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Life-purpose intervention reduces anxiety

A brief life-purpose intervention reduces trauma-film anxiety and rumination

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The data discussed in this article are publicly available at <https://osf.io/58hdy/>

These data have been previously presented at two conferences: (1) Ostafin, B.D., (2019). Meaning in life and psychopathology: An antidote to fear and desire? Talk given at the annual meeting of the International Association for the Psychology of Religion, Gdansk, Poland, and (2) Ostafin, B.D. (2017). Meaning in life reduces anxiety-related rumination. Talk given at the annual meeting of the American Psychological Association, Washington, D.C.

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Brian Ostafin received his PhD in clinical psychology from Boston University in 2004 and has worked in the Clinical Psychology and Experimental Psychopathology department at the University of Groningen (Netherlands) since 2010. His research used an existential frame

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to examine topics such as meaning in life, mindfulness, and the experience of awe, including questions regarding basic processes and clinical benefits.

Travis Proulx received a PhD in developmental psychology from the University of British Columbia in 2008. He has worked at the Cardiff University School of Psychology since 2016. In collaboration with others, he has developed the Meaning Maintenance Model. The focus of his research is the manner in which meaning systems shape social motivations, and the ways that people maintain meaning in the wake of experiences that are inconsistent with their expectations.

Abstract

Background and Objectives: Although there is accumulating evidence for an inverse relation between life meaning and anxiety, most of this research has used cross-sectional designs.

Design and Methods: We examined the relation between life meaning and anxiety with an experimental design ($N = 103$), hypothesizing that compared to control, a brief life-purpose intervention administered after a film stressor would result in less anxiety and film-related rumination and that anxiety would mediate the intervention-rumination relation. After viewing a validated ‘trauma film’ depicting a racially-motivated physical assault, participants completed either a life-purpose intervention comprised of reading about life meaning and writing about intrinsically valued goals or one of two control groups consisting of either a distracting theme (computers) or a threat-relevant theme (racial equality), both designed to be engaging without evoking life-purpose.

Results: Results showed that compared to control, the life-purpose participants reported less post-intervention anxiety and film-related rumination and that the intervention effect on rumination was mediated by anxiety.

Conclusions: The findings support the promise of meaning-related interventions for anxiety.

Keywords: Anxiety, Meaning, Purpose, Rumination, Trauma

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“The greatest and most important problems of life... can never be solved, but only outgrown... some higher or wider interest arose on the person's horizon, and through this widening of view, the insoluble problem lost its urgency.” (Jung, 1947, p. 89)

Early clinical psychologists such as Jung (1931/1947) and Frankl (1946/1959) described the importance of developing meaning in life (MIL) to treat psychological distress. This idea is supported by more recent theory that describes violations of goals and beliefs as critical sources of daily (Proulx, Inzlicht, & Harmon-Jones, 2012) and clinically-relevant (Janoff-Bulman, 1992) anxiety and rumination. That MIL is inversely related to stressor-related anxiety and rumination is supported by correlational research, including cross-sectional (Debats, 1996; Steger, Kashdan, Sullivan, & Lorentz, 2008) and prospective (Groleau, Calhoun, Cann, & Tedeshi, 2013; Schaefer et al., 2013) designs. Correlational findings also suggest that the inverse relation between MIL and rumination may be explained by individuals with high MIL experiencing less stressor-related anxiety (Ostafin & Proulx, in press). Further, experimental studies that elicit pre-stressor MIL have shown that such inductions reduce stress-related responses of cortisol (Creswell et al., 2015) and noradrenaline (Slegers, Proulx, & Van Beest, 2015). Less work has examined the benefits of post-stressor MIL interventions, though a meta-analysis found that meaning-focused clinical interventions reduce psychological distress (Vos, Craig, & Cooper, 2015).

One reason why MIL interventions might diminish response to stressors is that activating commitment to important goals/values can create perspective, thereby reducing the motivational salience of the threat. This idea is mentioned in Jung's opening quote and in Frankl's observation that MIL allows the individual to rise “above the sufferings of the moment” (Frankl, 1959, p. 95). A related concept is *trivialization* (Festinger, 1957), in which

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affirmation of life values unrelated to a goal-threat diminishes the motivational salience of that threat (Simon, Greenberg, & Brehm, 1995).

An important consequence of stressor-related distress is that it can elicit repetitive negative thinking (Nolen-Hoeksema, Wisco, & Lyubormirsky, 2008; Proulx et al., 2012). Ability to reduce post-stressor anxiety would thus have clinical implications, including a direct route of reducing anxiety symptoms and an indirect route through repetitive negative thinking, which plays a role in the development and maintenance of post-traumatic stress disorder and other clinical disorders (Brewin, Gregory, Lipton, & Burgess, 2010; Dalgleish, 2004; Ehring & Watkins, 2008; Janoff-Bulman, 1992; Park, Mills, & Edmondson, 2012).

In sum, previous work indicates an inverse relation between MIL and response to stressors. Previous research has mostly used correlational designs or pre-stressor MIL inductions. The potential of using MIL interventions in the clinic would be supported by finding that such interventions reduce stressor-related consequences such as anxiety and rumination. The current study was designed to address this question. We examined whether a post-stressor MIL intervention would lead to (1) less anxiety, (2) less stressor-related rumination, and (3) that the MIL-rumination relation would be mediated by anxiety.

