 0.08 |
| | | Mattering | -0.06 | 0.20 | 0.00 | 0.92 | -0.08 | 0.03 |
| | Goal violations | Intercept | 1.77 | <0.001 | -0.05 | <0.001 | 0.06 | 0.01 |
| | | Comprehension | -0.18 | <.01 | 0.00 | 0.80 | 0.03 | 0.47 |
| | | Purpose | -0.02 | 0.70 | 0.04 | 0.11 | 0.00 | 0.94 |
| | | Mattering | -0.07 | 0.16 | 0.01 | 0.65 | -0.01 | 0.71 |
| | Intrusions | Intercept | 1.74 | <0.001 | -0.03 | 0.04 | 0.10 | <0.001 |
| | | Comprehension | -0.16 | <.01 | -0.02 | 0.38 | -0.02 | 0.56 |
| | | Purpose | -0.03 | 0.65 | 0.04 | 0.12 | 0.01 | 0.88 |
| | | Mattering | -0.07 | 0.18 | 0.01 | 0.75 | -0.01 | 0.83 |
| | Resoultion | Intercept | 1.76 | <0.001 | -0.04 | <.01 | -0.03 | 0.03 |
| | | Comprehension | -0.17 | <.01 | -0.01 | 0.56 | 0.02 | 0.48 |
| | | Purpose | -0.02 | 0.73 | 0.03 | 0.16 | -0.01 | 0.70 |
| | | Mattering | -0.07 | 0.19 | 0.00 | 0.82 | 0.02 | 0.21 |
| Depression | Belief | Intercept | 1.88 | <0.001 | -0.05 | 0.002 | 0.11 | <0.001 |

| | | | p | | p | | p |
|---|---|---|---|---|---|---|---|
| violations | Comprehension | -0.27 | <0.001 | 0.01 | 0.74 | -0.02 | 0.63 |
| | Purpose | -0.11 | 0.03 | 0.04 | 0.08 | 0.02 | 0.75 |
| | Mattering | -0.11 | 0.01 | 0.02 | 0.39 | -0.02 | 0.66 |
| Goal violations | Intercept | 1.87 | <0.001 | -0.04 | <.01 | 0.13 | <0.001 |
| | Comprehension | -0.27 | <0.001 | 0.01 | 0.51 | -0.01 | 0.76 |
| | Purpose | -0.11 | 0.04 | 0.04 | 0.08 | -0.01 | 0.80 |
| | Mattering | -0.09 | 0.03 | 0.01 | 0.69 | -0.03 | 0.46 |
| Intrusions | Intercept | 1.82 | <0.001 | -0.01 | 0.70 | 0.18 | <0.001 |
| | Comprehension | -0.24 | <0.001 | -0.01 | 0.51 | -0.09 | 0.02 |
| | Purpose | -0.12 | 0.01 | 0.05 | 0.04 | 0.01 | 0.81 |
| | Mattering | -0.10 | 0.02 | 0.01 | 0.49 | 0.01 | 0.75 |
| Resoultion | Intercept | 1.86 | <0.001 | -0.04 | <.01 | -0.05 | 0.02 |
| | Comprehension | -0.25 | <0.001 | 0.00 | 0.91 | 0.05 | 0.11 |
| | Purpose | -0.11 | 0.04 | 0.04 | 0.09 | -0.05 | 0.15 |
| | Mattering | -0.10 | 0.02 | 0.01 | 0.53 | 0.03 | 0.23 |

*Note.* $p$ = significance value.

