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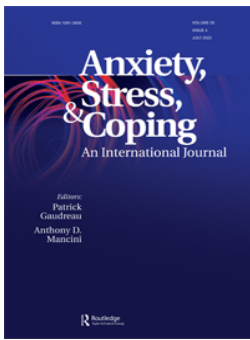
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Fear of the unknown as a mechanism of the inverse relation between life meaning and psychological distress

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ABSTRACT

Background and Objectives: Although there is accumulating evidence for an inverse relation between life meaning and psychological distress, little is known about the mechanisms of this relation. Using cross-sectional, observational methods, this research examined fear of uncertainty as one potential mechanism.

Design and Methods: Study 1 ($N=141$) was completed with a convenience sample, a unidimensional measure of life meaning, and general measures of anxiety and depression. Study 2 ($N=152$) was completed with a sample prescreened for anxiety, a multidimensional measure of life meaning, and clinical measures of anxiety and depression.

Results: The results from both studies generally showed an inverse relation between life meaning and psychological distress. Study 2 further indicated that these relations were stronger for the meaning subscale of perceiving life as coherent/comprehensible than the subscales assessing whether participants' lives are perceived as purposeful or significant. Mediation analyses in both studies showed indirect effects of life meaning on psychological distress through fear of uncertainty.

Conclusions: These findings support and extend previous research by showing that (i) meaning-as-comprehension may be particularly important in regards to psychological distress, and (ii) fear of uncertainty may mediate the inverse relation between meaning and measures of anxiety and depression.

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Introduction

The idea that life meaning plays a role in psychopathology and its treatment has a long history in clinical psychology (Adler, 1929; Frankl, 1946/1959; Horney, 1950; Jung, 1928/1966). Although there is increasing evidence for an inverse relation between life meaning and psychological distress (for a review, see Steger, 2012) and a growing interest in developing meaning-based interventions (Breitbart & Poppito, 2014; Schneider, 2008; Yalom, 1980), little is known about the mechanisms of this relation. The current research examines fear of the unknown as a potential mechanism.

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Life meaning and psychological distress

Research on the role of life meaning in psychological distress has mostly relied on correlational designs using self-report measures. Although first-generation measures of life meaning often consisted of unidimensional measures with items representing a number of meaning-related constructs, the field has begun to take a more differentiated approach to theorizing about and measuring life meaning. Specifically, researchers have started to converge on a conceptualization of life meaning as involving both an overall sense of whether life is meaningful and three components that contribute to a sense of a meaningful life, including comprehension (coherence), purpose, and mattering (significance) (George & Park, 2016; Martela & Steger, 2016). Using the terminology of George and Park (2016, p. 206), *comprehension* involves feeling “that one’s life makes sense, things seem clear in one’s life, things in one’s life fit together well, and things are as they ought to be,” *purpose* occurs when individuals are “motivated by valued life goals” and involves “a sense of engagement with life” in which individuals feel “pulled and directed toward their goals,” and *mattering* consists of individuals feeling that “their existence is of significance, importance, and value to the world.”

Research with first-generation unidimensional measures has consistently shown that meaning is inversely related with depression and anxiety, using both cross-sectional (Ishida & Okada, 2006; King & Hicks, 2009; Steger et al., 2009) and prospective designs (Eakman, 2014; Ostafin & Proulx, 2020a; Schaefer et al., 2013; Scheffold et al., 2014). Cross-sectional research using a new multidimensional measure has shown that comprehension, purpose, and mattering are inversely related with depression and anxiety and that the comprehension scale showed the strongest effects (George & Park, 2017). Intervention studies have also demonstrated that meaning can reduce psychological distress, though this research has mostly used indirect measures of distress. One study found that a meaning affirmation (about religious values in religious participants) before a Stroop task resulted in a weaker aversive reaction to task errors indicated by neural response (Inzlicht & Tullett, 2010). Another study found that compared to control, a meaning affirmation (thinking about important values) before a stressful task resulted in less post-stressor cortisol response (Creswell et al., 2005). A third study showed that a meaning affirmation (to socio-political values) before presentation of playing cards with anomalous items resulted in a diminished arousal response to the anomalous cards, indicated by pupil dilation (Sleegers et al., 2015). Recent research has shown that a brief meaning intervention administered after a stressor can reduce stressor-related anxiety and rumination (Ostafin & Proulx, 2020b). These experimental findings are supported by clinical research that has found meaning interventions to reduce anxiety and depression symptoms (Breitbart et al., 2010; Mohabbat-Bahar et al., 2014; for meta-analyses, see Kang et al., 2019; Vos et al., 2015).