Pilot study

The primary aims of the pilot study were to create a meaning intervention that elicited a sense of purpose (*life-purpose essay*; adapted from Yalom [1980] and Steve Jobs' commencement speech at Stanford ["You've got to find what you love", 2005]) and control conditions that were equivalently engaging. We tested two control conditions that were either relevant or irrelevant to the stressor in order to contrast the impact of MIL with materials that address the stressor (*racial equality essay*; adapted from internet article "How a white supremacist gang leader shed his racist beliefs" [2011]) or distract from the stressor (*computer essay*; adapted from Routledge et al. [2011]) without evoking a sense of purpose. Twenty-

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seven participants read all three essays (see essays in the Supplemental Material available online). Participants rated each essay on the categories of being *engaging* and eliciting a *sense of purpose*, using two items per category (see Supplementary Material available online). Both categories had adequate internal consistency (engagement $\alpha = .69$; purpose $\alpha = .85$).

The results (see Table S1 in Supplementary Material available online) showed that the *Life-purpose* essay elicited more purpose compared both to the computer ($t(26)=7.09, p < .001; d = 1.364$) and the race equality conditions ($t(26)=5.65, p < .001; d = 1.085$). The *Racial equality* essay had higher ratings of engagement compared to the *Computer* essay, ($t(26)=4.01, p < .001; d = 0.792$) but not the *Life-purpose* essay, $p > .16$. The purpose and computer essays did not differ on engagement, $p > .13$. These results indicate the validity of the *Life-purpose* essay to elicit a sense of purpose relative to the control conditions and that both control essays were at least as engaging as the *Life-purpose* essay. Recent research has similarly shown that this brief MIL intervention elicits a sense of purpose in an analog eating disorder sample (Doornick, Glashouwer, Ostafin & de Jong, 2020).

Main Study

Participants

One hundred and ten undergraduate students from a Dutch university were recruited to participate as partial fulfillment of a class requirement. The study was approved by the psychology Institutional Review Board (approval #12151-E) and was carried out with the provisions of the World Medical Association Declaration of Helsinki. Six participants reported English fluency below *moderate* and were subsequently omitted from analyses. One participant did not complete the study because the building closed before the session could be completed. The final sample of 103 participants had a $M_{\text{age}} = 20.61$ years ($SD_{\text{age}} = 1.77$), was primarily female ($n = 66$) and of German ($n = 63$) and Dutch ($n = 27$) ethnicity (other European countries, $n = 8$; South American countries, $n = 3$; Turkey, $n = 1$; and Pakistan, $n =$

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1). This sample resulted in a power of .98 to detect a large effect size, .71 to detect a medium effect size, and .17 to detect a small effect size.

Materials

Aversive film. The film consisted of a 2-minute clip from the movie *American History X* (Kaye, 1998). The clip depicted a violent physical assault in which a skinhead shoots two African-American men who were stealing his truck and then stomps on one man's head whose open mouth was on a curb. This film has been previously used to examine trauma-related rumination (Matsumoto, Sensui, & Mochizuki, 2017; Wessel, Huntjens, & Verwoerd, 2010).

Conditions. Three conditions were used and consisted of reading one of the essays noted in the pilot study (life-purpose, $n = 34$; computer, $n = 35$; or race equality, $n = 34$).

Participants were instructed that essay comprehension would be assessed. After reading the essay, participants summarized it (using 25-125 words). Participants in the *Life-purpose* condition were then instructed to write (using 25-125 words) about two or three “things that are most important to you – the things that give purpose and meaning to your life” and participants in the *Racial equality* condition were instructed to “argue for the importance of racial equality” (using 25-125 words).

State anxiety. State anxiety was assessed with a 6-item short-form version of the Spielberger State Anxiety Inventory (Marteau & Bekker, 1992) with scale anchors consisting of 1 (*Not at all*) to 5 (*Very much*). The scale was administered twice and showed good internal consistency (α 's = .79 and .90).

State affect. State affect was measured with a single item assessing how participants feel “right now”, ranging from 1 (*Very negative*) to 9 (*Very positive*). For ease of interpretation, the item is reverse-scored in the analyses so that larger values represent greater negative affect.

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Film-related rumination. Participants were instructed via the computer that they would have a rest period. After three minutes, participants heard a tone indicating the rest period was over, after which they reported on film-related ruminative thoughts during the rest period using a 100-mm visual analogue scale with anchors of 0 (*disagree*) and 100 (*agree*) for the following five items: “I found it hard to stop thinking about the video”, “I thought about the video a lot during the rest period.”, “I had a lot of evaluative thoughts (e.g., labelling people or actions as 'good' or 'bad')”, “I thought a lot about the reasons for what happened in the video”, and “I thought a lot about the characters in the video”. The scale showed good internal consistency ($\alpha = .93$). The scale demonstrated positive skew and was subsequently administered a square root transformation.

Procedure

Participants were run in private workstations. The session began with providing informed consent, after which participants completed measures of demographics and baseline state anxiety. The entire study was administered via computers using online software (Qualtrics, Provo, UT). Participants next viewed the aversive film and reported post-film state affect. Participants then completed one of the randomly assigned conditions and reported their post-intervention state anxiety. After this, participants completed the film-related rumination task. Participants next read a humorous story to facilitate mood repair and then were again administered the state affect measure. The study was run by a clinical psychology graduate student who monitored participants for signs of upset. If there were no signs, participants were debriefed (no participant showed or verbally expressed signs of marked upset).

Results

Analytic plan

An ANCOVA was administered to examine the hypothesis that the life-purpose condition would exhibit less post-intervention anxiety (controlling for baseline anxiety)

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compared to controls. A *t*-test was administered to examine the hypothesis that the life-purpose condition would exhibit less film-related rumination compared to controls. The hypothesis that the purpose-rumination relation would be mediated by anxiety was tested with a bootstrap sampling procedure using the PROCESS macro for SPSS (Hayes, 2013). Effect size (Cohen's *d*) and 95% confidence intervals are reported.

