

Sense of Purpose Moderates the Associations Between Daily Stressors and Daily Well-being

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Abstract

Background Having a sense of purpose in life has been consistently demonstrated as a predictor of positive health outcomes, including less perceived stress, yet, little is known about the role of sense of purpose on stressful days.

Purpose The current study investigated the sense of purpose as a moderator of stressor-related changes in daily physical symptoms, positive affect, and negative affect.

Methods A subset of the Midlife in the United States study ($n = 1949$, $m_{age} : 56.4$ years) reported their sense of purpose, along with up to eight daily assessments of stressors, affect, and physical symptoms. Multilevel models evaluated whether sense of purpose was associated with deviations in affect or physical symptom reporting on days when participants reported a stressor versus days when stressors did not occur.

Results Sense of purpose was associated with higher daily positive affect, lower daily negative affect, and fewer daily physical symptoms. Compared with individuals who reported lower levels of purpose, those reporting higher levels encountered the same number of daily stressors, yet showed less of an increase in negative affect and physical symptoms on stressor days than on stressor-free days. Purpose did not predict changes in positive affect in response to daily stressors.

Conclusions Findings provide evidence that a purposeful life may be characterized by lower negative affect and physical symptom reporting on stressful days.

Keywords Purpose in life • Daily stress • Negative affect • Physical symptoms

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Living a stress-free life is unlikely, and therefore, research has focused on identifying emotional and physical reactivity to stressors in daily life and how such reactivity is associated with health outcomes. For instance, levels of emotional reactivity on days with stressors predict levels of inflammation [1], heart rate variability [2], chronic health conditions [3], and even mortality risk [4]. When considering who is less likely to “sweat the small stuff,” it may be those individuals with bigger things in mind for their future.

As such, how one deals with stress may differ as to whether one feels a sense of purpose in life, defined as the perception that one has broad aims, hierarchically superordinate to short-term goals, to strive toward and a direction for life [5–6]. Having a purpose in life is presumed to allow individuals a better ability to allocate their resources to progress toward their overarching goals [5]. Similarly, purpose has been

described as a psychosocial resource that, in line with the resources and perception model [7], helps individuals dampen their arousal to aversive or challenging events [8]. In support, research suggests that a higher sense of purpose is associated with lower levels of perceived stress [9] and reduced cortisol reactivity and output [10–11]. Moreover, experimental work shows that participants primed to think about their purpose report less anxiety in real-world situations that tend to stress others [12].

The current study tested whether sense of purpose moderates the associations between daily stressors and daily affective or physical symptom reporting, using data from the National Study of Daily Experiences (NSDE), a substudy of the Midlife in the United States Study (MIDUS). First, we predicted that higher levels of sense of purpose would be associated with more positive affect and less negative affect across days, in line with past daily diary work on purpose [13–14]. A higher sense of purpose also should be associated with fewer daily physical symptoms. Second, purposeful individuals should be less disturbed by stressful situations, as indexed by less change in positive affect, negative affect, and physical symptoms on days when stressors occur, compared with nonstressor days. Third, these findings should hold even when controlling for potential demographic predictors of daily affect and physical symptom reporting (e.g., sex, age, and education) and general self-reported health.

Method

Participants and Procedure

Data for the current study were collected as part of the MIDUS 2 assessment, where 1,949 participants completed both an initial questionnaire (including measures of sense of purpose and self-rated health), as well as daily diary interviews by telephone for 8 days (as part of the NSDE). Most participants completed all the eight daily interviews (69.06%; average number of interviews completed = 7.39, $SD = 1.27$). Participants were predominantly female (57.72%) and white (84.40%) and were 56.41 years old on average ($SD = 12.16$, range = 33–84 years). This sample size has proven sufficient for detecting associations in the work discussed previously (e.g., 1–2).

Sense of purpose

Sense of purpose was assessed using the purpose subscale from the Psychological Well-being Scales [15–16]. Participants report their agreement to seven items, including “I have a sense of direction and purpose in life” on a seven-point scale ($\alpha = 0.70$).

