Which Predicts Longevity Better: Satisfaction With Life or Purpose in Life?

Frank Martela[1], Elmeri Laitinen[2, 3], and Christian Hakulinen[2]
[1] Department of Industrial Engineering and Management, Aalto University
[2] Department of Psychology and Logopedics, University of Helsinki
[3] Digital and Psychosocial Treatments, HUS Helsinki University Hospital

Life satisfaction and purpose in life are fundamental yet separate ways to evaluate one's life. Both positively predict physical health and longevity, making them key factors for length and quality of life. However, we do not know which of them predicts mortality, when controlling for the influence of each other. Given that purpose in life involves a more active engagement with life and can help to cope with suffering, we hypothesize that purpose in life could be a more direct prospective predictor of longevity, overshadowing any effect of life satisfaction, when the two are pitted against each other as prospective predictors of longevity. To examine these hypotheses, we utilized Midlife in the U.S. survey, which is a 23-year follow-up study, ($N = 5,993$) and Cox proportional hazards models, repeating the analyses both without covariates and when controlling for various demographic and health-related variables. We show that both life satisfaction and purpose in life predict mortality when modeled separately. When life satisfaction, purpose in life and self-rated health were entered as simultaneous predictors of mortality, purpose in life remained a slightly more robust predictor of mortality, while life satisfaction became only marginally significant, suggesting that some of the factors that connect it to mortality are covered by the other two subjective evaluations. Overall, the results demonstrate that purpose in life is a robust predictor of mortality, and thus a key dimension of well-being to attend to as people age, while the predictive power of life satisfaction is more dependent on the choice of covariates.

Public Significance Statement
Well-being is an important predictor of longevity. But which type of well-being predicts it best? This study compared purpose in life and life satisfaction as predictors of mortality, finding that the former was the more robust predictor of longevity. Thus, purpose in life is a key factor to attend to and strengthen, especially as people age.

Prospective studies have demonstrated that positive psychological well-being is predictive of many physical health factors (Howell et al., 2007; Lyubomirsky et al., 2005)—including longevity (Chida & Steptoe, 2008; Martín-María et al., 2017). Various indicators of subjective well-being prospectively predict, for example, better mobility and functional status (Ostir et al., 2000), less cardiovascular diseases (Davidson et al., 2010), and lower likelihood of strokes (Kim et al., 2011; Ostir et al., 2001), with a meta-analysis of 35 studies offering evidence for an association with lower mortality (Chida & Steptoe, 2008). Psychological well-being is thus a key factor for both the length and quality of people's life span as they age, making it a key factor in models of successful aging (Brandtstädter & Greve, 1994; Collins et al., 2009) as it can help

in ameliorating the health and deterioration challenges associated with aging (Hill et al., 2015).

However, people can make several types of positive evaluations of their lives ranging from life satisfaction and purpose in life to the presence of positive emotions in life (Diener et al., 2017; Martela & Sheldon, 2019). Although such evaluations tend to be positively correlated, research has demonstrated that they also differ in terms of what predicts them and what they predict (Cross et al., 2018; Diener et al., 1999). Life satisfaction could be a better predictor of mortality than either positive or negative affect (Xu & Roberts, 2010), while negative affect seems not to predict lower mortality when controlling for life satisfaction and positive affect (Wiest et al., 2011). Ryff et al. (2004), in turn, showed that eudaimonic

---

well-being was associated with lower levels of salivary cortisol and cardiovascular risk, while positive affect was not. Accordingly, rather than just lumping all indicators of positive psychological well-being together, "each of the specific constructs need to be understood in their own right" (Diener et al., 1999, p. 277), especially as predictors of health-related factors (Cross et al., 2018). So, in addition to examining *whether* positive psychological well-being predicts decreased mortality, it is important to examine *which types* of psychological well-being are the best predictors of longevity.

We will focus, in particular, on life satisfaction and purpose in life. Life satisfaction is a cognitive evaluation a person makes about how satisfied they are with their lives as a whole and is arguably the most researched type of subjective life evaluation (Diener, 1984; Diener et al., 1999). Defined as "a global assessment of a person's quality of life according to his own chosen criteria" (Shin & Johnson, 1978, p. 478), assessments of life satisfaction offer the person a chance to evaluate their lives as a whole based on their own subjective criteria. A whole research field has emerged that focuses on understanding the individual and societal predictors of life satisfaction (reviewed in, e.g., Diener, 2012; Diener et al., 2018), with several studies confirming its predictive power for longevity (Boehm et al., 2015; Collins et al., 2009; Rosella et al., 2019; Wiest et al., 2011; Xu & Roberts, 2010; reviewed in Chida & Steptoe, 2008). Accordingly, our first hypothesis aims to replicate these findings:

> *Hypothesis 1:* Life satisfaction is a prospective positive predictor of longevity, even when controlling for demographic factors and baseline health.

Meaning and purpose in life, however, represent another fundamental way of making an evaluative judgment of one's life. Purpose in life is about having goals in life and a sense of directedness and is closely associated with an overall evaluation of how meaningful and significant one feels one's life is (Martela & Steger, 2016). Instead of thinking how satisfied one is with one's life, one is evaluating how purposeful one's life is in terms of having core goals, aims, and direction (King & Hicks, 2021; Martela & Steger, 2016). Having such sense of purpose in life has been argued to be important for life to be valuable and worth living (e.g., Camus, 1955; Frankl, 1963). Several studies have demonstrated that meaning and purpose in life predicts better health (Roepke et al., 2014) and decreased mortality (Hill & Turiano, 2014), with a meta-analysis of ten prospective studies on the effects of purpose in life offering clear evidence for an association with lower all-cause mortality (Cohen et al., 2016). Accordingly, our second hypothesis follows this stream of research:

> *Hypothesis 2:* Purpose in life is a prospective positive predictor of longevity, even when controlling for demographic factors and baseline health.

Both life satisfaction (Collins et al., 2009; Wiest et al., 2011; Xu & Roberts, 2010) and life purpose (Cohen et al., 2016; Hill & Turiano, 2014) have been separately shown to positively predict longevity in several studies. Both are also fundamental yet separate ways to evaluate one's life as a whole. Yet no previous studies have pitted them against each other as predictors of longevity to see which

type of life evaluation is more important as a prospective predictor. Life evaluation is arguably a fundamental part of well-being, but what kind of life evaluation should we focus on: Whether people are satisfied with their life or whether they see their existence as purposeful? This study starts to answer such a question by examining which of them is a better predictor of mortality.