All hypotheses were tested by comparing the life-purpose condition to controls represented as an aggregate of the computer and racial equality conditions. Exploratory analyses were then conducted to compare each of the three groups on the outcome variables. The data discussed in this article are publicly available at <https://osf.io/58hdy/>

Preliminary analyses

Table 1 shows that film-related rumination was significantly correlated both with post-film affect and with post-intervention (but not baseline) anxiety. These findings support the validity of the video clip as a trauma film (James et al., 2016).

The effect of the mood repair (in addition to natural recovery and intervention effects) was assessed with a paired-samples *t*-test. The results showed that compared to the post-film assessment point ($M = 6.06$, $SD = 1.68$), state negative affect after the mood repair was significantly lower ($M = 4.07$, $SD = 1.35$), $t(102) = 12.00$, $p = 3.2 \times 10^{-21}$, Cohen's $d = 1.20$.

There were no group differences on the variables of age, sex, and baseline anxiety, $ps > .22$.

[Table 1 near here]

Intervention effect on film-related anxiety and rumination

Our first hypothesis was that a life-purpose intervention would result in less film-related anxiety compared to controls. An ANCOVA controlling for baseline anxiety showed that the life-purpose group ($M = 2.12$, $SE = .12$) reported less anxiety after the intervention compared to controls ($M = 2.69$, $SE = .08$), $F(1, 100) = 16.10$, $p = .0001$, Cohen's $d = 0.75$, $CI [.29, .86]$

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(see Figure 1a). To further explore this finding, we examined whether the groups differed in affect immediately after the film (pre-intervention). A *t*-test indicated that the groups differed, $t(101) = 2.02, p = .046$, with the life-purpose group reporting less post-film negative affect ($M = 5.59, SD = 1.83$) compared to controls ($M = 6.29, SD = 1.56$). We thus conducted another ANCOVA that controlled for both post-film affect and baseline anxiety. The results showed that the life-purpose condition continued to demonstrate less anxiety compared to controls, $F(1, 99) = 11.20, p = .001$, Cohen's $d = 0.75$, CI [.17, .67]. Exploratory analyses compared the three individual groups on post-intervention anxiety. ANCOVAs that controlled for post-film affect and baseline anxiety showed that the life-purpose condition reported less anxiety compared to the computer condition, $F(1, 65) = 7.27, p = .009$, Cohen's $d = 0.72$, and the race equality condition, $F(1, 64) = 9.70, p = .003$, Cohen's $d = 0.78$. The computer and race equality conditions did not differ, $F(1, 65) = 0.34, p = .56$.

Our second hypothesis was that a life-purpose intervention would lead to less film-related rumination compared to controls. The results of the *t*-test indicated that compared to controls ($M = 4.47, SD = 2.81$), the life-purpose group ($M = 3.31, SD = 2.64$) demonstrated less rumination, $t(101) = 2.01, p = .048$, Cohen's $d = 0.43$, CI [.01, 2.31] (see Figure 1b). Exploratory *t*-test analyses compared the three individual groups on film-related rumination. The results indicated that the life-purpose condition reported less rumination compared to the computer condition, $t(67) = 2.31, p = .024$, Cohen's $d = .56$ but not less than the racial equality condition, $t(66) = 1.18, p = .24$. Further, the computer and racial equality conditions did not differ, $t(67) = 1.15, p = .26$.

In order to further investigate these findings, we examined the possibility that the main effects may be explained by a different amount of time between the trauma film and dependent variables between groups. Specifically, the computer control condition did not include post-summary writing whereas the life-purpose (write about important goals) and race

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equality (write about importance of racial equality) did. It is thus possible that the main effects were influenced by the shorter time between the trauma film and dependent variables in the computer condition limiting distraction from the film content. The study software recorded the amount of time between the end of the trauma film and the completion of the film-related rumination task. A t -test indicated no difference in duration between the life-purpose and aggregate control conditions, $t(101) = 0.97, p = .36$, but the computer control condition was faster than both the life-meaning, $t(67) = 2.60, p = .012$, and race equality, $t(67) = 2.45, p = .017$, conditions. There was no difference between the life-meaning and race equality conditions, $t(66) = 0.38, p = .71$. Regarding the relation between duration and the dependent variables, a partial correlation between duration and post-intervention anxiety, controlling for baseline anxiety and post-film affect indicated a non-significant relation, $pr(99) = .004, p = .97$ and a bivariate correlation of duration and rumination indicated a non-significant relation $r(103) = -.04, p = .71$. These results suggest that the main effects are not driven by the shorter time between the trauma film and dependent variables in the computer control condition.

Anxiety as mechanism of the purpose-rumination relation

Our third hypothesis was that the relation between a life-purpose intervention and film-related rumination would be mediated by anxiety. This was tested using the PROCESS macro for SPSS (Hayes, 2013), in which film-related rumination was regressed on condition (life-purpose vs. controls), with the proposed mediator consisting of residual change scores for post-intervention state anxiety (controlling for baseline anxiety and post-film affect). A bias-corrected bootstrap 95% confidence intervals for the indirect effect ($= -0.57$) based on 10,000 bootstrap samples did not include zero (-1.17 to -0.17), indicating a model in which the relation between condition and rumination is partially accounted for by the effects of the intervention on film-related anxiety (see Figure 1c).

[Figure 1 near here]

Discussion

The findings suggest that meaning interventions may help to limit the psychological consequences that accompany stressful events. Specifically, the results showed that compared to controls, participants who thought about and committed to pursuing intrinsic values showed less stressor-related anxiety and rumination. The results further showed that the effect of the intervention on rumination was partially mediated by anxiety.