Daily diary interviews

Participants indicated each day whether any of seven stressors had occurred in the past 24 hr: argument, avoiding a potential argument, work or school stressor, home stressor, discrimination, social network stressor, or any other stressor [17]. A dichotomous variable was created to indicate the occurrence of any stressor that day (1 = yes, 0 = no). The stressor severity also was rated on a four-point scale from 1 (Not at All) to 4 (Very Stressful).

Daily affect was assessed using scales developed for MIDUS II [18–19] that asked participants to report the frequency of each emotion for each day, on a scale from 0 (None of the Time) to 4 (All of the Time). Negative affect consisted of 14 items: *restless or fidgety, nervous, worthless, so sad nothing could cheer you up, everything was an effort, hopeless, lonely, afraid, jittery, irritable, ashamed, upset, angry, and frustrated* ($\alpha = 0.86$). Positive affect consisted of 13 items: *in good spirits, cheerful, extremely happy, calm and peaceful, satisfied, full of life, close to others, like you belong, enthusiastic, attentive, proud, active, and confident* ($\alpha = 0.94$). The affect item ratings were averaged to obtain daily positive and negative affect scores. Participants indicated whether they had experienced 28 physical symptoms each day (e.g., headache, fatigue, cough); the responses were summed to obtain the number of daily physical symptoms [20].

Covariates

Age, gender, and education were included as covariates because of previous literature regarding their associations with purpose (e.g., 21) and with daily stress (e.g., 22). Self-rated health was assessed at baseline with the item “In general, would you say your physical health is excellent, very good, good, fair, or poor?” Responses were made on a 1–5 scale, with higher scores referring to worse physical health. We controlled for self-rated health to ensure that any differential associations of purpose with daily affect or physical symptoms on stressful days would be over and above the influences of general health.

Plan of Analysis

Correlational analyses were first conducted to test whether sense of purpose was associated with average daily positive and negative affect, physical symptoms, and stressors. For our primary analyses, multilevel modeling was used to account for the nesting of days within persons [23]. Two-level models were run separately for the following outcomes: (a) daily negative affect, (b) daily positive affect, and (c) number of daily physical symptoms. At Level 1 (within-person), we entered a time-varying predictor to indicate the occurrence of any stressor that day (yes/no); the affect models further included daily

physical symptoms as a time-varying covariate. Time-invariant measures were entered at Level 2 to examine their between-person associations, specifically sense of purpose, age, gender, education, and self-rated health. To evaluate the sense of purpose as a potential moderator of the associations between daily stress and affect or physical symptoms, a cross-level interaction for purpose \times daily stressors was included in each multilevel model. Within- and between-person effects were disaggregated by using person-mean centering for Level 1 variables and grand-mean centering for Level 2 variables [24]. Analyses were conducted using SAS 9.4.

Results

Descriptive and Correlational Analyses

On a 0–4 scale, mean daily negative affect was 0.21 ($SD = 0.28$) and mean daily positive affect was 2.72 ($SD = 0.71$). Participants reported a mean of 1.91 daily physical symptoms ($SD = 1.94$). On average, stressors occurred on 40% of days ($SD = 27\%$). Participants experienced a total of 3.77 stressors across the eight interview days ($SD = 3.20$). Sense of purpose was significantly correlated with higher daily positive affect [$r(1,949) = 0.33$], lower negative affect [$r(1,949) = -0.26$], and fewer physical symptoms [$r(1,949) = -0.18$], all p 's $< .001$. Sense of purpose was unrelated to daily stressor frequency [$r(1,949) = -0.03$, $p = .17$] or total number of stressors [$r(1,949) = 0.00$, $p = .89$] but was negatively associated with stressor severity [$r(1,949) = -0.11$, $p < .001$]. However, including severity as a predictor variable in the regression models below did not affect the findings.