Table 13

*Comprehension, Purpose, and Mattering as Moderators in Regression Models*

| | DV: Distress | | DV: Anxiety | | DV: Depression | |
|---|---|---|---|---|---|---|
| | $\beta$ | $p$ | $\beta$ | $p$ | $\beta$ | $p$ |
| Focal Predictor: Belief violations | | | | | | |
| Belief violations | .161 | .045 | .188 | <.01 | .246 | <.001 |
| Comprehension | -.317 | <.01 | -.222 | .021 | -.308 | <.001 |
| Purpose | .116 | .252 | -.133 | .140 | -.231 | <.01 |
| Mattering | .024 | .817 | -.126 | .169 | -.143 | .064 |
| Comprehension X belief violations | -.004 | .965 | -.135 | .144 | -.064 | .413 |
| Purpose X belief violations | .025 | .798 | -.082 | .347 | -.009 | .904 |
| Mattering X belief violations | -.065 | .549 | -.052 | .596 | -.077 | .346 |
| $\Delta R^2$ | .003 | .907 | .053 | <.01 | .018 | .117 |
| Model $R^2$ | .130 | <.01 | .312 | <.001 | .512 | <.001 |
| Focal Predictor: Goal violations | | | | | | |
| Goal violations | .251 | <.01 | .271 | <.001 | .348 | <.001 |
| Comprehension | -.287 | <.01 | -.209 | <.01 | -.279 | <.001 |
| Purpose | .128 | .190 | -.077 | .389 | -.191 | <.01 |
| Mattering | .032 | .748 | -.136 | .140 | -.140 | .058 |
| Comprehension X goal violations | .003 | .976 | -.102 | .290 | -.102 | .188 |
| Purpose X goal violations | .015 | .894 | -.014 | .894 | .001 | .986 |
| Mattering X goal violations | -.111 | .285 | -.053 | .585 | -.080 | .303 |
| $\Delta R^2$ | .010 | .598 | .023 | .154 | .026 | <.05 |
| Model $R^2$ | .162 | <.001 | .298 | <.001 | .548 | <.001 |
| Focal Predictor: Intrusions | | | | | | |
| Intrusions | .471 | <.001 | .391 | <.001 | .319 | <.001 |

| | β | p | β | p | β | p |
|---|---|---|---|---|---|---|
| Comprehension | -.275 | <.01 | -.218 | <.05 | -.336 | <.001 |
| Purpose | .143 | .100 | -.105 | .202 | -.199 | .005 |
| Mattering | .061 | .499 | -.071 | .406 | -.103 | .162 |
| Comprehension X intrusions | .044 | .617 | -.184 | <.05 | -.111 | .128 |
| Purpose X intrusions | -.025 | .802 | .120 | .195 | .049 | .533 |
| Mattering X intrusions | -.092 | .376 | -.103 | .293 | -.114 | .177 |
| $\Delta R^2$ | .008 | .613 | .038 | <.05 | .029 | <.05 |
| Model $R^2$ | .320 | <.001 | .393 | <.001 | .553 | <.001 |
| **Focal Predictor: Resolution** | | | | | | |
| Resolution | -.474 | <.001 | -.042 | .568 | -.073 | .250 |
| Comprehension | -.263 | <.01 | -.340 | <.01 | -.417 | <.001 |
| Purpose | .099 | .312 | -.062 | .535 | -.137 | .108 |
| Mattering | .125 | .196 | -.116 | .241 | -.159 | .062 |
| Comprehension X resolution | -.043 | .645 | -.063 | .524 | .012 | .891 |
| Purpose X resolution | -.091 | .371 | -.019 | .852 | .039 | .661 |
| Mattering X resolution | .161 | .090 | .233 | <.05 | .100 | .243 |
| $\Delta R^2$ | .013 | .402 | .034 | .055 | .018 | .136 |
| Model $R^2$ | .299 | <.001 | .261 | <.001 | .459 | <.001 |