The current results are congruent with correlational and experimental findings that MIL inversely predicts anxiety and rumination and that anxiety is a mechanism of the MIL-rumination relation (Ostafin & Proulx, 2020; Slegers et al., 2015; Steger et al., 2008). This study also extends previous research in several ways, including: (i) the use of an experimental (in contrast to correlational) design, allowing for causal inferences of the relation between MIL and both anxiety and rumination and (ii) showing that a meaning intervention given after (in contrast to before) a stressor can reduce acute anxiety and rumination. Further, the finding that post-stressor rumination can be reduced by a meaning intervention may be relevant for the development of clinical interventions, as rumination has been shown to be involved in the development (Nolen-Hoeksema et al., 2008) and maintenance (Ehring & Watkins, 2008) of psychological disorders.

Two control conditions were used, including a computer-related essay and a racial equality essay. Both essays were at least as engaging as the life-purpose essay. The computer condition was included to control for the distraction-related benefits of engaging but irrelevant material, as previous research has shown that post-stressor distraction can reduce anxiety and rumination (Blackie & Kocovski, 2016; Lier, Harder, Oosterman, de Vries, & van Goor, 2018). The racial equality condition controlled for the impact of meaningfully relevant material that does not specifically evoke broader values and a sense of purpose in life

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(Stone, Wiegand, Cooper, & Aronson, 1997). Exploratory analyses showed that the purpose intervention led to reduced post-stressor anxiety compared to both control conditions and that it led to less rumination compared to the computer condition but not the racial equality condition. The highly-relevant and engaging nature of the racial equality condition are possible explanations for the latter finding.

Several methodological elements limit the interpretation of the results. First, several attributes of the sample are relevant to the interpretation of the findings. The sample size was somewhat underpowered as it provided a statistical power of .71 to detect medium effect size differences between the conditions. Further, the use of a non-clinical sample for which English was not the native language limits the external validity of the findings. Future research would benefit from examining the model in a well-powered clinical sample for which the study language matches the native language of the participants. Second, although the pilot study showed the meaning intervention elicited a greater sense of life purpose compared to the other conditions (with this finding replicated in Doornik et al., 2020), purpose was not assessed in the main study, making it unclear whether the effects are due to this proposed mechanism. Future research should include purpose-related mediator variables. A third limitation is that the study used one type of trauma film with the theme of physical violence. Although there is some evidence that physical violence themed trauma films may be especially good at eliciting distress (Arnaudova & Hagenars, 2017), confidence in the generalizability of the findings will be increased if they replicate with other types of trauma films. Further, the violence depicted in the current trauma film was motivated by racial animosity. In the Netherlands, it is normative to assess ethnic identity/migration status rather than racial identity and so the potential influence of racial identity could not be examined. However, it is plausible that racial identity could moderate the effects of both the film and the

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interventions and so future research would benefit from methods and analyses that incorporate racial identity.

In sum, the results support early clinical theories that meaning interventions can help individuals cope with stressful events (Jung, 1931/1947; Frankl, 1946/1959). Many current clinical interventions ‘look backward’ in treating anxiety by directly focusing on changing previously-learned cognitions and behaviors (Barlow, 2014). In contrast, the current results suggest that turning toward the future can help the individual to outgrow the past.

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The data discussed in this article are publicly available at <https://osf.io/58hdy/>

These data have been previously presented at two conferences: (1) Ostafin, B.D., (2019). Meaning in life and psychopathology: An antidote to fear and desire? Talk given at the annual meeting of the International Association for the Psychology of Religion, Gdansk, Poland, and (2) Ostafin, B.D. (2017). Meaning in life reduces anxiety-related rumination. Talk given at the annual meeting of the American Psychological Association, Washington, D.C.

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Brian Ostafin received his PhD in clinical psychology from Boston University in 2004 and has worked in the Clinical Psychology and Experimental Psychopathology department at the University of Groningen (Netherlands) since 2010. His research used an existential frame

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to examine topics such as meaning in life, mindfulness, and the experience of awe, including questions regarding basic processes and clinical benefits.

Travis Proulx received a PhD in developmental psychology from the University of British Columbia in 2008. He has worked at the Cardiff University School of Psychology since 2016. In collaboration with others, he has developed the Meaning Maintenance Model. The focus of his research is the manner in which meaning systems shape social motivations, and the ways that people maintain meaning in the wake of experiences that are inconsistent with their expectations.

Abstract

Background and Objectives: Although there is accumulating evidence for an inverse relation between life meaning and anxiety, most of this research has used cross-sectional designs.

Design and Methods: We examined the relation between life meaning and anxiety with an experimental design ($N = 103$), hypothesizing that compared to control, a brief life-purpose intervention administered after a film stressor would result in less anxiety and film-related rumination and that anxiety would mediate the intervention-rumination relation. After viewing a validated ‘trauma film’ depicting a racially-motivated physical assault, participants completed either a life-purpose intervention comprised of reading about life meaning and writing about intrinsically valued goals or one of two control groups consisting of either a distracting theme (computers) or a threat-relevant theme (racial equality), both designed to be engaging without evoking life-purpose.

Results: Results showed that compared to control, the life-purpose participants reported less post-intervention anxiety and film-related rumination and that the intervention effect on rumination was mediated by anxiety.

Conclusions: The findings support the promise of meaning-related interventions for anxiety.