Fear of the unknown as a common factor in psychological distress

Although there is increasing evidence for an inverse relation between life meaning and psychological distress, little is known about the mechanisms that underlie this relation. Fear of the unknown represents one potential mechanism that has long been proposed by existential thinkers. Following Kierkegaard’s (1844/1980) initial ideas, existential philosophers (Heidegger, 1927/1996; Tillich, 1952) and psychologists (Boss, 1962; Yalom, 1980) have proposed that the core of human existence is characterized by the unknowable, which has been variously described (using English translations) as the indefinite (Heidegger, 1927/1996) or nothingness (Nietzsche, 1885/1961; Tillich, 1952) and that this state involves infinite possibility (Kierkegaard, 1844/1980). Importantly, this indeterminate state elicits anxiety (Heidegger, 1927/1996; Kierkegaard, 1844/1980; Tillich, 1952). Further, responses to the unknown can involve identification with the meaning structures of one’s culture, with the effect that such involvement “covers over” the unknown (Heidegger, 1927/1996; Kierkegaard, 1844/1980) or opening to and facing the unknown, with the effect of facilitating individualized, creative possibilities to live an authentic life (Boss, 1962; Heidegger, 1927/1996; Tillich, 1952). Although such turning toward the unknown may increase anxiety, the unknown and attendant anxiety may be

relativized as a fundamental motivational force, replaced by personal growth, individualized meaning structures, and the experience of vitality (Boss, 1962; Tillich, 1952; Yalom, 1980).

The idea of the unknown as pervading the center of human experience is found in more recent philosophers (Dreyfus & Kelly, 2011) and cognitive scientists (Simon, 1987). Further, the idea that the unknown elicits anxiety has been examined by psychology researchers. Specifically, a number of researchers define the unknown as occurring when there is insufficient information for determining the motivational relevance of a phenomenon and note that the aversive response to such states of the unknown – and the attendant experience of uncertainty (the terms are used interchangeably in this paper) – plays a central role in anxiety and anxiety-related disorders (Barlow, 2002; Carleton, 2016; Gray & McNaughton, 2000; Grupe & Nitschke, 2013). For example, Gray's model proposes that anxiety is elicited by uncertainty related to perception and behavior – what a phenomenon is and how to act in its presence (Gray & McNaughton, 2000; Hirsh et al., 2012). Research shows that anxiety and anxiety disorders are related with an excessive negative response to uncertainty using self-report (Carleton et al., 2012) and psychophysiological (Grillon et al., 2008) methods. Carleton (2016) goes as far as to argue that fear of uncertainty is the most fundamental fear that contributes to anxiety. Recent research provides initial evidence that fear of uncertainty is indeed more strongly related to anxiety than other candidate fundamental fears (Papenfuss & Ostafin, 2021). In addition to anxiety, there is evidence that aversive response to uncertainty is related to other emotional disorders such as depression (for a meta-analysis, see Gentes & Ruscio, 2011).

Carleton's (2016) model of an evolutionarily old system via which the unknown elicits anxiety is aligned with the perspective that basic emotion systems are activated by typical categories of stimuli and that although emotions were selected because they increased adaptation, aberrant response of these emotion systems contributes to psychopathology (Panksepp, 2001). Whether emotions are functional and contribute to adaptation or aberrant and contribute to psychopathology is influenced by contextual factors such as genetics (Aleman et al., 2008) or learning (Chorpita & Barlow, 1998). The presence of life meaning represents another factor that may influence response to the unknown.

Life meaning as an antidote to the unknown

Echoing the existential idea that meaning can “cover over” the unknown (Heidegger, 1927/1996), Hirsh and colleagues (2012) note that goals, and especially the integrated goal hierarchies of a meaning structure, can constrain perceptual and behavioral uncertainty. The comprehension sub-construct has similarly been proposed to reduce the amount of uncertainty experienced by the individual (George & Park, 2016; Martela & Steger, 2016). In addition to reducing the amount of uncertainty, life meaning may also relativize the motivational salience of uncertainty. Specifically, reductions in the amount of uncertainty may lead to less defensive fear response to uncertainty when it occurs. For example, hearing unexpected and strange noises in the attic would likely elicit less anxiety if the noises occurred during the daytime with others around versus late at night while one is alone. A reason for this may be that the former situation has less perceptual and behavioral uncertainty, as the presence of daylight affords gathering information regarding the source of the sounds and the presence of others affords resources for adaptive response (e.g., greater likelihood of exploring the source of the sounds; help in the case of an intruder). Evidence that the amount of uncertainty influences aversive response to uncertain events is provided by findings that defensive response (i.e., startle reflex) to an unpredicted aversive stimulus (i.e., startle probe) is greater in conditions of uncertainty. For example, eliciting an uncertain context by placing participants in a dark (vs. lit) room leads to greater startle to unpredicted noise blasts – but not to noise blasts for which the participant is first prepared (i.e., by a weaker auditory stimulus presented before the startle probe) (Grillon et al., 1997, 1998). Evidence is also shown in aversive conditioning tasks that involve predictable and unpredictable conditions regarding the presentation of electric shock. Startle response to unpredicted noise blasts is stronger in the unpredictable context than in the predictable context (Grillon et al., 2004; Papenfuss et al., 2021). These lines of research

indicate that when there is more uncertainty, individuals have a greater negative response to uncertain aversive events. Given that a meaningful life is typically one that is coherent and thus one in which uncertainty is constrained (George & Park, 2016; Hirsh et al., 2012), individuals with more meaning may subsequently have weaker fear responses to uncertainty.

