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Published in:
Psychology and Aging

DOI:
[10.1037/pag0000802](https://doi.org/10.1037/pag0000802)

Published: 15/02/2024

Document Version
Peer-reviewed accepted author manuscript, also known as Final accepted manuscript or Post-print

Please cite the original version:
Martela, F., Laitinen, E., & Hakulinen, C. (2024). Which Predicts Longevity Better : Satisfaction With Life or Purpose in Life? *Psychology and Aging*, 39(6), 589-598. <https://doi.org/10.1037/pag0000802>

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Which predicts longevity better: Satisfaction with life or purpose in life?

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This is a postprint version of an article published as:

Martela, F., Laitinen, E., & Hakulinen, C. (2024). Which predicts longevity better: Satisfaction with life or purpose in life? *Psychology and Aging*, 39(6), 589–598. <https://doi.org/10.1037/pag0000802>

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The ideas and data appearing in the manuscript have not been disseminated before (e.g., at a conference or meeting, posted on a listserv, shared on a website).

The data, materials for this study, and the list of other variables of the survey, are publicly accessible at <http://www.midus.wisc.edu> (MIDUS, 2023). The code is publicly accessible at https://osf.io/7csd8/?view_only=46215e61ecfa4d9081f59345f602983e (OSF, 2023).

Abstract

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 US 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 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.

Keywords: life satisfaction, meaning in life, purpose in life, mortality, longevity

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.

Introduction

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., 2022) 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.

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> (MIDUS, 2023). There is not a preregistration for the study. The code is publicly accessible at https://osf.io/7csd8/?view_only=46215e61ecfa4d9081f59345f602983e (OSF, 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 Midlife in the US (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=3487, 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 5993 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

¹ For example, Hill & Turiano (2014) also examine 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 & Simoes (2012) examined overall flourishing as a composite of a large number of well-being variables, and involved a 10-year follow-up period.

Aalto University Ethical Review Board but as the study utilized publicly available existing data, formal approval was not needed, 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: (1) I live life one day at a time and don't really think about the future; (2) Some people wander aimlessly through life, but I am not one of them; (3) I sometimes feel as if I've 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 1-4 (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 = doesn't smoke or hasn't smoked regularly). *Alcohol use* was reported as the level of alcohol use during the year the participant used it the most: 0 = doesn't drink; 1 = moderately (1-2 times a week); 2 = heavily (3+ times a week). *Weight* was reported according to 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).

2.3. Statistical analyses

The association between life satisfaction and purpose in life on mortality were analysed with a Cox proportional hazards model. When hazards were not proportional, the hazard ratios 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, 15th of December 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: (1) baseline model without any covariates; (2) model where age, gender, ethnicity, education, and marital status were included as covariates; (3) model where health-related behaviors (smoking, alcohol consumption, and BMI), and chronic conditions were included as an additional covariates; (4) 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 144,448 person-years, a total of 1,857 deaths were observed. The correlation between life satisfaction and purpose in life was .24 ($p < 0.001$).

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 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 hazard ratio 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 ($p=.06$).

The results examining the moderating effect of age on the association between life satisfaction and mortality are shown in **Supplement Table 1**. 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 (**Supplement Table 2**): 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 hypothesised 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 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 models where self-rated health was added as an additional covariate. This is in line with 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 hazard ratio 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.

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 alpha, .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. Ryff & Keyes, 1995;

Hill & Turiano, 2014), this raises some concerns, and it would be preferable to use more internally consistent scales in 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.

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.

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Figure 1. Predicted hazard ratio according to the levels of purpose in life (low=-1 SD; high=+1 SD). Analysis is adjusted for age, sex, ethnicity, education and marital status.