Keywords: Anxiety, Meaning, Purpose, Rumination, Trauma

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“The greatest and most important problems of life... can never be solved, but only outgrown... some higher or wider interest arose on the person's horizon, and through this widening of view, the insoluble problem lost its urgency.” (Jung, 1947, p. 89)

Early clinical psychologists such as Jung (1931/1947) and Frankl (1946/1959) described the importance of developing meaning in life (MIL) to treat psychological distress. This idea is supported by more recent theory that describes violations of goals and beliefs as critical sources of daily (Proulx, Inzlicht, & Harmon-Jones, 2012) and clinically-relevant (Janoff-Bulman, 1992) anxiety and rumination. That MIL is inversely related to stressor-related anxiety and rumination is supported by correlational research, including cross-sectional (Debats, 1996; Steger, Kashdan, Sullivan, & Lorentz, 2008) and prospective (Groleau, Calhoun, Cann, & Tedeshi, 2013; Schaefer et al., 2013) designs. Correlational findings also suggest that the inverse relation between MIL and rumination may be explained by individuals with high MIL experiencing less stressor-related anxiety (Ostafin & Proulx, in press). Further, experimental studies that elicit pre-stressor MIL have shown that such inductions reduce stress-related responses of cortisol (Creswell et al., 2015) and noradrenaline (Slegers, Proulx, & Van Beest, 2015). Less work has examined the benefits of post-stressor MIL interventions, though a meta-analysis found that meaning-focused clinical interventions reduce psychological distress (Vos, Craig, & Cooper, 2015).

One reason why MIL interventions might diminish response to stressors is that activating commitment to important goals/values can create perspective, thereby reducing the motivational salience of the threat. This idea is mentioned in Jung's opening quote and in Frankl's observation that MIL allows the individual to rise “above the sufferings of the moment” (Frankl, 1959, p. 95). A related concept is *trivialization* (Festinger, 1957), in which

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affirmation of life values unrelated to a goal-threat diminishes the motivational salience of that threat (Simon, Greenberg, & Brehm, 1995).

An important consequence of stressor-related distress is that it can elicit repetitive negative thinking (Nolen-Hoeksema, Wisco, & Lyubormirsky, 2008; Proulx et al., 2012). Ability to reduce post-stressor anxiety would thus have clinical implications, including a direct route of reducing anxiety symptoms and an indirect route through repetitive negative thinking, which plays a role in the development and maintenance of post-traumatic stress disorder and other clinical disorders (Brewin, Gregory, Lipton, & Burgess, 2010; Dalgleish, 2004; Ehring & Watkins, 2008; Janoff-Bulman, 1992; Park, Mills, & Edmondson, 2012).

In sum, previous work indicates an inverse relation between MIL and response to stressors. Previous research has mostly used correlational designs or pre-stressor MIL inductions. The potential of using MIL interventions in the clinic would be supported by finding that such interventions reduce stressor-related consequences such as anxiety and rumination. The current study was designed to address this question. We examined whether a post-stressor MIL intervention would lead to (1) less anxiety, (2) less stressor-related rumination, and (3) that the MIL-rumination relation would be mediated by anxiety.

Pilot study

The primary aims of the pilot study were to create a meaning intervention that elicited a sense of purpose (*life-purpose essay*; adapted from Yalom [1980] and Steve Jobs' commencement speech at Stanford ["You've got to find what you love", 2005]) and control conditions that were equivalently engaging. We tested two control conditions that were either relevant or irrelevant to the stressor in order to contrast the impact of MIL with materials that address the stressor (*racial equality essay*; adapted from internet article "How a white supremacist gang leader shed his racist beliefs" [2011]) or distract from the stressor (*computer essay*; adapted from Routledge et al. [2011]) without evoking a sense of purpose. Twenty-

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seven participants read all three essays (see essays in the Supplemental Material available online). Participants rated each essay on the categories of being *engaging* and eliciting a *sense of purpose*, using two items per category (see Supplementary Material available online). Both categories had adequate internal consistency (engagement $\alpha = .69$; purpose $\alpha = .85$).

The results (see Table S1 in Supplementary Material available online) showed that the *Life-purpose* essay elicited more purpose compared both to the computer ($t(26)=7.09, p < .001; d = 1.364$) and the race equality conditions ($t(26)=5.65, p < .001; d = 1.085$). The *Racial equality* essay had higher ratings of engagement compared to the *Computer* essay, ($t(26)=4.01, p < .001; d = 0.792$) but not the *Life-purpose* essay, $p > .16$. The purpose and computer essays did not differ on engagement, $p > .13$. These results indicate the validity of the *Life-purpose* essay to elicit a sense of purpose relative to the control conditions and that both control essays were at least as engaging as the *Life-purpose* essay. Recent research has similarly shown that this brief MIL intervention elicits a sense of purpose in an analog eating disorder sample (Doornick, Glashouwer, Ostafin & de Jong, 2020).

Main Study

Participants

One hundred and ten undergraduate students from a Dutch university were recruited to participate as partial fulfillment of a class requirement. The study was approved by the psychology Institutional Review Board (approval #12151-E) and was carried out with the provisions of the World Medical Association Declaration of Helsinki. Six participants reported English fluency below *moderate* and were subsequently omitted from analyses. One participant did not complete the study because the building closed before the session could be completed. The final sample of 103 participants had a $M_{\text{age}} = 20.61$ years ($SD_{\text{age}} = 1.77$), was primarily female ($n = 66$) and of German ($n = 63$) and Dutch ($n = 27$) ethnicity (other European countries, $n = 8$; South American countries, $n = 3$; Turkey, $n = 1$; and Pakistan, $n =$

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1). This sample resulted in a power of .98 to detect a large effect size, .71 to detect a medium effect size, and .17 to detect a small effect size.

Materials

Aversive film. The film consisted of a 2-minute clip from the movie *American History X* (Kaye, 1998). The clip depicted a violent physical assault in which a skinhead shoots two African-American men who were stealing his truck and then stomps on one man's head whose open mouth was on a curb. This film has been previously used to examine trauma-related rumination (Matsumoto, Sensui, & Mochizuki, 2017; Wessel, Huntjens, & Verwoerd, 2010).

Conditions. Three conditions were used and consisted of reading one of the essays noted in the pilot study (life-purpose, $n = 34$; computer, $n = 35$; or race equality, $n = 34$).