*Note.* DV = dependent variable; $\beta$ = beta regression coefficient; $p$ = significance value.
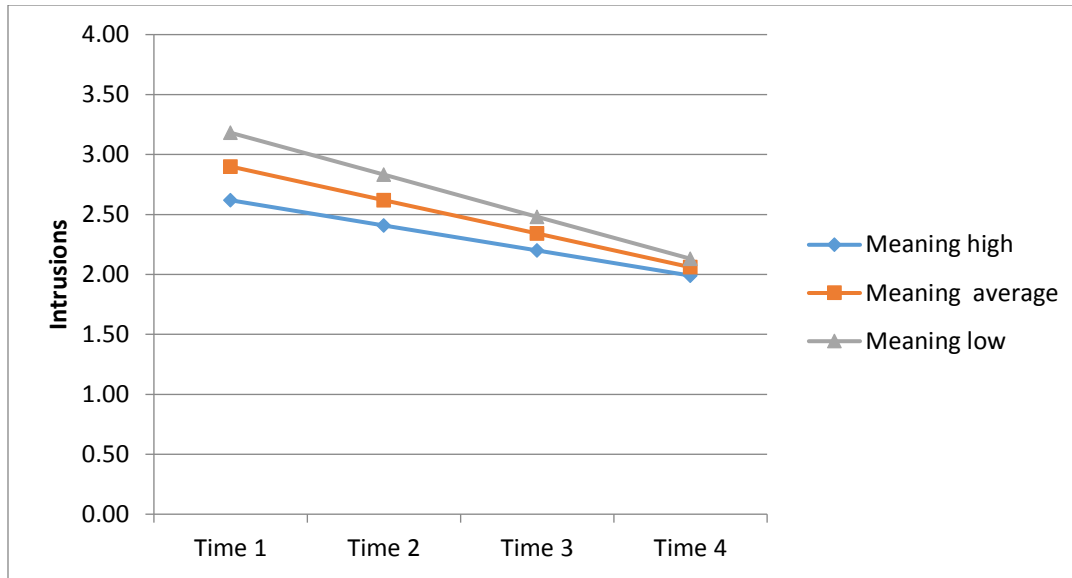
*Figure 1*. Estimated trajectory of intrusions across time at mean levels of meaning and one standard deviation above and below mean levels of meaning.
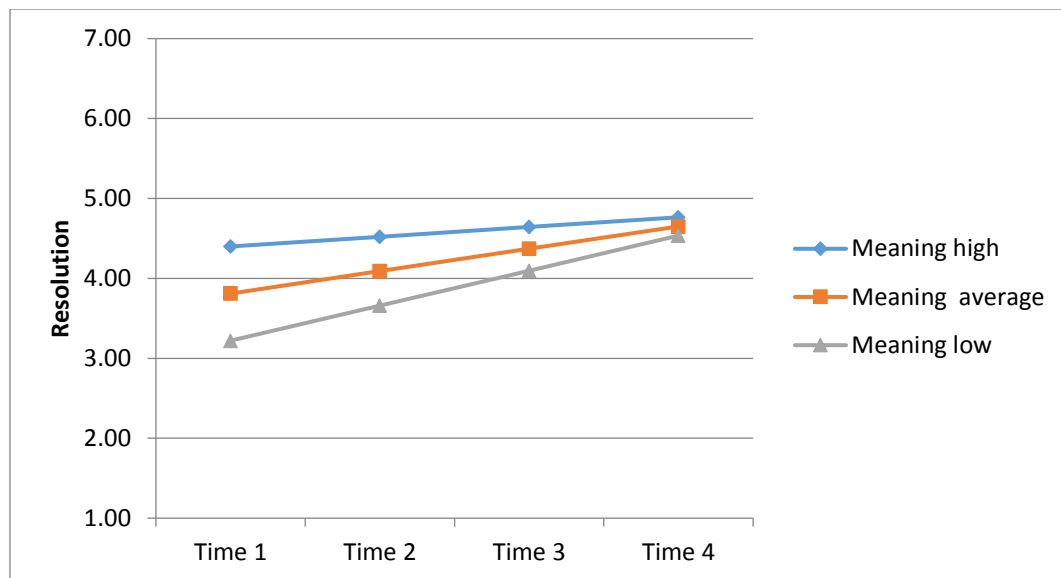
*Figure 2.* Estimated trajectory of resolution across time at mean levels of meaning and one standard deviation above and below mean levels of meaning.
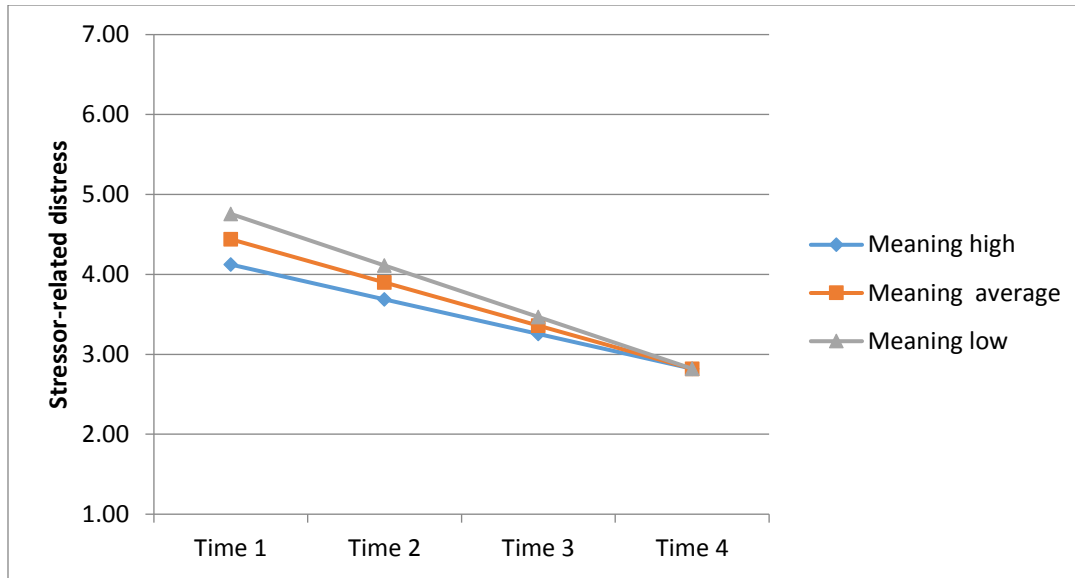
*Figure 3.* Estimated trajectory of stressor-related distress across time at mean levels of meaning and one standard deviation above and below mean levels of meaning.
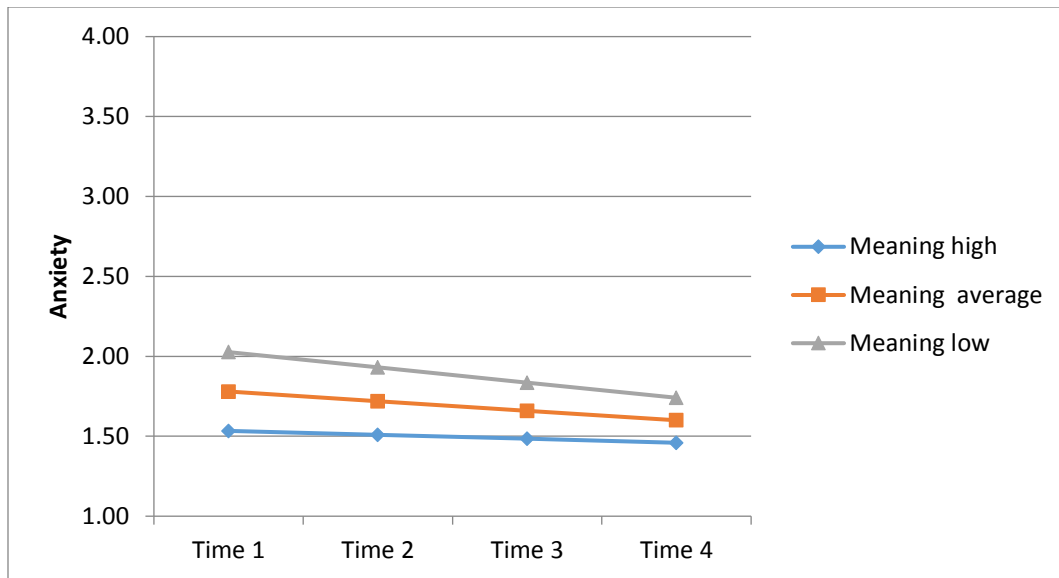
*Figure 4.* Estimated trajectory of anxiety across time at mean levels of meaning and one standard deviation above and below mean levels of meaning.