In particular, we will argue that purpose in life, as an evaluation, is potentially more important for health and resilience of human beings. As agentic and inherently active beings (Ryan & Deci, 2000) humans need meaningful activity and a positive sense of self-worth that engaging in such activity can bring (Burrow & Rainone, 2017). High purpose in life thus represents a more active and committed engagement with life than mere high satisfaction. This could potentially lead to more active lifestyle, which in turn would contribute to better health. Furthermore, meaning and purpose in life is arguably a resilience factor, helping to cope with life's vicissitudes (Frankl, 1963; Park, 2010). Accordingly, meaning in life has been associated with proactive coping (Miao et al., 2017; Ward et al., 2023) and lower distress after challenging events (Bryan et al., 2013), thus arguably providing an especially important resource in dire life situations. Having purpose in life thus could help in coping with and to having lower distress after them, and thus it could be more strongly predictive of health compared to life satisfaction. While life satisfaction is important, we thus hypothesize that having purpose in life would be more important for human survival, both through more active lifestyle and less distress and better coping with stressful events. Accordingly, the third—and previously unexplored—hypothesis of our study is as follows:

> *Hypothesis 3:* When controlling for each other, purpose in life as compared to life satisfaction will emerge as the stronger prospective positive predictor of longevity.

The experience of purpose in life and how it affects individuals can potentially change across the lifespan. Some argue that people have a greater need for meaning as they age (Reker & Wong, 2012), while others see that maturity is a time for integration that could lead to a clearer comprehension of one's purpose in life (Erikson, 1959; Krause, 2007). Empirically, research has shown that older adults tend to report less purpose in life (Pinquart, 2002; Springer et al., 2011)—although other research has shown more individual variability and relative stability of purpose in life as people age (Hill et al., 2015; Ko et al., 2016). Furthermore, there are research showing that factors making life meaningful change as people age. While the relation between loneliness and purpose in life remained stable in their study, Hill et al. (2023) found that age moderated the association between sense of purpose and social support, with support being less important for older adults' purpose in life. Hicks et al. (2012), in turn, demonstrated that those who expect to have less lifetime left draw more meaning from the present. Accordingly, it is interesting to see whether age would moderate the relation between purpose in life and mortality.

The previous research has shown that the associations of various indicators of subjective well-being with health indicators, such as metabolic syndrome (Boylan & Ryff, 2015), dementia risk (Sutin, Luchetti, et al., 2023), and immunity and inflammation markers (Sutin, Stephan, et al., 2023), are not moderated by age. Accordingly, we do not have strong hypotheses, making this a more exploratory investigation. However, it could be that the ability

of purpose in life to help people to cope with increasing ailments could make the association stronger for older adults.

Research Question: Does age moderate the associations of life satisfaction or purpose in life with mortality?

Method

Transparency and Openness

The data, materials for this study, and the list of other variables of the survey are publicly accessible at http://www.midus.wisc.edu (Midlife in the United States [MIDUS], 2023). There is not a preregistration for the study. The code is publicly accessible at https://osf.io/7csd8 (Open Science Framework, 2023). We report how we determined our sample size, any data exclusions, all manipulations, and all measures in this study.

Data

The present study participants are from the MIDUS survey (Brim et al., 2019), a large-scale longitudinal study conducted in the United States to investigate the effects of psychological and social factors on age-related differences in health and well-being. The original MIDUS 1 study was conducted in 1994–1996 with a base probability sample of $N = 3,487$, and also gathered additional data on some metropolitan areas ($N = 757$), siblings of the base sample respondents ($N = 950$) and twin pairs ($N = 1914$). The present study included 5,993 participants (52% female) who had complete data on life satisfaction, purpose in life and all covariates. The MIDUS data collection was approved by the institutional review board at the University of Wisconsin–Madison and participants provided oral informed consent.

While various waves of the MIDUS have been used in more than thousand studies, including studies examining well-being and mortality (e.g., Hill & Turiano, 2014; Keyes & Simoes, 2012; Willroth et al., 2020), we are not aware of any study that examined both life satisfaction and purpose in life simultaneously as predictors of mortality.[1] The study adhered to the guidelines of Aalto University Ethical Review Board but as the study utilized publicly available existing data, formal approval was not need, as per the guidelines.

Measures

Life Satisfaction

Life satisfaction was assessed in MIDUS 1 with a five-item scale where participants rated their life overall, work, health, relationship with partner, and relationship with children on a scale from 0 to 10 (from *the worst possible* to *the best possible*), $\alpha = .67$. This scale has been used in several previous studies as a general assessment of people's satisfaction with life (e.g., Boylan & Ryff, 2015; Mosley-Johnson et al., 2019; Prenda & Lachman, 2001). Life satisfaction scale value was calculated by first taking a mean of the partner/children items to create a single family relations item, then calculating an overall mean score over it and other items. If participant had missing information in any of these items, life satisfaction was calculated using the items available. Higher scores on the final scale reflect higher satisfaction with life.

Purpose in Life

Purpose in life was assessed with the three item version (Ryff & Keyes, 1995) of Ryff's (1989) originally 20 item long and widely used Purpose in Life subscale of Psychological Well-Being included in MIDUS 1, $\alpha = .36$. These items were: (a) I live life 1 day at a time and do not really think about the future; (b) some people wander aimlessly through life, but I am not one of them; (c) I sometimes feel as if I have done all there is to do in life. Participants rated these items on a scale from 1 (*strongly agree*) to 7 (*strongly disagree*). The purpose in life scale was calculated as a total sum of the item values (relevant item reverse-coded).

Mortality

Mortality information up to the end of 2022 was gathered from the National Death Index in 2023. For confidentiality purposes, only the month and year of death were recorded.

Covariates

All covariates were reported at the study baseline. First, we felt important to control for known demographic predictors of mortality such as age, gender, ethnicity, education, and marital status. Second, we wanted to control for health-related factors known to predict mortality, including smoking, alcohol use, weight, number of chronic conditions, and self-rated physical health.

Demographic Covariates. *Age* was reported as years. *Gender* was reported as male/female and recoded into a dummy variable (1 = female, 2 = male). *Ethnicity* was coded as follows: 0 = Caucasian; 1 = African American; 2 = other. *Education* was reported as a number of discrete levels from 1 to 4 (1 = some grade school to GED; 2 = graduated high school; 3 = some college [no bachelor's degree]; 4 = graduated college to doctorate or professional degree). *Marital status* was reported as 0 = not married, divorced or separated, 1 = married.