Participants were instructed that essay comprehension would be assessed. After reading the essay, participants summarized it (using 25-125 words). Participants in the *Life-purpose* condition were then instructed to write (using 25-125 words) about two or three “things that are most important to you – the things that give purpose and meaning to your life” and participants in the *Racial equality* condition were instructed to “argue for the importance of racial equality” (using 25-125 words).

State anxiety. State anxiety was assessed with a 6-item short-form version of the Spielberger State Anxiety Inventory (Marteau & Bekker, 1992) with scale anchors consisting of 1 (*Not at all*) to 5 (*Very much*). The scale was administered twice and showed good internal consistency (α 's = .79 and .90).

State affect. State affect was measured with a single item assessing how participants feel “right now”, ranging from 1 (*Very negative*) to 9 (*Very positive*). For ease of interpretation, the item is reverse-scored in the analyses so that larger values represent greater negative affect.

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Film-related rumination. Participants were instructed via the computer that they would have a rest period. After three minutes, participants heard a tone indicating the rest period was over, after which they reported on film-related ruminative thoughts during the rest period using a 100-mm visual analogue scale with anchors of 0 (*disagree*) and 100 (*agree*) for the following five items: “I found it hard to stop thinking about the video”, “I thought about the video a lot during the rest period.”, “I had a lot of evaluative thoughts (e.g., labelling people or actions as 'good' or 'bad')”, “I thought a lot about the reasons for what happened in the video”, and “I thought a lot about the characters in the video”. The scale showed good internal consistency ($\alpha = .93$). The scale demonstrated positive skew and was subsequently administered a square root transformation.

Procedure

Participants were run in private workstations. The session began with providing informed consent, after which participants completed measures of demographics and baseline state anxiety. The entire study was administered via computers using online software (Qualtrics, Provo, UT). Participants next viewed the aversive film and reported post-film state affect. Participants then completed one of the randomly assigned conditions and reported their post-intervention state anxiety. After this, participants completed the film-related rumination task. Participants next read a humorous story to facilitate mood repair and then were again administered the state affect measure. The study was run by a clinical psychology graduate student who monitored participants for signs of upset. If there were no signs, participants were debriefed (no participant showed or verbally expressed signs of marked upset).

Results

Analytic plan

An ANCOVA was administered to examine the hypothesis that the life-purpose condition would exhibit less post-intervention anxiety (controlling for baseline anxiety)

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compared to controls. A *t*-test was administered to examine the hypothesis that the life-purpose condition would exhibit less film-related rumination compared to controls. The hypothesis that the purpose-rumination relation would be mediated by anxiety was tested with a bootstrap sampling procedure using the PROCESS macro for SPSS (Hayes, 2013). Effect size (Cohen's *d*) and 95% confidence intervals are reported.

All hypotheses were tested by comparing the life-purpose condition to controls represented as an aggregate of the computer and racial equality conditions. Exploratory analyses were then conducted to compare each of the three groups on the outcome variables.

The data discussed in this article are publicly available at <https://osf.io/58hdy/>

Preliminary analyses

Table 1 shows that film-related rumination was significantly correlated both with post-film affect and with post-intervention (but not baseline) anxiety. These findings support the validity of the video clip as a trauma film (James et al., 2016).

The effect of the mood repair (in addition to natural recovery and intervention effects) was assessed with a paired-samples *t*-test. The results showed that compared to the post-film assessment point ($M = 6.06$, $SD = 1.68$), state negative affect after the mood repair was significantly lower ($M = 4.07$, $SD = 1.35$), $t(102) = 12.00$, $p = 3.2 \times 10^{-21}$, Cohen's $d = 1.20$.

There were no group differences on the variables of age, sex, and baseline anxiety, $ps > .22$.

[Table 1 near here]

Intervention effect on film-related anxiety and rumination

Our first hypothesis was that a life-purpose intervention would result in less film-related anxiety compared to controls. An ANCOVA controlling for baseline anxiety showed that the life-purpose group ($M = 2.12$, $SE = .12$) reported less anxiety after the intervention compared to controls ($M = 2.69$, $SE = .08$), $F(1, 100) = 16.10$, $p = .0001$, Cohen's $d = 0.75$, CI [.29, .86]

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(see Figure 1a). To further explore this finding, we examined whether the groups differed in affect immediately after the film (pre-intervention). A *t*-test indicated that the groups differed, $t(101) = 2.02, p = .046$, with the life-purpose group reporting less post-film negative affect ($M = 5.59, SD = 1.83$) compared to controls ($M = 6.29, SD = 1.56$). We thus conducted another ANCOVA that controlled for both post-film affect and baseline anxiety. The results showed that the life-purpose condition continued to demonstrate less anxiety compared to controls, $F(1, 99) = 11.20, p = .001$, Cohen's $d = 0.75$, CI [.17, .67]. Exploratory analyses compared the three individual groups on post-intervention anxiety. ANCOVAs that controlled for post-film affect and baseline anxiety showed that the life-purpose condition reported less anxiety compared to the computer condition, $F(1, 65) = 7.27, p = .009$, Cohen's $d = 0.72$, and the race equality condition, $F(1, 64) = 9.70, p = .003$, Cohen's $d = 0.78$. The computer and race equality conditions did not differ, $F(1, 65) = 0.34, p = .56$.