Current studies

Although there is a growing evidence base for the inverse relation between life meaning and psychological distress, little is known about the mechanisms of this relation. The current studies were designed to examine a model in which fear of the unknown mediates the meaning-distress relation. Study 1 tested this research question with undergraduate students using a unidimensional measure of life meaning (Steger et al., 2006). Study 2 tested the question with a sample that was prescreened for symptoms of anxiety and used a newer, multidimensional measure of life meaning that assesses comprehension, purpose, and mattering (George & Park, 2017). Both studies tested the hypotheses that meaning is inversely related with anxiety and depression (H1) and that the inverse relation is partially mediated by fear of the unknown (operationalized with a fear of uncertainty measure) (H2). The Study 2 hypotheses were preregistered on the As Predicted website (<https://aspredicted.org/blind.php?x=t6qn2f>).

Study 1

Participants and procedure

One hundred and forty-one undergraduate students ($M_{\text{age}} = 20.09$ years, $SD_{\text{age}} = 1.90$) at a Dutch university volunteered to participate as partial fulfillment of a class requirement. The majority of participants self-reported as female ($n = 103$) and either German ($n = 74$) or Dutch ($n = 26$) nationality. The study was approved by the University of Groningen psychology department ethics review board (approval number 16208-S-NE). This sample resulted in a power of .95 to detect a bivariate correlation of .30. After signing an informed consent form, participants completed a packet of the measures listed below.

Measures

Meaning in life

Life meaning was assessed with the Presence of Meaning scale from the Meaning in Life Questionnaire (Steger et al., 2006). The Presence of Meaning scale consists of five items (e.g., "I understand my life's meaning") using a scale ranging from 1 (*Absolutely untrue*) to 7 (*Absolutely true*). The scale demonstrated good internal consistency ($\alpha = .89$).

Depression and anxiety

The Brief Symptom Inventory (Derogatis & Melisaratos, 1983) was used to assess how much participants were bothered by depression (six items; e.g., "Feeling blue") and anxiety (six items; e.g., "Spells of terror or panic") symptoms over the previous month using a scale ranging from 0 (*Not at all*) to 4 (*Extremely*). Internal consistency was good for both the depression ($\alpha = .83$) and anxiety ($\alpha = .84$) scales.

Fear of the unknown

Fear of the unknown was assessed with the Intolerance of Uncertainty Scale – short form (Carleton et al., 2007), which consists of 12 items describing cognitive, emotional and behavioral responses to uncertainty (e.g., "Unforeseen events upset me greatly"; "When it's time to act, uncertainty paralyzes me") rated on a scale ranging from 1 (*not at all characteristic of me*) to 5 (*entirely characteristic of me*). Although the scale consists of two subscales, there is evidence that the overall scale is more appropriate for assessing the construct (Shihata et al., 2018). The scale demonstrated good internal consistency ($\alpha = .87$).

Data analyses

Statistical analyses for both studies were conducted with SPSS version 26 (IBM Corp., 2019). The hypothesis that meaning is inversely related with anxiety and depression (H1) was tested with bivariate correlations. The hypothesis that the inverse relations with anxiety and depression are mediated by fear of uncertainty (H2) was tested with regression analyses using version 3.5 of the PROCESS macro for SPSS (Hayes, 2013).

Results

Correlation hypotheses

Bivariate correlation analyses (see Table 1) supported the first hypothesis that life meaning is inversely related with anxiety (small-to-medium effect size) and depression (large effect size). Table 1 also demonstrates that meaning in life is inversely related with fear of uncertainty.

Mediation hypotheses

The second hypothesis was that fear of uncertainty would partially mediate the relation between life meaning and psychological distress and this was tested with regression analyses in which depression and anxiety (in separate analyses) were regressed on life meaning, with fear of uncertainty entered as the proposed mediator. The top panel in Figure 1 illustrates that the relation between life meaning and depression was reduced when controlling for fear of uncertainty. Specifically, a bias-corrected bootstrap 95% confidence interval for the indirect effect ($\beta = -0.096$) based on 10,000 bootstrap samples did not include zero (-0.168 to -0.034), indicating a model in which the relation between life meaning and depression is partially accounted for by individual differences in fear of uncertainty. The bottom panel in Figure 1 illustrates that fear of uncertainty also partially mediates the relation between life meaning and anxiety, as a bias-corrected bootstrap 95% confidence interval for the indirect effect ($\beta = -0.082$) based on 10,000 bootstrap samples did not include zero (-0.154 to -0.026).