Health-Related Covariates. *Smoking* was coded as a binary variable (1 = smoked regularly at some point in life; 2 = does not smoke or has not smoked regularly). *Alcohol use* was reported as the level of alcohol use during the year the participant used it the most: 0 = does not drink; 1 = moderately (1–2 times a week); 2 = heavily (3+ times a week). *Weight* was reported according to body mass index (BMI) categorized as: 1 = normal (BMI < 25); 2 = overweight (BMI > 25); 3 = obese (BMI > 30). *Number of chronic conditions* in past 12 month was reported based on a list of chronic conditions participants reported as having or not having. *Self-rated physical health* was assessed with the following question: "In general, would you say your physical health is excellent, very good, good, fair, or poor?" Answers ranged from 1 (*poor*) to 5 (*excellent*).

Statistical Analyses

The association between life satisfaction and purpose in life on mortality were analyzed with a Cox proportional hazards model.

---

[1] For example, Hill and Turiano (2014) also examined purpose in life but their study uses 14-year follow-up period, ours uses 23 years, and they do not examine life satisfaction. Willroth et al. (2020) in turn examine life satisfaction but not purpose in life and involved a different follow-up period. Keyes and Simoes (2012) examined overall flourishing as a composite of a large number of well-being variables and involved a 10-year follow-up period.

When hazards were not proportional, the hazard ratios (HRs) were interpreted as average ratios over the entire time period (Stensrud & Hernán, 2020). Life satisfaction and purpose in life were standardized for the analyses. The follow-up was from the study entry and the censoring was until the date of death or end of follow-up, December 15, 2022, whichever came first.

To test hypotheses one and two, the individual association between life satisfaction and purpose in life on mortality were examined in the following four separate models: (a) baseline model without any covariates; (b) model where age, gender, ethnicity, education, and marital status were included as covariates; (c) model where health-related behaviors (smoking, alcohol consumption, and BMI), and chronic conditions were included as an additional covariates; and (d) in the final model, where self-rated physical health was included as an additional covariate. Self-rated health was added separately from other health-related factors as it is a subjective general evaluation, which is closely aligned with and potentially influenced by subjective well-being (Benyamini et al., 2000), and thus controlling for it has been criticized for leading to statistical overadjustment (Kubzansky et al., 2016). Accordingly, we wanted to isolate its effect as compared to other, more objective health-related factors.

To examine the third hypothesis, the association between life satisfaction and purpose in life on mortality were examined in a multivariate model where these two variables were inserted together, first without any covariates. In the next stages, we repeated the analysis, while adding the same covariates as above: demographic factors in the second model, health-related factors in the third model, and self-rated health as a final covariate in the fourth model.

Last, to examine whether age moderates the associations of life satisfaction or purpose in life with mortality, we included an interaction term between life satisfaction and purpose in life with age. All statistical analyses in this study were performed in Stata/MP 17.0.

Results

Descriptive statistics of examined variables on the complete sample can be found in Table 1. Over the follow-up period of 144,478 person-years, a total of 1,857 deaths were observed. The correlation between life satisfaction and purpose in life was .24 ($p < .001$).

The associations between life satisfaction with mortality are shown in Table 2. In the model with no covariates, life satisfaction was not associated with mortality (HR = 1.01, 95% CI [0.96, 1.06]). However, when demographic factors were controlled for, higher life satisfaction was associated with decreased risk of early death (HR = 0.80, 95% CI [0.76, 0.83]). The association attenuated slightly, but remained significant, when health-related factors were included as additional covariates (HR = 0.87, 95% CI [0.82, 0.91]). In the final model, where self-rated health was also included as an additional covariate, the association between life satisfaction and mortality was further attenuated, but remained significant (HR = 0.94, 95% CI [0.89, 0.99]).

The associations between purpose in life with mortality are shown in Table 3. Higher purpose in life was associated with a decreased risk of an early death in the model with no covariates (HR = 0.75, 95% CI [0.72, 0.78]). The association remained significant, although clearly attenuated, when controlling for demographic

Table 1
Descriptive Statistics for the Sample (N = 5,993)

Variable	Frequency (%)	M (SD)
Age		46.7 (12.9)
Gender		
Male	2,853 (47.6)	
Female	3,140 (52.4)	
Ethnicity		
Caucasian	5,451 (91)	
African American	299 (5)	
Other	243 (4.1)	
Education		
Some grade school to general educational development	578 (9.6)	
Graduated high school	1,639 (27.3)	
Some college (no bachelor's degree)	1,831 (30.6)	
Graduated college to doctorate or professional degree	1,945 (32.5)	
Marital status		
Not married	1,922 (32.1)	
Married	4,071 (67.9)	
Smoking		
No smoking history	2,925 (48.8)	
Smoked regularly at some point	3,068 (51.2)	
Alcohol consumption		
None	606 (10.1)	
Some	3,047 (50.8)	
Much	2,340 (39)	
Body mass index		
Normal	2,395 (40)	
Overweight	2,143 (35.8)	
Obese	1,455 (24.3)	
Self-rated health		3.5 (1.0)
Chronic conditions		2.4 (2.5)
Satisfaction with life		7.7 (1.3)
Purpose in life		5.5 (1.2)

factors (HR = 0.89, 95% CI [0.85, 0.93]), and when additionally controlling for health-related factors (HR = 0.92, 95% CI [0.88, 0.96]). Including self-rated health as an additional covariate did not attenuate the association; higher purpose in life was associated with a decreased risk in early death (HR = 0.93, 95% CI [0.89, 0.97]).

The results from the multivariate models, where both life satisfaction and purpose in life were included, are shown in Table 4. In the model with no covariates, higher purpose in life was associated with decreased risk of early death (HR = 0.73, 95% CI [0.70, 0.77]), but higher life satisfaction was associated with increased risk of early death (HR = 1.09, 95% CI [1.04, 1.14]). However, when demographic factors were added as covariates, both higher life satisfaction (HR = 0.81, 95% CI [0.77, 0.85]) and higher purpose in life (HR = 0.93, 95% CI [0.88, 0.97]) were associated with a decreased risk of an early death. Including health-related factors as additional covariates attenuated the association between life satisfaction and mortality (HR = 0.88, 95% [CI 0.83, 0.92]), while the association between purpose in life and mortality remained relatively stable (HR = 0.94, 95% CI [0.89, 0.98]). In the final model where self-rated health was included as an additional covariate, higher purpose in life was associated with an decreased risk of an early death with a HR of 0.94 (95% CI [0.89, 0.98]). The association between life satisfaction and mortality (HR = 0.95, 95% CI [0.90, 1.00]) was clearly attenuated and was no longer statistically significant ($p = .06$).