Our second hypothesis was that a life-purpose intervention would lead to less film-related rumination compared to controls. The results of the *t*-test indicated that compared to controls ($M = 4.47, SD = 2.81$), the life-purpose group ($M = 3.31, SD = 2.64$) demonstrated less rumination, $t(101) = 2.01, p = .048$, Cohen's $d = 0.43$, CI [.01, 2.31] (see Figure 1b). Exploratory *t*-test analyses compared the three individual groups on film-related rumination. The results indicated that the life-purpose condition reported less rumination compared to the computer condition, $t(67) = 2.31, p = .024$, Cohen's $d = .56$ but not less than the racial equality condition, $t(66) = 1.18, p = .24$. Further, the computer and racial equality conditions did not differ, $t(67) = 1.15, p = .26$.

In order to further investigate these findings, we examined the possibility that the main effects may be explained by a different amount of time between the trauma film and dependent variables between groups. Specifically, the computer control condition did not include post-summary writing whereas the life-purpose (write about important goals) and race

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equality (write about importance of racial equality) did. It is thus possible that the main effects were influenced by the shorter time between the trauma film and dependent variables in the computer condition limiting distraction from the film content. The study software recorded the amount of time between the end of the trauma film and the completion of the film-related rumination task. A t -test indicated no difference in duration between the life-purpose and aggregate control conditions, $t(101) = 0.97, p = .36$, but the computer control condition was faster than both the life-meaning, $t(67) = 2.60, p = .012$, and race equality, $t(67) = 2.45, p = .017$, conditions. There was no difference between the life-meaning and race equality conditions, $t(66) = 0.38, p = .71$. Regarding the relation between duration and the dependent variables, a partial correlation between duration and post-intervention anxiety, controlling for baseline anxiety and post-film affect indicated a non-significant relation, $pr(99) = .004, p = .97$ and a bivariate correlation of duration and rumination indicated a non-significant relation $r(103) = -.04, p = .71$. These results suggest that the main effects are not driven by the shorter time between the trauma film and dependent variables in the computer control condition.

Anxiety as mechanism of the purpose-rumination relation

Our third hypothesis was that the relation between a life-purpose intervention and film-related rumination would be mediated by anxiety. This was tested using the PROCESS macro for SPSS (Hayes, 2013), in which film-related rumination was regressed on condition (life-purpose vs. controls), with the proposed mediator consisting of residual change scores for post-intervention state anxiety (controlling for baseline anxiety and post-film affect). A bias-corrected bootstrap 95% confidence intervals for the indirect effect ($= -0.57$) based on 10,000 bootstrap samples did not include zero (-1.17 to -0.17), indicating a model in which the relation between condition and rumination is partially accounted for by the effects of the intervention on film-related anxiety (see Figure 1c).

[Figure 1 near here]

Discussion

The findings suggest that meaning interventions may help to limit the psychological consequences that accompany stressful events. Specifically, the results showed that compared to controls, participants who thought about and committed to pursuing intrinsic values showed less stressor-related anxiety and rumination. The results further showed that the effect of the intervention on rumination was partially mediated by anxiety.

The current results are congruent with correlational and experimental findings that MIL inversely predicts anxiety and rumination and that anxiety is a mechanism of the MIL-rumination relation (Ostafin & Proulx, 2020; Slegers et al., 2015; Steger et al., 2008). This study also extends previous research in several ways, including: (i) the use of an experimental (in contrast to correlational) design, allowing for causal inferences of the relation between MIL and both anxiety and rumination and (ii) showing that a meaning intervention given after (in contrast to before) a stressor can reduce acute anxiety and rumination. Further, the finding that post-stressor rumination can be reduced by a meaning intervention **may be relevant for the development of clinical interventions**, as rumination has been shown to be involved in the development (Nolen-Hoeksema et al., 2008) and maintenance (Ehring & Watkins, 2008) of psychological disorders.

Two control conditions were used, including a computer-related essay and a racial equality essay. Both essays were at least as engaging as the life-purpose essay. The computer condition was included to control for the distraction-related benefits of engaging but irrelevant material, as previous research has shown that post-stressor distraction can reduce anxiety and rumination (Blackie & Kocovski, 2016; Lier, Harder, Oosterman, de Vries, & van Goor, 2018). The racial equality condition controlled for the impact of meaningfully relevant material that does not specifically evoke broader values and a sense of purpose in life

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(Stone, Wiegand, Cooper, & Aronson, 1997). Exploratory analyses showed that the purpose intervention led to reduced post-stressor anxiety compared to both control conditions and that it led to less rumination compared to the computer condition but not the racial equality condition. The highly-relevant and engaging nature of the racial equality condition are possible explanations for the latter finding.

Several methodological elements limit the interpretation of the results. First, several attributes of the sample are relevant to the interpretation of the findings. The sample size was somewhat underpowered as it provided a statistical power of .71 to detect medium effect size differences between the conditions. Further, the use of a non-clinical sample for which English was not the native language limits the external validity of the findings. Future research would benefit from examining the model in a well-powered clinical sample for which the study language matches the native language of the participants. Second, although the pilot study showed the meaning intervention elicited a greater sense of life purpose compared to the other conditions (with this finding replicated in Doornik et al., 2020), purpose was not assessed in the main study, making it unclear whether the effects are due to this proposed mechanism. Future research should include purpose-related mediator variables. A third limitation is that the study used one type of trauma film with the theme of physical violence. Although there is some evidence that physical violence themed trauma films may be especially good at eliciting distress (Arnaudova & Hagenars, 2017), confidence in the generalizability of the findings will be increased if they replicate with other types of trauma films. Further, the violence depicted in the current trauma film was motivated by racial animosity. In the Netherlands, it is normative to assess ethnic identity/migration status rather than racial identity and so the potential influence of racial identity could not be examined. However, it is plausible that racial identity could moderate the effects of both the film and the

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interventions and so future research would benefit from methods and analyses that incorporate racial identity.