Multilevel Models

Table 1 presents the results of three multilevel models for sense of purpose as a predictor of daily negative affect, positive affect, and number of physical symptoms. For the negative affect model, the main effect of purpose indicated that greater purpose was associated with lower daily negative affect, controlling for age, gender, education, self-rated physical health, and physical symptoms and stressors that day. The occurrence of a stressor was linked to increased same-day negative affect. Figure 1A represents the significant purpose \times daily stressors interaction; individuals with lower purpose had more pronounced increases in negative affect on days when stressors occurred (simple slope for lower purpose [1- SD below mean]: Est. = 0.186; 95% confidence interval [CI] = 0.172, 0.200; $p < .001$), compared to those with higher purpose (simple slope for higher purpose [1- SD above mean]: Est. = 0.119; 95% CI = 0.105, 0.133; $p < .001$). The main effect and purpose \times daily

stressors interaction together explained an additional 5.84% of the between-person variance in negative affect that remained after controlling for all other variables, as well as 6.88% of the random slope variance for the association of daily stressors with negative affect.

For the positive affect model, purpose was associated with higher daily positive affect (pseudo $R^2 = 9.49\%$). Positive affect decreased on days when stressors occurred. However, the nonsignificant interaction for purpose \times daily stressors indicated that purpose was not differentially associated with positive affect on stressor versus nonstressor days.

Finally, purpose predicted fewer physical symptoms. Daily stressors were linked to more same-day physical symptoms. Figure 1B plots the significant purpose \times daily stressors interaction for predicting physical symptoms. Individuals with lower levels of purpose had greater increases in the number of physical symptoms on days when stressors occurred (simple slope: Est. = 0.456; 95% CI = 0.380, 0.539; $p < .001$), compared to those with higher purpose (simple slope: Est. = 0.241; 95% CI = 0.163, 0.319; $p < .001$). Controlling for all covariates, purpose and its interaction with daily stressors explained an additional 0.81% of the between-person variance in physical symptoms and 5.72% of the random slope variance for the association of daily stressors with physical symptoms.

Exploratory Tests of Age and Gender Moderation

On an exploratory basis, we tested potential age and gender differences in the links between purpose and stressor-related changes in daily well-being by adding three-way interaction terms (purpose \times daily stressors \times age or gender). Neither gender ($B = 0.0001$, $p = .96$) nor age ($B = -0.0001$, $p = .30$) moderated the association between purpose and stressor-related positive affect or between purpose and stressor-related physical symptoms ($B = 0.012$, $p = .17$ and $B = 0.0004$, $p = .22$, respectively). For stressor-related negative affect, both age ($B = 0.0001$, $p = .03$) and gender ($B = 0.004$, $p = .004$) interactions reached significance; women and older adults showed a relatively stronger link between purpose and stressor-related changes in negative affect. However, the associations between purpose and stressor-related negative affect remained significant for men and women, as well as when the analyses were conducted separately for younger (less than 45 years), middle (45–64 years) and older (65 years and older) adults.

General Discussion

The current study examined whether having sense of purpose is differentially associated with reported daily

Table 1. Multilevel Models for Sense of Purpose as a Predictor of Daily Affect, Number of Daily Physical Symptoms, and Reactivity to Daily Stressors ($N = 1,949$ Persons and 14,384–14,386 Days)