Table 2

The Association Between Life Satisfaction With Mortality

Variable	HR [95% CI]	HR [95% CI]	HR [95% CI]	HR [95% CI]
Satisfaction with life	1.01 [0.96, 1.06]	0.80 [0.76, 0.83]	0.87 [0.82, 0.91]	0.94 [0.89, 0.99]
Age		1.11 [1.11, 1.12]	1.11 [1.11, 1.12]	1.11 [1.10, 1.11]
Gender				
Male		Ref.	Ref.	Ref.
Female		0.68 [0.62, 0.74]	0.69 [0.62, 0.76]	0.69 [0.62, 0.76]
Ethnicity				
Caucasian		Ref.	Ref.	Ref.
African American		1.20 [0.96, 1.49]	1.21 [0.97, 1.51]	1.12 [0.90, 1.40]
Other		0.84 [0.63, 1.12]	0.80 [0.60, 1.07]	0.76 [0.57, 1.02]
Education				
Some grade school to general educational development		Ref.	Ref.	Ref.
Graduated high school		0.75 [0.65, 0.86]	0.80 [0.70, 0.93]	0.86 [0.75, 1.00]
Some college (no bachelor's degree)		0.72 [0.62, 0.83]	0.76 [0.66, 0.88]	0.86 [0.74, 1.00]
Graduated college to doctorate or professional degree		0.52 [0.44, 0.60]	0.52 [0.44, 0.60]	0.60 [0.52, 0.70]
Marital status				
Not married		Ref.	Ref.	Ref.
Married		0.79 [0.71, 0.87]	0.79 [0.71, 0.87]	0.78 [0.70, 0.86]
Smoking				
Not smoked			Ref.	Ref.
Smoked			1.60 [1.44, 1.77]	1.60 [1.44, 1.78]
Alcohol consumption				
None			Ref.	Ref.
Some			0.89 [0.77, 1.03]	0.93 [0.80, 1.07]
Much			0.88 [0.75, 1.03]	0.91 [0.77, 1.06]
Body mass index				
Normal			Ref.	Ref.
Overweight			0.88 [0.79, 0.98]	0.87 [0.78, 0.97]
Obese			1.22 [1.09, 1.37]	1.16 [1.03, 1.31]
Chronic conditions			1.05 [1.04, 1.07]	1.03 [1.01, 1.05]
Self-rated health				0.77 [0.73, 0.82]

Note. HR = hazard ratio; Ref. = reference category. Values are hazard ratios and 95% confidence intervals (CIs). $N = 5,993$.

The results examining the moderating effect of age on the association between life satisfaction and mortality are shown in Supplemental Table S1. These results clearly show that age does not moderate the associations of life satisfaction with mortality. On the contrary, the association between purpose in life with mortality was found to be moderated to some degree by age (Supplemental Table S2): In the model where demographic factors were controlled for the interaction term between purpose in life and age was statistically significant ($p = .004$), but in the models where first health-related factors and then self-rated health was included as additional covariates, the interaction term between purpose in life and age was clearly attenuated and no longer statistically significant. Illustration of the interaction suggested that the association between purpose in life with mortality was somewhat stronger among older participants (Figure 1).

Discussion

This study aimed to explore how life satisfaction and purpose in life are associated with mortality in a 23-year follow-up study and to examine which of them remains a predictor of mortality when controlling for the effects of each other. Both life satisfaction and purpose in life were hypothesized to be predictive as regards mortality when examined alone. However, when examined together, we predicted that purpose in life would be more strongly related to mortality.

The results mostly provided support for Hypothesis 1: Examined without covariates, life satisfaction was not associated with mortality. When demographic covariates and when demographic and health-related covariates were added to the model, however, life satisfaction was a significant predictor of longevity. The association attenuated when self-rated health was controlled for but remained significant. These results contribute to the previous research on the topic (e.g., Collins et al., 2009; Wiest et al., 2011; Xu & Roberts, 2010) by demonstrating the key role that chosen covariates have in analyses of the relation between life satisfaction and mortality. Most previous studies on life satisfaction have found a significant relationship with mortality (e.g., Boehm et al., 2015; Rosella et al., 2019), but in some cases, the effect has been insignificant when certain factors have been controlled for (e.g., Wiest et al., 2011, 2013). We encourage future investigations to examine models with no covariates and with a more standardized set of covariates—preferably added in steps—to determine whether different results are due to actual differences in the samples studied or whether they are due to different covariates chosen. Providing results with different sets of covariates offers more robust and granular information about the conditions and potential interactions that determine when indicators of well-being are predictive of mortality.

The results provided clear support for Hypothesis 2: Purpose in life predicted longevity, and the result remained robust in models with no covariates, in models with demographic covariates, in models with demographic and health-related covariates, and in

Table 3
The Association Between Purpose in Life With Mortality

Variable	HR [95% CI]	HR [95% CI]	HR [95% CI]	HR [95% CI]
Purpose in life	0.75 [0.72, 0.78]	0.89 [0.85, 0.93]	0.92 [0.88, 0.96]	0.93 [0.89, 0.97]
Age		1.11 [1.10, 1.11]	1.11 [1.10, 1.11]	1.11 [1.10, 1.11]
Gender				
Male		Ref.	Ref.	Ref.
Female		0.66 [0.60, 0.73]	0.68 [0.61, 0.75]	0.69 [0.62, 0.76]
Ethnicity				
Caucasian		Ref.	Ref.	Ref.
African American		1.11 [0.90, 1.38]	1.16 [0.93, 1.44]	1.10 [0.89, 1.37]
Other		0.89 [0.66, 1.19]	0.80 [0.60, 1.07]	0.76 [0.56, 1.01]
Education				
Some grade school to general educational development		Ref.	Ref.	Ref.
Graduated high school		0.74 [0.65, 0.86]	0.81 [0.71, 0.94]	0.88 [0.76, 1.02]
Some college (no bachelor's degree)		0.74 [0.64, 0.86]	0.79 [0.68, 0.91]	0.90 [0.77, 1.04]
Graduated college to doctorate or professional degree		0.54 [0.46, 0.63]	0.54 [0.46, 0.63]	0.63 [0.54, 0.74]
Marital status				
Not married		Ref.	Ref.	Ref.
Married		0.76 [0.68, 0.84]	0.78 [0.70, 0.86]	0.78 [0.71, 0.87]
Smoking				
Not smoked			Ref.	Ref.
Smoked			1.63 [1.47, 1.81]	1.62 [1.46, 1.79]
Alcohol consumption				
None			Ref.	Ref.
Some			0.91 [0.79, 1.05]	0.94 [0.81, 1.09]
Much			0.91 [0.78, 1.06]	0.92 [0.79, 1.08]
Body mass index				
Normal			Ref.	Ref.
Overweight			0.89 [0.79, 0.99]	0.87 [0.78, 0.97]
Obese			1.24 [1.11, 1.40]	1.16 [1.04, 1.31]
Chronic conditions			1.07 [1.05, 1.09]	1.03 [1.01, 1.05]
Self-rated health				0.76 [0.72, 0.80]