Given the cross-sectional nature of the data, the direction of the mediation model cannot be determined. Although our theory proposes that the fear of uncertainty represents a mechanism of the inverse relation between life meaning and psychological distress, it is possible that the direction goes the other way – that meaning could mediate the relation between fear of uncertainty and psychological distress. We examined this possibility with post-hoc analyses in which fear of uncertainty was entered as the predictor and life meaning as the potential mediator. The results showed that meaning did not act as a mediator for the anxiety outcome but did act as a mediator for the depression outcome (see Supplemental Table 1).

Discussion

The correlation results of Study 1 are consistent with previous research showing an inverse relation between the Presence of Meaning scale and both anxiety and depression (Huo et al., 2019; Miller & Rottinghaus, 2014; Steger et al., 2009). The current study extends previous findings by examining fear of the unknown as a potential mechanism of the relation between life meaning and

Table 1. Bivariate correlations among study 1 variables ($N = 141$).

Variable	Mean	SD	1	2	3
1. Meaning in life	20.05	6.83	–		
2. Fear of uncertainty	30.98	9.15	–.29***	–	
3. Depression	8.76	5.51	–.48***	.44***	–
4. Anxiety	8.17	5.18	–.22*	.32***	.58***

* $p < .05$, ** $p < .01$, *** $p < .001$.

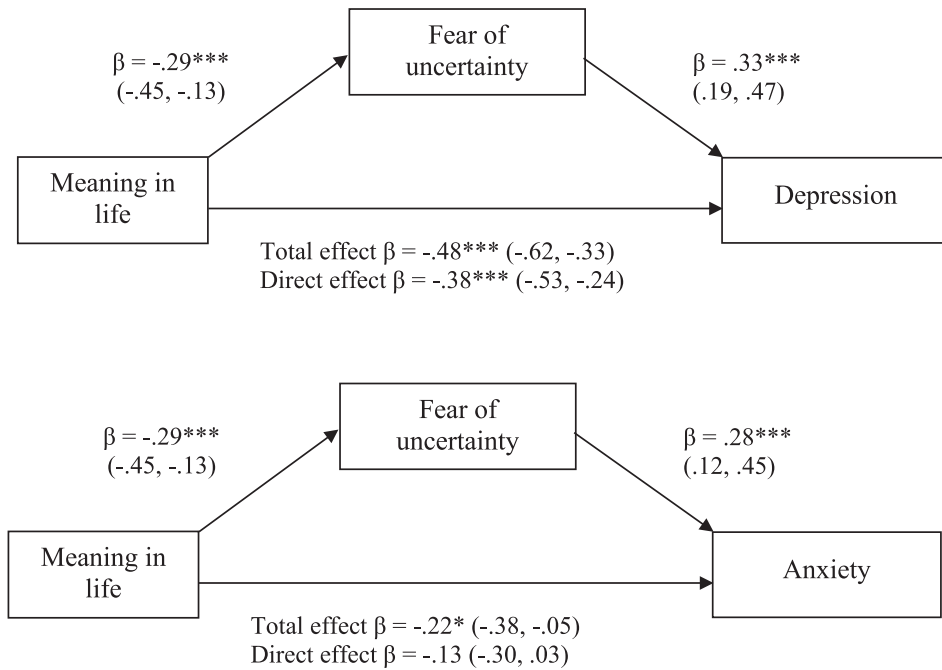


Figure 1. Study 1 model of the indirect effect of meaning in life on depression (top) and anxiety (bottom) through fear of uncertainty. Coefficients represent standardized coefficients and 95% Confidence Intervals noted in parentheses. * $p < .05$, ** $p < .01$, *** $p < .001$.

psychological distress. The results support a model in which fear of uncertainty mediates the relation between life meaning and both depression and anxiety.

Study 2 was designed to build on the findings of Study 1 in several ways. First, it assessed life meaning with a multidimensional measure. George and Park (2016) have noted that older unidimensional measures often assess subjective judgments about an overall sense of meaning (e.g., “my life is meaningful”) and that a benefit of such measures is that they may reflect the participants’ experience of life meaning. However, because such measures allow participants to decide what “meaning” means, these scales may have more noise (e.g., greater influence by affective states; Heintzelman & King, 2014). Additionally, unidimensional measures often include several meaning-related constructs. For example, the Presence of Meaning scale includes items that reflect the subconstructs of comprehension (“I understand my life’s meaning”) and purpose (“My life has a clear sense of purpose”). Such measures are limited in their ability to examine the extent to which comprehension, purpose, and mattering individually contribute to the phenomenon of interest. Having such information would facilitate theory building and the development of interventions. Study 2 thus used a recently developed measure of this more differentiated operationalization of meaning.