Parameter	Negative affect ($N = 14,384$ days)			Positive affect ($N = 14,385$ days)			Physical symptoms ($N = 14,386$ days)		
	B (95% CI)	p		B (95% CI)	p		B (95% CI)	p	
Intercept	0.211 (0.191, 0.231)	<.001		2.623 (2.569, 2.678)	<.001		1.580 (1.431, 1.730)	<.001	
Age	-0.003 (-0.004, -0.002)	<.001		0.012 (0.010, 0.015)	<.001		-0.002 (-0.009, 0.004)	.50	
Gender (1 = male)	-0.027 (-0.048, -0.006)	.01		0.012 (-0.045, 0.070)	0.68		-0.533 (-0.691, -0.375)	<.001	
Education (Ref = college graduate)									
Some college	-0.038 (-0.063, -0.013)	.003		0.140 (0.070, 0.209)	<.001		0.052 (-0.139, 0.242)	.60	
High school graduate or below	-0.029 (-0.055, -0.003)	.03		0.206 (0.135, 0.277)	<.001		0.004 (-0.191, 0.199)	.97	
Self-rated health ^a	0.049 (0.038, 0.060)	<.001		-0.152 (-0.181, -0.122)	<.001		0.662 (0.580, 0.743)	<.001	
No. of daily physical symptoms	0.036 (0.033, 0.039)	<.001		-0.050 (-0.055, -0.045)	<.001		-----		
Any daily stressors (1 = yes)	0.153 (0.143, 0.163)	<.001		-0.130 (-0.147, -0.114)	<.001		0.350 (0.295, 0.405)	<.001	
Sense of purpose	-0.009 (-0.010, -0.007)	<.001		0.030 (0.026, 0.035)	<.001		-0.023 (-0.035, -0.012)	<.001	
Sense of purpose \times daily stressors	-0.005 (-0.006, -0.003)	<.001		0.000 (-0.002, 0.003)	0.95		-0.016 (-0.024, -0.008)	<.001	
Effect sizes for proportion reduction in variance components ^b									
Pseudo R^2 for random intercept variance ($\tau U02$)									
Sense of purpose		5.61%		9.49%			0.80%		
Sense of purpose \times daily stressors		5.84%		9.49%			0.81%		
Pseudo R^2 for stressors slope variance ($\tau U12$)									
Sense of purpose \times daily stressors		6.88%		0%			5.72%		

Effect sizes were calculated by comparing a base model containing all variables except sense of purpose to (i) a model that added the main effect for sense of purpose and (ii) a model that included both the main effect and sense of purpose \times daily stressors interaction.

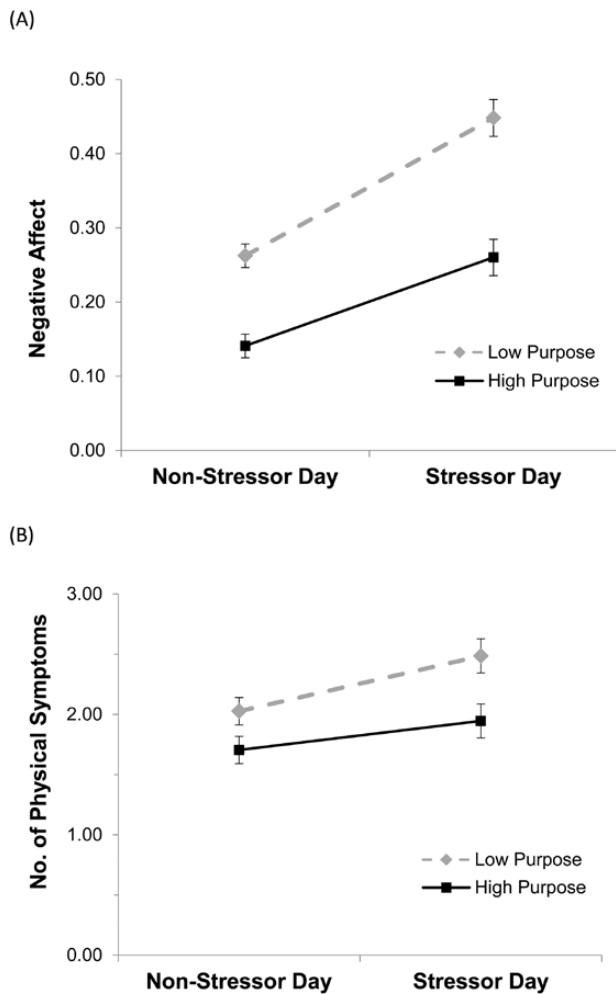


Fig. 1. Representation of the interactions between purpose and stressor day when predicting daily negative affect (A) and number of physical symptoms (B).