Note. HR = hazard ratio; Ref. = reference category. Values are hazard ratios and 95% confidence intervals (CIs). $N = 5,993$.

models where self-rated health was added as an additional covariate. This is in line with the previous research on the topic (e.g., Cohen et al., 2016; Hill & Turiano, 2014). We add to this literature by demonstrating that the effects hold while controlling for demographic and health-related factors, including self-rated health, which is not often controlled for (e.g., Alimujiang et al., 2019; Hill & Turiano, 2014). It is also worth noting that while controlling for self-rated health attenuated the relation between life satisfaction and mortality, self-rated health did not have a similar effect on the relation between purpose in life and mortality.

Hypothesis 3, claiming that purpose in life is the primary predictor of mortality, received mixed support. We examined this in four analyses, each with some additional covariates. When life satisfaction and purpose in life were pitted against each other as predictors of longevity without any covariates, only purpose in life emerged as a significant predictor. Higher life satisfaction, in fact, was associated with an increased risk of mortality in that analysis. When demographic factors, and when demographic and health-related factors were added as covariates, both life satisfaction and purpose in life significantly predicted decreased mortality. However, when adding self-rated health as a covariate in the final analysis, purpose in life and self-rated health emerged as significant predictors of longevity, while life satisfaction became only marginally significant. The results thus show that purpose in life remains a robust predictor of mortality, with its HR not much

affected by the controlling of life satisfaction or self-rated health. Similarly, the predictive power of life satisfaction is not much affected by the addition of purpose in life as a control variable, thus suggesting that they have independent and not much overlapping predictive power as regards mortality. However, the predictive power of life satisfaction is attenuated by the controlling of self-rated health, suggesting that one reason life satisfaction predicts mortality is that it tracks people satisfaction with their health. Purpose in life is thus the more robust predictor of mortality, while the predictive power of life satisfaction seems to be more unstable and depend on the selection of covariates.

As regards the model that included self-rated health as an additional covariate, it can be interpreted as pitting three self-rated well-being factors against each other as predictors of mortality: life satisfaction, purpose in life, and self-rated health. The fact that the two latter ones remained significant tells us that purpose in life seems to capture some psychological factors not related to self-rated health, that are relevant for mortality. And the fact that self-rated health was significant tells us that it captures aspects of health not covered by the other, more objective health-related covariates or the two subjective well-being indicators. However, the fact that life satisfaction became only marginally significant predictor of mortality, when these two other subjective evaluations are controlled for, tells us that the factors related to mortality that it is able to capture are partially covered by the two other subjective indicators.

Table 4
The Multivariate Association Between Life Satisfaction and Purpose in Life With Mortality

Variable	HR [95% CI]	HR [95% CI]	HR [95% CI]	HR [95% CI]
Satisfaction with life	1.09 [1.04, 1.14]	0.81 [0.77, 0.85]	0.88 [0.83, 0.92]	0.95 [0.90, 1.00]
Purpose	0.73 [0.70, 0.77]	0.93 [0.88, 0.97]	0.94 [0.89, 0.98]	0.94 [0.89, 0.98]
Age		1.11 [1.11, 1.12]	1.11 [1.11, 1.12]	1.11 [1.10, 1.11]
Gender				
Male		Ref.	Ref.	Ref.
Female		0.67 [0.61, 0.74]	0.68 [0.62, 0.76]	0.69 [0.62, 0.76]
Ethnicity				
Caucasian		Ref.	Ref.	Ref.
African American		1.19 [0.96, 1.48]	1.20 [0.97, 1.50]	1.12 [0.90, 1.40]
Other		0.83 [0.62, 1.12]	0.79 [0.59, 1.06]	0.76 [0.56, 1.01]
Education				
Some grade school to general educational development		Ref.	Ref.	Ref.
Graduated high school		0.76 [0.66, 0.88]	0.82 [0.71, 0.94]	0.88 [0.76, 1.01]
Some college (no bachelor's degree)		0.74 [0.64, 0.85]	0.78 [0.68, 0.91]	0.89 [0.77, 1.03]
Graduated college to doctorate or professional degree		0.54 [0.46, 0.63]	0.54 [0.47, 0.63]	0.63 [0.54, 0.73]
Marital status				
Not married		Ref.	Ref.	Ref.
Married		0.80 [0.73, 0.89]	0.80 [0.73, 0.89]	0.79 [0.72, 0.88]
Smoking				
Not smoked			Ref.	Ref.
Smoked			1.60 [1.45, 1.78]	1.61 [1.45, 1.78]
Alcohol consumption				
None			Ref.	Ref.
Some			0.90 [0.78, 1.04]	0.94 [0.81, 1.08]
Much			0.88 [0.75, 1.03]	0.91 [0.78, 1.07]
Body mass index				
Normal			Ref.	Ref.
Overweight			0.88 [0.79, 0.99]	0.87 [0.78, 0.97]
Obese			1.21 [1.08, 1.37]	1.16 [1.03, 1.30]
Chronic conditions			1.05 [1.03, 1.07]	1.03 [1.01, 1.05]
Self-rated health				0.77 [0.73, 0.82]

Note. HR = hazard ratio; Ref. = reference category. Life satisfaction and purpose in life were analyzed together. Values are hazard ratios and 95% confidence intervals (CIs). *N* = 5,993.

As for the moderating role of age in these relations, we found that age did not moderate the effect of life satisfaction on mortality. In contrast, the association between purpose in life and mortality was slightly stronger among older participants, providing tentative support to the notion that a sense of purpose could become an increasingly important coping factor as people age. Some research has suggested that purpose in life can decline as people get old (Pinquart, 2002; Springer et al., 2011), while Hicks et al. (2012) showed that when people experience they have little time left, they draw more meaning from the present moment. Thus, helping people to retain a sense of purpose in life even when they get old could be an important factor to attend to and strengthen.