Study 2 was also designed to extend Study 1 by increasing the clinical relevance of the methods. For example, the use of a convenience sample in Study 1 may limit the ability to generalize the findings to clinical populations. As a first step in examining the relevance of the model for clinical populations, Study 2 used a sample that was prescreened for elevated anxiety. In addition, although the Study 1 depression and anxiety measures are widely used, they may be more valid as measures of general psychological distress than for identifying clinically relevant symptoms (Recklitis et al., 2017). Study 2 thus included measures commonly used in clinical research to assess symptoms of depression and several anxiety disorders.

Study 2

Participants and procedure

Participants at a Dutch university were administered a pre-screening battery that included a 7-item measure to assess anxiety (Spitzer et al., 2006). Participants who indicated elevated anxiety (≥ 8 ; Kroenke et al., 2007) were recruited to participate in the current study. Of those invited, 152 ($M_{\text{age}} = 20.48$ years, $SD_{\text{age}} = 2.67$) volunteered to participate as partial fulfillment of a class requirement. Of the six symptom measures used, three provide cutoff scores for clinical relevance. As can be seen in Table 2, the mean scores of the sample indicated clinically relevant symptoms of depression (scores of 20–24 representing mild depression [Olsen et al., 2003], mean score of 23.57 and 61.2% of sample with a score of 20 or more), worry (scores of 57 or more representing clinically-relevant symptoms [Fresco et al., 2003], mean score of 58.76 and 61.2% of sample with a score of 57 or more), and obsessive compulsive disorder (scores of 21 or more representing clinically-relevant symptoms [Foa et al., 2002], mean score of 20.55 and 45.4% of sample with a score of 21 or more). The majority of participants self-reported as female ($n = 116$) and either German ($n = 64$) or Dutch ($n = 39$) nationality. The study was approved by the University of Groningen psychology department ethics review board (approval number 18122-5). This sample resulted in a power of .95 to detect a bivariate correlation of .30. After signing an informed consent form, participants completed a packet of the measures listed below.

Measures

Life meaning

Meaning was assessed with the Multidimensional Existential Meaning Scale (George & Park, 2017), which consists of 15 items rated on a scale ranging from 1 (*Very strongly disagree*) to 7 (*Very strongly agree*) to assess the following subscales: *Comprehension* (e.g., “I understand my life”), *Purpose* (e.g., “I have overarching goals that guide me in my life”) and *Mattering* (e.g., “Even considering how big the universe is, I can say that my life matters”). The aggregate measure of the scale demonstrated good consistency, $\alpha = .92$, as did each of the subscales: *Comprehension* $\alpha = .86$; *Purpose* $\alpha = .92$; and *Mattering* $\alpha = .88$.

Fear of the unknown

Fear of the unknown was assessed with the Intolerance of Uncertainty Scale – short form (Carleton et al., 2007), and demonstrated good internal consistency ($\alpha = .92$).

Depression

Symptoms of depression were assessed with the Major Depression Inventory (Bech et al., 2001). This questionnaire consists of 13 items (e.g., “Have you felt low in spirits or sad?”), with the overall sum using 10 items (three items have two alternatives, with the higher score used in the sum). Participants rate how much they experienced the symptoms over the past two weeks with a scale ranging from 0 (*At no time*) to 5 (*All the time*). The scale’s internal consistency was good ($\alpha = .90$).

Worry

Worry was assessed using the Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990). The questionnaire consists of 16 items (e.g., “I’m always worrying about something”), which participants rate according to how much the statements are true for them on a scale ranging from 1 (*Does NOT describe me*) to 5 (*Describes me PERFECTLY*). The scale demonstrated good internal consistency ($\alpha = .90$).

Table 2. Bivariate correlations among study 2 variables ($N = 152$).

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. MEMS total	65.37	15.07	–									
2. Comprehension	21.49	5.40	.87***	–								
3. Purpose	26.07	5.32	.81***	.62***	–							
4. Mattering	17.81	7.04	.87***	.62***	.50***	–						
5. Fear uncertainty	32.26	10.66	–.33***	–.34***	–.19*	–.30***	–					
6. Depression	23.57	10.18	–.50***	–.51***	–.37***	–.40***	.46***	–				
7. Worry	58.76	11.78	–.30***	–.27**	–.16*	–.31***	.70***	.55***	–			
8. OCD	20.55	9.91	–.13	–.23**	–.04	–.08	.62***	.50***	.53***	–		
9. Social anxiety	25.46	13.45	–.34***	–.34***	–.17*	–.34***	.55***	.46***	.56***	.38***	–	
10. Agoraphobia	15.07	9.64	–.06	–.06	.02	–.09	.49***	.30***	.50***	.41***	.51***	–
11. Interoceptive fear	6.02	5.47	–.22**	–.26**	–.04	–.24**	.38***	.29***	.40***	.29***	.44***	.49***

* $p < .05$, ** $p < .01$, *** $p < .001$.