In sum, the results support early clinical theories that meaning interventions can help individuals cope with stressful events (Jung, 1931/1947; Frankl, 1946/1959). Many current clinical interventions ‘look backward’ in treating anxiety by directly focusing on changing previously-learned cognitions and behaviors (Barlow, 2014). In contrast, the current results suggest that turning toward the future can help the individual to outgrow the past.

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Table 1

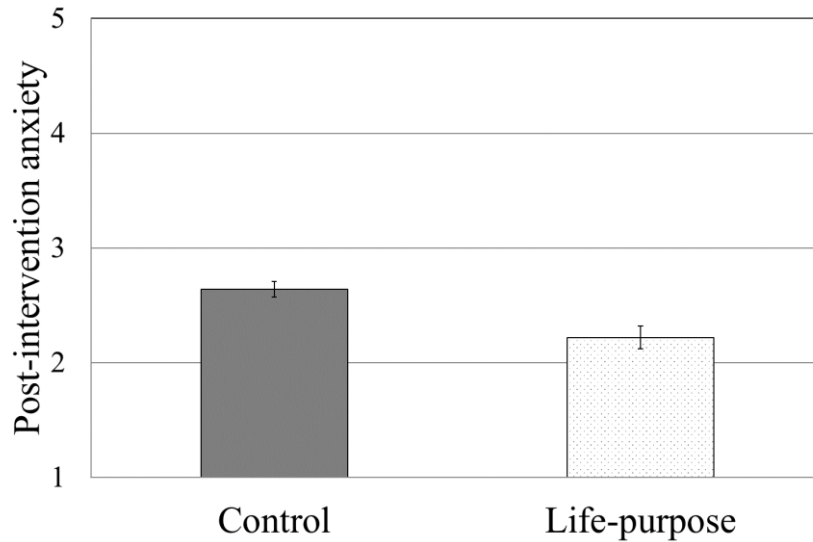
Means, Standard Deviations, and Bivariate Correlations among Study Variables (N = 103)

Variable	Mean	SD	1	2	3
1. Film rumination	24.48	25.25	--		
2. Post-film affect	3.94	1.68	.35***	--	
3. Baseline anxiety	2.01	0.63	.15	.34***	--
4. Post-intervention anxiety	2.50	0.84	.47***	.62***	.50***

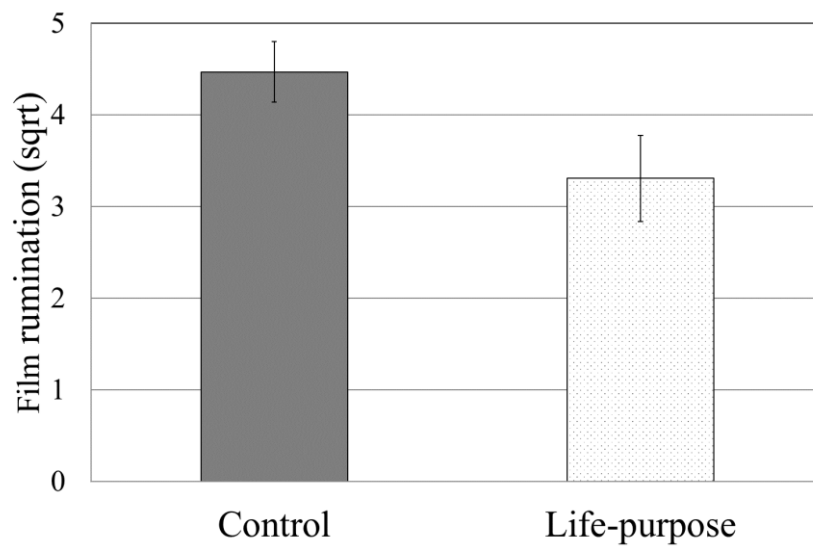
Note. Means and standard deviations given in non-transformed scores. Correlation analyses conducted with transformed scores. For the Post-film affect measure, larger scores indicate more negative affect (relative to less positive affect).

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

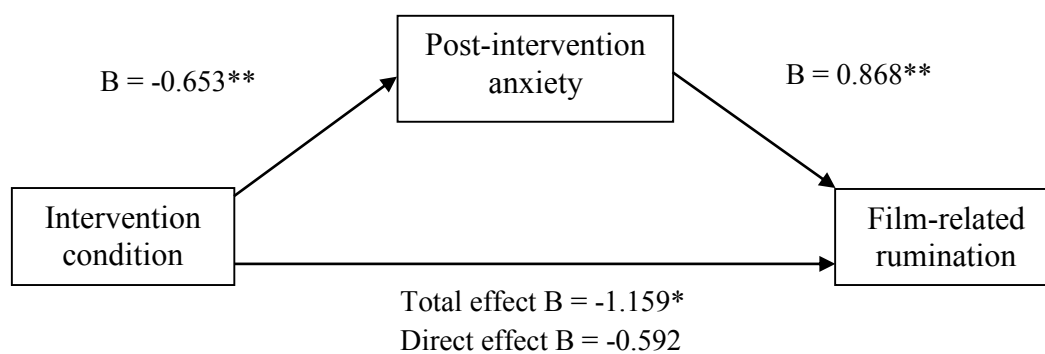
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1a



1b



1c

Figure 1a-c. Effects of life-purpose intervention on study outcomes. 1a and 1b compare aggregate control ($n = 69$) with life-purpose condition ($n = 34$) on post-intervention anxiety (controlling for baseline anxiety and post-film affect) (1a) and film-related rumination (1b). Error bars represent 1 SE. 1c represents the model of the indirect effect of life-purpose intervention on film-related rumination through post-intervention anxiety (residual change

Life-purpose intervention reduces anxiety

score controlling for baseline anxiety and post-film affect). Coefficients represent unstandardized coefficients. * $p < .05$. ** $p < .01$.



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