Certain limitations need to be acknowledged when interpreting the study results. First, this type of research cannot demonstrate causality, as unaccounted third variables such as genetic contributors to both well-being and longevity (see Sadler et al., 2011) could explain the observed associations between subjective well-being indicators and mortality. The study is also limited by the available measures used in MIDUS sample, such as the purpose in life questionnaire having only three items and low internal consistency (.36), and thus the results should be replicated utilizing other measures of purpose in life and life satisfaction. The study also utilizes a relatively homogenous sample in one country, making cross-cultural generalizations hard. It is also worth noting that the

scale for purpose in life had a rather low Cronbach's α, .36. This mainly reflects the fact that there were small number of items and that these items were chosen to reflect the conceptual wideness within the construct of purpose in life rather than to maximize internal consistency (Ryff & Keyes, 1995). While the correlation between short and long version of the purpose in life scale has been reported to be high (Ryff & Keyes, 1995), and the three item version of purpose in life scale has been used in a number of previous studies (e.g., Hill & Turiano, 2014; Ryff & Keyes, 1995), this raises some concerns, and it would be preferable to use more internally consistent scales in the future studies.

Furthermore, the study does not examine the mechanisms and mediators through which psychological well-being contributes to longevity and should be complemented with research examining the pathways connecting psychological well-being with longevity. Some of the examined covariates could operate as mediators or suppressors (MacKinnon et al., 2000), calling for future research programs to identify the various roles played by various cofounder. Finally, future research could examine how purpose in life is related to other known psychological predictors of mortality that might have partial construct overlap such as cynicism (Tindle et al., 2009; Weiss et al., 2020) and ikigai (Sone et al., 2008; Tanno et al., 2009), as this may help identify what exactly it is about purpose in life that drives the effect on mortality.

Figure 1

Predicted Hazard Ratio According to the Levels of Purpose in Life (Low = −1 SD; High = +1 SD)
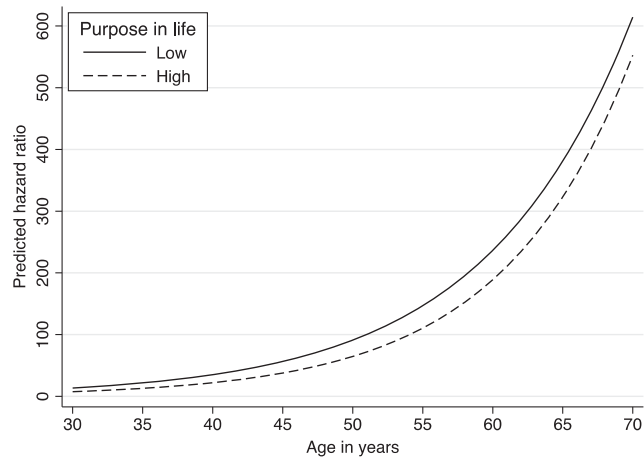
Note. Analysis is adjusted for age, sex, ethnicity, education, and marital status.

Nevertheless, even acknowledging these limitations, the study lends support to the notion that purpose in life is more closely aligned with these pathways than life satisfaction. As humans are agentic and active beings (Ryan & Deci, 2000), sense of purpose thus seems to capture a type of evaluation closer to the core of human psychological well-being than mere passive satisfaction in life and could be an important resilience factor in various setbacks in life (Park, 2010). Clinical implications of this study thus underline the necessity of including proper measures of purpose and meaning in life in research on epidemiology, health, and well-being. Along with traditional focus on risk factors, more emphasis should be given to protective psychological factors (VanderWeele et al., 2020), with purpose in life arguably as one of the most potential psychological resilience factor that deserves more attention in future research and in clinical settings.

References

Alimujiang, A., Wiensch, A., Boss, J., Fleischer, N. L., Mondul, A. M., McLean, K., Mukherjee, B., & Pearce, C. L. (2019). Association between life purpose and mortality among US Adults older than 50 years. *JAMA Network Open*, 2(5), Article e194270. https://doi.org/10.1001/jamanetworkopen.2019.4270

Benyamini, Y., Idler, E. L., Leventhal, H., & Leventhal, E. A. (2000). Positive affect and function as influences on self-assessments of health: Expanding our view beyond illness and disability. *The Journals of Gerontology: Series B*, 55(2), 107–116. https://doi.org/10.1093/geronb/55.2.P107

Boehm, J. K., Winning, A., Segerstrom, S., & Kubzansky, L. D. (2015). Variability modifies life satisfaction's association with mortality risk in older adults. *Psychological Science*, 26(7), 1063–1070. https://doi.org/10.1177/0956797615581491

Boylan, J. M., & Ryff, C. D. (2015). Psychological well-being and metabolic syndrome: Findings from the midlife in the United States national sample. *Psychosomatic Medicine*, 77(5), 548–558. https://doi.org/10.1097/PSY.0000000000000192

Brandtstädter, J., & Greve, W. (1994). The aging self: Stabilizing and protective processes. *Developmental Review*, 14(1), 52–80. https://doi.org/10.1006/drev.1994.1003

Brim, O. G., Ryff, C. D., & Kessler, R. C. (2019). *How healthy are we? A national study of well-being at midlife*. University of Chicago Press.

Bryan, C. J., Elder, W. B., McNaughton-Cassill, M., Osman, A., Hernandez, A. M., & Allison, S. (2013). Meaning in life, emotional distress, suicidal ideation, and life functioning in an active duty military sample. *The Journal of Positive Psychology*, 8(5), 444–452. https://doi.org/10.1080/17439760.2013.823557

Burrow, A. L., & Rainone, N. (2017). How many likes did I get?: Purpose moderates links between positive social media feedback and self-esteem. *Journal of Experimental Social Psychology*, 69, 232–236. https://doi.org/10.1016/j.jesp.2016.09.005

Camus, A. (1955). *Myth of Sisyphus* (J. O'Brien, Trans.). Vintage Books.

Chida, Y., & Steptoe, A. (2008). Positive psychological well-being and mortality: A quantitative review of prospective observational studies. *Psychosomatic Medicine*, 70(7), 741–756. https://doi.org/10.1097/PSY.0b013e31818105ba

Cohen, R., Bavishi, C., & Rozanski, A. (2016). Purpose in life and its relationship to all-cause mortality and cardiovascular events: A meta-analysis. *Psychosomatic Medicine*, 78(2), 122–133. https://doi.org/10.1097/PSY.0000000000000274

Collins, A. L., Glei, D. A., & Goldman, N. (2009). The role of life satisfaction and depressive symptoms in all-cause mortality. *Psychology and Aging*, 24(3), 696–702. https://doi.org/10.1037/a0016777

Cross, M. P., Hofschneider, L., Grimm, M., & Pressman, S. D. (2018). Subjective well-being and physical health. In E. Diener, S. Oishi, & L. Tay (Eds.), *Handbook of well-being* (pp. 496–513). DEF Publishers.