Obsessive compulsive symptoms

Symptoms of obsessive-compulsive disorder were assessed using the Obsessive Compulsive Inventory – Revised (OCI-R; Foa et al., 2002). It consists of 18 self-statements describing symptom behaviors (e.g., “I check things more often than necessary”) that are rated on a scale ranging from 0 (*not at all*) to 4 (*extremely*) according to how much these behaviors have distressed the participant over the past month. The scale demonstrated good internal consistency ($\alpha = .84$).

Panic and phobias

Symptoms of social phobia (10 items; e.g., “Giving a speech”), interoceptive fear (5 items; e.g., “Playing a vigorous sport on a hot day”), and agoraphobia (9 items; e.g., “Going through a car wash”) were assessed with the Albany Panic and Phobia questionnaire (APPQ; Brown et al., 2005; Rapee et al., 1994) using a scale ranging from 0 (*no fear*) to 8 (*extreme fear*), according to how much fear is anticipated in case of an encounter during the following week. Internal consistency was good for all three scales: Social phobia scale $\alpha = .89$; Interoceptive fear scale $\alpha = .76$; and Agoraphobia scale $\alpha = .77$.

Data analyses

The hypothesis that meaning is inversely related with anxiety and depression (H1) was tested with bivariate correlations first with the aggregate score of the life meaning measure. As there were several anxiety measures, a Bonferroni–Holm correction was applied to correct for a family-wise error rate in the analyses with the five measures. Therefore, the smallest to largest p -values were tested against alphas of .01, .0125, .0167, .025, and .05, respectively. In order to provide additional information about the relation between life meaning and psychological distress, bivariate correlations with the distress measures were tested with the individual scales of comprehension, purpose, and mattering. The hypothesis that the inverse relations with anxiety and depression are mediated by fear of uncertainty (H2) was tested with regression analyses using version 3.5 of the PROCESS macro for SPSS (Hayes, 2013), first with the aggregate score of the life meaning measure and then with the individual scales.

Results

Main effect hypothesis

The hypothesis that life meaning is inversely related with symptoms of anxiety and depression was largely supported with bivariate correlations with the aggregate measure of meaning (see Table 2). In addition to demonstrating a large effect size inverse relation with depression, life meaning showed medium effect size inverse relations with a majority of the anxiety measures. Specifically, results using the Bonferroni–Holm correction indicated that life meaning was inversely related with social anxiety, $p < .001$, worry, $p < .001$, and interoceptive fear, $p = .007$, but not with agoraphobia or obsessive-compulsive disorder. Table 2 also indicates that the aggregate life meaning measure was inversely related with fear of uncertainty.

We also examined whether psychological distress was inversely related with the meaning-related scales of comprehension, purpose, and mattering. As can be seen in Table 2, all three scales were for the most part related with the psychological distress measures (i.e., 10 of the 15 correlations were statistically significant). We next conducted exploratory analyses to examine whether the subscales predicted unique variance of fear of uncertainty and each of the psychological distress measures. The unique variance question was conducted with regression analyses in which fear of uncertainty and the distress variables were regressed on the three meaning subscales. As shown in Supplemental Table 2, the comprehension scale most consistently demonstrated unique relations, including fear of uncertainty, depression, obsessive-compulsive disorder symptoms, social anxiety, and

interoceptive fear. Mattering predicted a unique variance of the worry and social anxiety measures and the purpose scale demonstrated unique variance only for the interoceptive fear variable.

Mediation hypothesis

The second hypothesis was that fear of uncertainty would partially mediate the relation between life meaning and both depression and anxiety and this was tested with regression analyses, in which depression and anxiety measures (in separate analyses) were regressed on the aggregate measure of life meaning, with individual differences in fear of uncertainty entered as the mediator. The results are illustrated in Table 3, which shows indirect effects of the relation between life meaning and all depression and anxiety measures through fear of uncertainty, indicated by the 95% confidence intervals for all indirect effect measures not including zero. Of note, the indirect effects were observed even for the two anxiety measures that did not show bivariate correlations with life meaning (agoraphobia and obsessive-compulsive disorder).

We also conducted exploratory analyses to examine whether the relation between the meaning subscales and the psychological distress variables was mediated by fear of uncertainty. As above, these analyses were conducted with the PROCESS macro, in which depression and anxiety measures (in separate analyses) were regressed on each of the three meaning subscales, with fear of uncertainty entered as the proposed mediator. As indicated in Supplemental Tables 3a-c, the results uniformly indicated that the relation of each of the psychological distress variables and each of the meaning subscales was partly mediated by fear of uncertainty. We next examined the extent to which the relation between each meaning subscale and psychological distress was mediated by fear of uncertainty, while controlling for the other two meaning subscales (see Supplemental Table 4). The results indicated that fear of uncertainty continued to mediate the relation between the comprehension scale and all distress variables, including depression, worry, obsessive compulsive symptoms, social anxiety, agoraphobia and interoceptive fear. Mediation effects with the purpose and the mattering scales were no longer significant when controlling for the other two meaning scales.