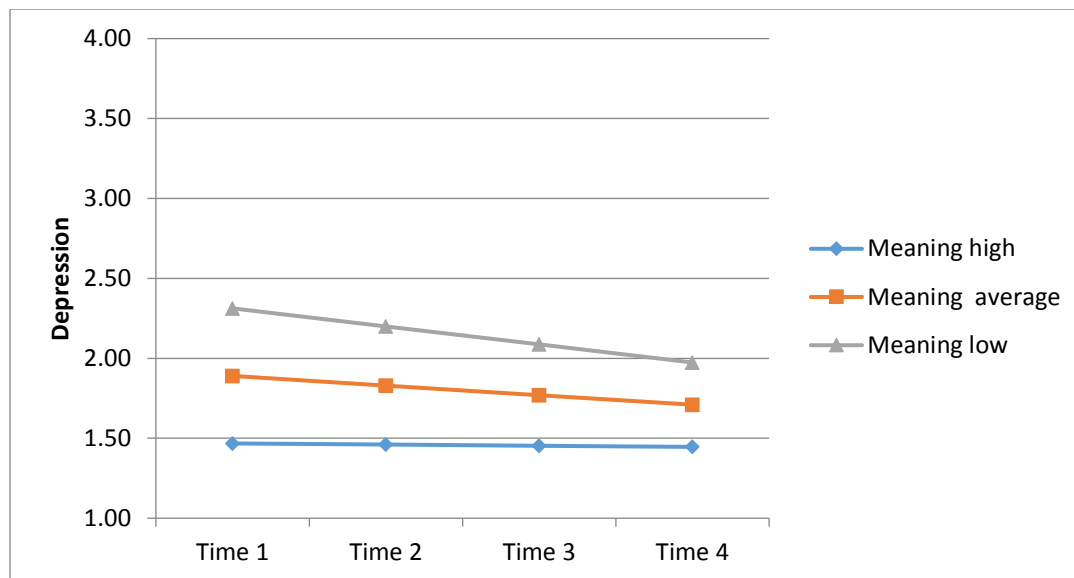*Figure 5.* Estimated trajectory of depression across time at mean levels of meaning and one standard deviation above and below mean levels of meaning.