Davidson, K. W., Mostofsky, E., & Whang, W. (2010). Don't worry, be happy: Positive affect and reduced 10-year incident coronary heart disease: The Canadian Nova Scotia Health Survey. *European Heart Journal*, 31(9), 1065–1070. https://doi.org/10.1093/eurheartj/ehp603

Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95(3), 542–575. https://doi.org/10.1037/0033-2909.95.3.542

Diener, E. (2012). New findings and future directions for subjective well-being research. *American Psychologist*, 67(8), 590–597. https://doi.org/10.1037/a0029541

Diener, E., Oishi, S., & Tay, L. (2018). Advances in subjective well-being research. *Nature Human Behaviour*, 2(4), 253–260. https://doi.org/10.1038/s41562-018-0307-6

Diener, E., Pressman, S. D., Hunter, J., & Delgadillo-Chase, D. (2017). If, why, and when subjective well-being influences health, and future needed research. *Applied Psychology. Health and Well-Being*, 9(2), 133–167. https://doi.org/10.1111/aphw.12090

Diener, E., Suh, E., Lucas, R., & Smith, H. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125(2), 276–302. https://doi.org/10.1037/0033-2909.125.2.276

Erikson, E. H. (1959). *Identity and the life cycle*. International University Press.

Frankl, V. E. (1963). *Man's search for meaning: An introduction to logotherapy* (I. Lasch, Trans.). Washington Square Press.

Hicks, J. A., Trent, J., Davis, W. E., & King, L. A. (2012). Positive affect, meaning in life, and future time perspective: An application of socioemotional selectivity theory. *Psychology and Aging*, 27(1), 181–189. https://doi.org/10.1037/a0023965

Hill, P. L., Olaru, G., & Allemand, M. (2023). Do associations between sense of purpose, social support, and loneliness differ across the adult lifespan? *Psychology and Aging*, 38(4), 345–355. https://doi.org/10.1037/pag0000733

Hill, P. L., & Turiano, N. A. (2014). Purpose in life as a predictor of mortality across adulthood. *Psychological Science*, 25(7), 1482–1486. https://doi.org/10.1177/0956797614531799

Hill, P. L., Turiano, N. A., Spiro, A., III, & Mroczek, D. K. (2015). Understanding inter-individual variability in purpose: Longitudinal findings from the VA Normative Aging Study. *Psychology and Aging*, *30*(3), 529–533. https://doi.org/10.1037/pag0000020

Howell, R. T., Kern, M. L., & Lyubomirsky, S. (2007). Health benefits: Meta-analytically determining the impact of well-being on objective health outcomes. *Health Psychology Review*, *1*(1), 83–136. https://doi.org/10.1080/17437190701492486

Keyes, C. L., & Simoes, E. J. (2012). To flourish or not: Positive mental health and all-cause mortality. *American Journal of Public Health*, *102*(11), 2164–2172. https://doi.org/10.2105/AJPH.2012.300918

Kim, E. S., Park, N., & Peterson, C. (2011). Dispositional optimism protects older adults from stroke: The health and retirement study. *Stroke*, *42*(10), 2855–2859. https://doi.org/10.1161/STROKEAHA.111.613448

King, L. A., & Hicks, J. A. (2021). The science of meaning in life. *Annual Review of Psychology*, *72*(1), 561–584. https://doi.org/10.1146/annurev-psych-072420-122921

Ko, H.-J., Hooker, K., Geldhof, G. J., & McAdams, D. P. (2016). Longitudinal purpose in life trajectories: Examining predictors in late midlife. *Psychology and Aging*, *31*(7), 693–698. https://doi.org/10.1037/pag0000093

Krause, N. (2007). Longitudinal study of social support and meaning in life. *Psychology and Aging*, *22*(3), 456–469. https://doi.org/10.1037/0882-7974.22.3.456

Kubzansky, L. D., Kim, E. S., Salinas, J., Huffman, J. C., & Kawachi, I. (2016). Happiness, health, and mortality. *Lancet*, *388*(10039), Article 27. https://doi.org/10.1016/S0140-6736(16)30896-0

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, *131*(6), 803–855. https://doi.org/10.1037/0033-2909.131.6.803

MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science*, *1*(4), 173–181. https://doi.org/10.1023/A:1026595011371

Martela, F., & Sheldon, K. M. (2019). Clarifying the concept of well-being: Psychological need-satisfaction as the common core connecting eudaimonic and subjective well-being. *Review of General Psychology*, *23*(4), 458–474. https://doi.org/10.1177/1089268019880886

Martela, F., & Steger, M. F. (2016). The meaning of meaning in life: Coherence, purpose and significance as the three facets of meaning. *The Journal of Positive Psychology*, *11*(5), 531–545. https://doi.org/10.1080/17439760.2015.1137623

Martín-María, N., Miret, M., Caballero, F. F., Rico-Uribe, L. A., Steptoe, A., Chatterji, S., & Ayuso-Mateos, J. L. (2017). The impact of subjective well-being on mortality: A meta-analysis of longitudinal studies in the general population. *Psychosomatic Medicine*, *79*(5), 565–575. https://doi.org/10.1097/PSY.0000000000000444

Miao, M., Zheng, L., & Gan, Y. (2017). Meaning in life promotes proactive coping via positive affect: A daily diary study. *Journal of Happiness Studies*, *18*(6), 1683–1696. https://doi.org/10.1007/s10902-016-9791-4

Midlife in the United States. (2023). *Midlife in the United States: A national longitudinal study of health & well-being*. University of Wisconsin. https://www.midus.wisc.edu/scopeofstudy.php

Mosley-Johnson, E., Garacci, E., Wagner, N., Mendez, C., Williams, J. S., & Egede, L. E. (2019). Assessing the relationship between adverse childhood experiences and life satisfaction, psychological well-being, and social well-being: United States Longitudinal Cohort 1995–2014. *Quality of Life Research*, *28*(4), 907–914. https://doi.org/10.1007/s11136-018-2054-6

Open Science Framework. (2023). *Which predicts longevity better: Life satisfaction or life meaningfulness?* https://osf.io/7csd8/

Ostir, G. V., Markides, K. S., Black, S. A., & Goodwin, J. S. (2000). Emotional well-being predicts subsequent functional independence and survival. *Journal of the American Geriatrics Society*, *48*(5), 473–478. https://doi.org/10.1111/j.1532-5415.2000.tb04991.x

Ostir, G. V., Markides, K. S., Peek, M. K., & Goodwin, J. S. (2001). The association between emotional well-being and the incidence of stroke in older adults. *Psychosomatic Medicine*, *63*(2), 210–215. https://doi.org/10.1097/00006842-200103000-00003

Park, C. L. (2010). Making sense of the meaning literature: An integrative review of meaning making and its effects on adjustment to stressful life events. *Psychological Bulletin*, *136*(2), 257–301. https://doi.org/10.1037/a0018301

Pinquart, M. (2002). Creating and maintaining purpose in life in old age: A meta-analysis. *Ageing International*, *27*(2), 90–114. https://doi.org/10.1007/s12126-002-1004-2

Prenda, K. M., & Lachman, M. E. (2001). Planning for the future: A life management strategy for increasing control and life satisfaction in adulthood. *Psychology and Aging*, *16*(2), 206–216. https://doi.org/10.1037/0882-7974.16.2.206

Reker, G. T., & Wong, P. T. P. (2012). Personal meaning in life and psychosocial adaptation in the later years. In P. T. P. Wong (Ed.), *The human quest for meaning: Theories, research, and applications* (2nd ed., pp. 433–456). Routledge.