affect and physical symptoms on days with and without a stressor. Participants who reported a higher sense of purpose in life tended to report less negative affect, more positive affect, and fewer physical symptoms. Furthermore, sense of purpose was associated with less pronounced increases in negative affect and physical symptoms on stressor days compared with stressor-free days. These findings provide further support that purposeful individuals may be better able to overcome obstacles and regulate their emotions [5]. Avoiding overreaction in the face of stressors may be a central component of leading a purpose-driven life, given that engagement with daily and long-term objectives will necessarily lead to challenging circumstances. Previous work has suggested that purposeful individuals can disconnect their perception of how challenging an obstacle is from their appraisal of the effort necessary to overcome the challenge [8]. Similarly, the current findings suggest that even if daily events are perceived as stressful, those perceptions may produce less reactivity for individuals with a stronger sense of purpose.

Though studies have demonstrated that purposeful individuals report less perceived stress in general [9], sense of purpose was unrelated to daily frequency of stressors or overall number of stressors reported in the current study. As such, the benefits of purpose appear to be better understood with respect to how it shapes the perception of stress rather than the likelihood with which stressful events occur; this interpretation is supported by the inverse association between purpose and perceived stressor severity. Having a sense of purpose has been linked to the perception that one can find multiple ways to deal with an obstacle [25]. Thus, purposeful individuals may be less likely to appraise their lives as stressful after they found multiple ways to overcome those challenges.

Of note, sense of purpose failed to moderate the associations between daily stressor and daily positive affect reporting. Sense of purpose was associated with greater positive affect across days, and the magnitude of this effect was similar for days with and without a stressor. A possible interpretation is that having a purpose in life builds a reservoir of positive affect, aligned with the notion that purposeful individuals are resilient in the face of negative events (e.g., 5). An alternative explanation presents when considering work on how the Big Five personality traits explain the associations between stressors and positive and negative affect [20]; in that work with the same sample as the current investigation, researchers found that personality traits explained more of the variance in stressor-related negative affect than stressor-related positive affect. Similar to the current findings with sense of purpose, that work found that several traits that predicted average daily positive affect were not predictive of changes in positive affect associated with daily stressors. Accordingly, it appears that stressor-related positive affect may be more difficult to understand from the perspective of individual differences in personality, a point that merits attention in future research.

The current study is limited in its ability to test these claims, given the correlational nature of the data set. As noted above, reduced stress reactivity may facilitate one's ability to lead a purpose-driven life. Accordingly, research needs to investigate the potential bidirectionality between purpose and stress responses. Moreover, the current study is limited in its ability to investigate "reactivity" to stress, given that we did not assess participants in real-time before, during, and following the reported stressor; as such, the current findings should be paired with experimental paradigms to better investigate the associations found in the current daily diary study. Additionally, the data are subject to self-report biases. Though self-reports are the common assessment strategy for purpose research, future work could supplement the current findings by using observer reports of sense of purpose (e.g., 26). These caveats aside, the current study

provides evidence toward the suggestion that leading a purposeful life may coincide with living a less turbulent and reactive one.

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Compliance with Ethical Standards

Authors' Statement of Conflict of Interest and Adherence to Ethical Standards Authors Patrick L. Hill, Nancy L. Sin, Nicholas A. Turiano, Anthony L. Burrow, and David M. Almeida all declare that they have no conflict of interest.

Authors' Contributions PLH and ALB developed the study concept, in collaboration with all other co-authors, and PLH drafted the manuscript. NLS analyzed the data with analytic and methodological assistance from NAT and DMA. All authors provided critical revisions to the document, and then approved the final version of the manuscript for submission.

Ethical Approval All procedures followed were in accordance with the American Psychological Association ethical standards and with the Helsinki Declaration. This study was approved by the Institutional Review Board at University of Wisconsin-Madison.

Informed Consent All participants provided written informed consent.

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