As in Study 1, we examined a model in which fear of uncertainty was entered as the predictor and meaning as the mediator. The results showed that meaning did not act as a mediator for four of the five anxiety outcomes but did act as a mediator for the depression outcome (see Supplemental Table 1).

Discussion

Similar to Study 1, the correlation results generally indicated an inverse relation between life meaning and measures of depression and anxiety. Specifically, the aggregate measure of life meaning was inversely related with symptoms of depression, worry, social anxiety, and interoceptive fear but not with obsessive-compulsive disorder or agoraphobia. As Table 2 indicates, the inverse relations between the meaning subscales and the depression and anxiety measures was largely similar to those with the aggregate measure, with the comprehension scale showing an additional

Table 3. Study 2 test of the effect of MEMS total scale on psychological distress through fear of uncertainty.

Outcome variable	Total effect		Direct effect		Indirect effect		
	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	Indirect effect	LLCI	ULCI
Depression	-.498	-7.035***	-.389	-5.568***	-.109	-.187	-.047
Worry	-.299	-3.831***	-.081	-1.305	-.218	-.331	-.113
OCD	-.133	-1.637	.077	1.141	-.210	-.320	-.107
Social anxiety	-.337	-4.388***	-.177	-2.500*	-.161	-.254	-.078
Agoraphobia	-.055	-0.680	.117	1.561	-.172	-.285	-.081
Interoceptive fear	-.219	-2.749**	-.108	-1.355	-.111	-.195	-.044

* $p < .05$, ** $p < 0.01$, *** $p < .001$.

Coefficients represent standardized coefficients.

relation with obsessive-compulsive symptoms and slightly stronger correlations compared to the other two subscales. The strength of the comprehension scale was further indicated by regression analyses indicating that when all three scales were simultaneously entered as predictors, comprehension demonstrated unique relations with depression, obsessive-compulsive disorder symptoms, social anxiety, interoceptive fear, as well as with fear of uncertainty. The other subscales showed weaker unique predictor effects, with the mattering scale related to worry and social anxiety and the purpose scale related to interoceptive fear.

Also similar to Study 1, the mediation analyses showed evidence for fear of the unknown as a mediator of all relations between the aggregate scale of life meaning and the depression and anxiety measures, including the two scales for which there were not significant main effect relations (i.e., the obsessive-compulsive disorder and agoraphobia scales). The findings with the agoraphobia and obsessive-compulsive disorder measures is perhaps to be expected, given evidence that indirect effects frequently occur when the relation between the predictor and criterion variables is relatively weaker than their relation with the mediator (Rucker et al., 2011). Further, all relations between the three meaning subscales and the depression and anxiety measures demonstrated indirect effects through fear of the unknown. In analyses controlling for the other two meaning subscales, the comprehension scale continued to show indirect relations through fear of the unknown with each of the depression and anxiety measures whereas there were no longer mediator effects for the purpose and mattering scales.

General discussion

These studies examined two hypotheses regarding the relation between life meaning and psychological distress. The first hypothesis was that life meaning would be inversely related to anxiety and depression. This hypothesis was largely supported, as Study 1 showed that a unidimensional measure of meaning was inversely related to both anxiety and depression and Study 2 showed that both the composite score and subscales of a multidimensional measure of meaning were inversely related with clinical symptom measures of depression, social anxiety, worry, and interoceptive fear but not with symptoms of agoraphobia or obsessive-compulsive disorder (with the exception of the comprehension subscale). The second hypothesis was that the inverse relation between life meaning and psychological distress would be mediated by fear of the unknown. This was also largely supported, as mediation analyses indicated indirect effects of life meaning and all measures of depression and anxiety through fear of uncertainty using both unidimensional (Study 1) and multidimensional (Study 2) measures of meaning.

Contributions

These studies support previous findings of an inverse relation between anxiety and depression and life meaning assessed with unidimensional (Steger et al., 2009) and multidimensional (George & Park, 2017) measures. As previous research has typically examined the relation between meaning and general anxiety (Miller & Rottinghaus, 2014; Steger et al., 2009), one contribution of the current research is the use of symptom measures from multiple disorders in Study 2. The findings indicated that life meaning showed strong associations with symptoms of depression, generalized anxiety disorder, and social anxiety disorder, somewhat weaker relations with interoceptive fear symptoms of panic disorder, and little or no relations with agoraphobia and obsessive-compulsive disorder. A potential reason for these findings is that depression, generalized anxiety disorder and social anxiety often involve concerns with incentives such as relationships and employment (Ashbaugh et al., 2019; Newby & Moulds, 2012; Roemer et al., 1997) whereas panic disorder and obsessive-compulsive disorder may involve concerns with physical and mental injury (de Silva, 1986; Ottaviani & Beck, 1987). Life meaning may thus play a more important role in disorders that involve problems with higher-order goals that provide purpose and comprehension.