Roepke, A. M., Jayawickreme, E., & Riffle, O. M. (2014). Meaning and health: A systematic review. *Applied Research in Quality of Life*, *9*(4), 1055–1079. https://doi.org/10.1007/s11482-013-9288-9

Rosella, L. C., Fu, L., Buajitti, E., & Goel, V. (2019). Death and chronic disease risk associated with poor life satisfaction: A population-based cohort study. *American Journal of Epidemiology*, *188*(2), 323–331. https://doi.org/10.1093/aje/kwy245

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, *69*(4), 719–727. https://doi.org/10.1037/0022-3514.69.4.719

Ryff, C. D., Singer, B. H., & Dienberg Love, G. (2004). Positive health: Connecting well-being with biology. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *359*(1449), 1383–1394. https://doi.org/10.1098/rstb.2004.1521

Sadler, M. E., Miller, C. J., Christensen, K., & McGue, M. (2011). Subjective wellbeing and longevity: A co-twin control study. *Twin Research and Human Genetics*, *14*(3), 249–256. https://doi.org/10.1375/twin.14.3.249

Shin, D. C., & Johnson, D. M. (1978). Avowed happiness as an overall assessment of the quality of life. *Social Indicators Research*, *5*(1–4), 475–492. https://doi.org/10.1007/BF00352944

Sone, T., Nakaya, N., Ohmori, K., Shimazu, T., Higashiguchi, M., Kakizaki, M., Kikuchi, N., Kuriyama, S., & Tsuji, I. (2008). Sense of life worth living (ikigai) and mortality in Japan: Ohsaki Study. *Psychosomatic Medicine*, *70*(6), 709–715. https://doi.org/10.1097/PSY.0b013e31817e7e64

Springer, K. W., Pudrovska, T., & Hauser, R. M. (2011). Does psychological well-being change with age? Longitudinal tests of age variations and further exploration of the multidimensionality of Ryff's model of psychological well-being. *Social Science Research*, *40*(1), 392–398. https://doi.org/10.1016/j.ssresearch.2010.05.008

Stensrud, M. J., & Hernán, M. A. (2020). Why test for proportional hazards? *JAMA*, *323*(14), 1401–1402. https://doi.org/10.1001/jama.2020.1267

Sutin, A. R., Luchetti, M., Aschwanden, D., Stephan, Y., Sesker, A. A., & Terracciano, A. (2023). Sense of meaning and purpose in life and risk of incident dementia: New data and meta-analysis. *Archives of Gerontology and Geriatrics*, *105*, Article 104847. https://doi.org/10.1016/j.archger.2022.104847

Sutin, A. R., Stephan, Y., Luchetti, M., & Terracciano, A. (2023). Purpose in life and markers of immunity and inflammation: Testing pathways of episodic memory. *Journal of Psychosomatic Research*, *174*, Article 111487. https://doi.org/10.1016/j.jpsychores.2023.111487

Tanno, K., Sakata, K., Ohsawa, M., Onoda, T., Itai, K., Yaegashi, Y., Tamakoshi, A., & the Japan Collaborative Cohort Study Group. (2009). Associations of ikigai as a positive psychological factor with all-cause mortality and cause-specific mortality among middle-aged and elderly Japanese people: Findings from the Japan Collaborative Cohort Study. *Journal of Psychosomatic Research*, *67*(1), 67–75. https://doi.org/10.1016/j.jpsychores.2008.10.018

Tindle, H. A., Chang, Y.-F., Kuller, L. H., Manson, J. E., Robinson, J. G., Rosal, M. C., Siegle, G. J., & Matthews, K. A. (2009). Optimism, cynical hostility, and incident coronary heart disease and mortality in the Women's Health Initiative. *Circulation*, *120*(8), 656–662. https://doi.org/10.1161/CIRCULATIONAHA.108.827642

VanderWeele, T. J., Chen, Y., Long, K., Kim, E. S., Trudel-Fitzgerald, C., & Kubzansky, L. D. (2020). Positive epidemiology? *Epidemiology*, *31*(2), 189–193. https://doi.org/10.1097/EDE.0000000000001147

Ward, S., Womick, J., Titova, L., & King, L. (2023). Meaning in life and coping with everyday stressors. *Personality and Social Psychology Bulletin*, *49*(3), 460–476. https://doi.org/10.1177/01461672211068910

Weiss, A., Costa, P. T., Jr., Deary, I. J., Garside, D. B., & Stamler, J. (2020). The MMPI factor scales and risk of death in men during 45 years of follow-up: The Western Electric study. *Psychology and Aging*, *35*(1), 97–111. https://doi.org/10.1037/pag0000421

Wiest, M., Schüz, B., Webster, N., & Wurm, S. (2011). Subjective well-being and mortality revisited: Differential effects of cognitive and emotional facets of well-being on mortality. *Health Psychology*, *30*(6), 728–735. https://doi.org/10.1037/a0023839

Wiest, M., Schüz, B., & Wurm, S. (2013). Life satisfaction and feeling in control: Indicators of successful aging predict mortality in old age. *Journal of Health Psychology*, *18*(9), 1199–1208. https://doi.org/10.1177/1359105312459099

Willroth, E. C., Ong, A. D., Graham, E. K., & Mroczek, D. K. (2020). Being happy and becoming happier as independent predictors of physical health and mortality. *Psychosomatic Medicine*, *82*(7), 650–657. https://doi.org/10.1097/PSY.0000000000000832

Xu, J., & Roberts, R. E. (2010). The power of positive emotions: It's a matter of life or death—Subjective well-being and longevity over 28 years in a general population. *Health Psychology*, *29*(1), 9–19. https://doi.org/10.1037/a0016767