Study 2 also extends previous research by examining the unique variance of psychological distress accounted for by the meaning subconstructs of comprehension, purpose, and mattering. Although the three subconstructs may influence each other, they are generally proposed to have distinct contributions to an overall sense of life meaning and other measures of psychological well-being and distress (George & Park, 2016; Martela & Steger, 2016; McKnight & Kashdan, 2009). Table 2 provides evidence for both perspectives in that the three scales were indeed interrelated with bivariate correlations ranging from .50 to .62, but not so strongly as to indicate they represent the same construct (Carlson & Herdman, 2012). Further, the comprehension scale most consistently predicted unique variance of the psychological distress variables and was the only subconstruct to uniquely predict fear of uncertainty (see Supplemental Table 1). The current findings support the important role given to comprehension/coherence for the experience of meaning and psychological distress, as discussed by existential thinkers (Camus, 1955; Tillich, 1952) and contemporary psychologists (Heine et al., 2006; Heintzelman & King, 2014; Janoff-Bulman & Yopyk, 2004; Peterson & Flanders, 2002). The findings regarding the importance of coherence are relevant for clinical researchers, who should further examine this meaning subconstruct in developing models of and interventions for mood and anxiety disorders.

These studies also extend previous findings by addressing a potential mechanism of the inverse relation between life meaning and psychological distress. Across both studies, the inverse relation between all (sub)scales of life meaning and all anxiety and depression scales showed indirect effects through fear of uncertainty. The nature of this model was further developed in the Study 2 analyses that examined the mediation effects for each meaning subscale when controlling for the other two subscales. The results showed that fear of uncertainty continued to act as a mediator between the comprehension subscale and all distress variables whereas none of the previously significant mediation effects with the purpose and mattering subscales remained significant. Given theory that the amount of uncertainty is most strongly related with the comprehension subscale (George & Park, 2016; Martela & Steger, 2016), the current findings coincide with previous results indicating that fear responses to uncertain aversive stimuli are weaker in conditions of less uncertainty (Grillon et al., 1998; Papenfuss et al., 2021).

Limitations and future directions

There are several limitations in addition to those listed above. One important limitation regards the mediation analyses. Although all of the analyses across both studies supported the proposed model of indirect effects of an inverse relation between life meaning and psychological distress through fear of uncertainty, the direction of these relations cannot be determined due to the cross-sectional nature of the methods. We conducted post-hoc analyses to examine whether the data would fit an alternative model in which meaning was entered as the mediator of the relations between fear of uncertainty and psychological distress. The results from both studies indicated that the anxiety data better fit a model in which life meaning is the predictor and fear of uncertainty the mediator but that the depression data also fit the alternative model in which meaning is the mediator. It may be that in some cases fear of uncertainty impedes the ability to find meaning with consequences that are more detrimental for depression than anxiety.¹ However, the correlational nature of the data suggests that the results be interpreted as initial evidence for the proposed model that requires further testing with longitudinal and experimental designs.

Another limitation regards the generalizability of the findings. The findings were similar in both studies and the use of an analog sample in Study 2 suggests the results will generalize to those suffering from clinical disorders (Abramowitz et al., 2014). To illustrate, the mean depression score in this sample (23.57) is similar to that found in a clinical sample of participants who were mildly depressed (mean = 20.9; Cuipers et al., 2007) and the mean worry score (58.76) is similar to what is seen in social anxiety patients (= 56.35) but lower than GAD patients (= 68.11; Fresco et al., 2003). Although the findings of Study 2 are promising, the extent to which the results apply to clinical samples needs to

be examined. Future research would benefit from correlational and experimental designs that test the 'life meaning-fear of uncertainty-psychological distress' model in clinical samples, thereby determining the extent to which the model is relevant for understanding and treating anxiety and mood disorders.

Conclusion

The cosmic horror author H.P. Lovecraft (1927) stated that "The oldest and strongest emotion of mankind is fear, and the oldest and strongest kind of fear is fear of the unknown." Existentially-oriented thinkers have proposed that fear of the unknown contributes to psychopathology and that life meaning can reduce both the frequency with which the unknown is encountered and the unknown's motivational salience (Boss, 1962; Heidegger, 1927/1996). The current studies are aligned with these ideas by (i) contributing to a growing body of evidence that fear of the unknown plays a transdiagnostic role in the symptoms of anxiety and mood disorders (Gentes & Ruscio, 2011) and (ii) providing support for a model in which the inverse relation between life meaning and psychological distress is partly accounted for by fear of the unknown. These findings suggest the transdiagnostic potential for life meaning interventions.

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