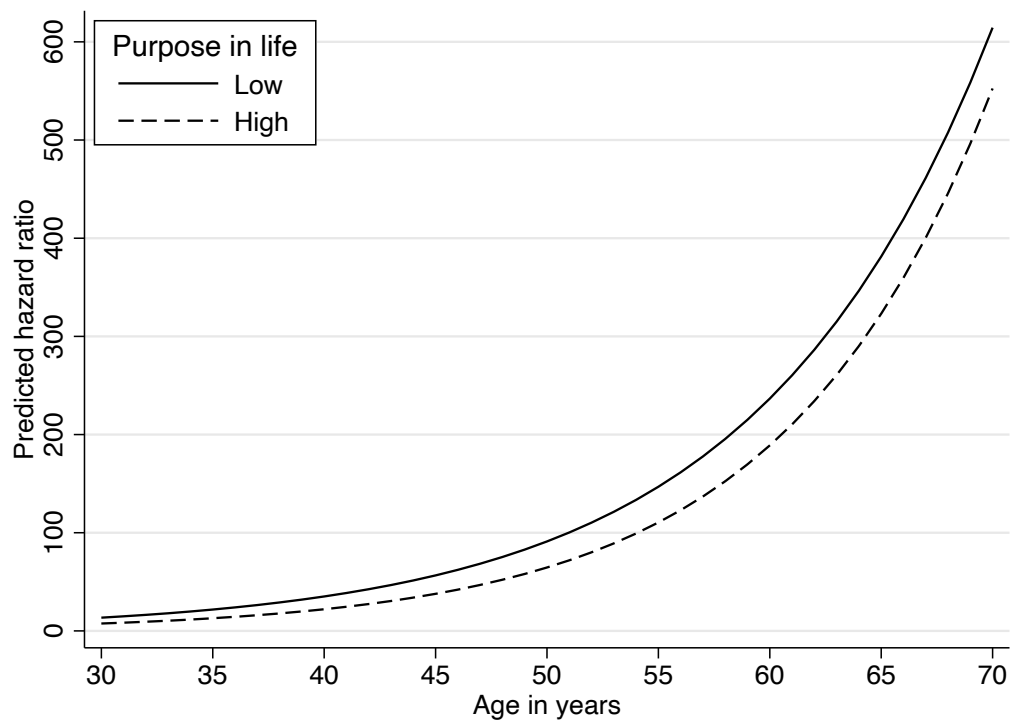


Table 1. Descriptive statistics for the sample (N=5993)

	Freq. (%)	Mean (SD)
Age		46.7 (12.9)
Gender		
<i>Male</i>	2853 (47.6)	
<i>Female</i>	3140 (52.4)	
Ethnicity		
<i>Caucasian</i>	5451 (91)	
<i>African American</i>	299 (5)	
<i>Other</i>	243 (4.1)	
Education		
<i>Some grade school to GED</i>	578 (9.6)	
<i>Graduated high school</i>	1639 (27.3)	
<i>Some college (no bachelor's degree)</i>	1831 (30.6)	
<i>Graduated college to doctorate or professional degree</i>	1945 (32.5)	
Marital status		
<i>Not married</i>	1922 (32.1)	
<i>Married</i>	4071 (67.9)	
Smoking		
<i>No smoking history</i>	2925 (48.8)	
<i>Smoked regularly at some point</i>	3068 (51.2)	
Alcohol consumption		
<i>None</i>	606 (10.1)	
<i>Some</i>	3047 (50.8)	
<i>Much</i>	2340 (39)	
BMI		
<i>Normal</i>	2395 (40)	
<i>Overweight</i>	2143 (35.8)	
<i>Obese</i>	1455 (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)

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				
<i>Male</i>		ref.	ref.	ref.
<i>Female</i>		0.68 (0.62 - 0.74)	0.69 (0.62 - 0.76)	0.69 (0.62 - 0.76)
Ethnicity				
<i>Caucasian</i>		ref.	ref.	ref.
<i>African American</i>		1.20 (0.96 - 1.49)	1.21 (0.97 - 1.51)	1.12 (0.90 - 1.40)
<i>Other</i>		0.84 (0.63 - 1.12)	0.80 (0.60 - 1.07)	0.76 (0.57 - 1.02)
Education				
<i>Some grade school to GED</i>		ref.	ref.	ref.
<i>Graduated high school</i>		0.75 (0.65 - 0.86)	0.80 (0.70 - 0.93)	0.86 (0.75 - 1.00)
<i>Some college (no bachelor's degree)</i>		0.72 (0.62 - 0.83)	0.76 (0.66 - 0.88)	0.86 (0.74 - 1.00)
<i>Graduated college to doctorate or professional degree</i>		0.52 (0.44 - 0.60)	0.52 (0.44 - 0.60)	0.60 (0.52 - 0.70)
Marital status				
<i>Not married</i>		ref.	ref.	ref.
<i>Married</i>		0.79 (0.71 - 0.87)	0.79 (0.71 - 0.87)	0.78 (0.70 - 0.86)
Smoking				
<i>Not smoked</i>			ref.	ref.
<i>Smoked</i>			1.60 (1.44 - 1.77)	1.60 (1.44 - 1.78)
Alcohol consumption				
<i>None</i>			ref.	ref.
<i>Some</i>			0.89 (0.77 - 1.03)	0.93 (0.80 - 1.07)
<i>Much</i>			0.88 (0.75 - 1.03)	0.91 (0.77 - 1.06)
BMI				
<i>Normal</i>			ref.	ref.

SATISFACTION AND MEANING AS PREDICTORS OF MORTALITY

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<i>Overweight</i>	0.88 (0.79 - 0.98)	0.87 (0.78 - 0.97)
<i>Obese</i>	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. Values are hazard ratios and 95% confidence intervals. N=5993.

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				
<i>Male</i>		ref.	ref.	ref.
<i>Female</i>		0.66 (0.60 - 0.73)	0.68 (0.61 - 0.75)	0.69 (0.62 - 0.76)
Ethnicity				
<i>Caucasian</i>		ref.	ref.	ref.
<i>African American</i>		1.11 (0.90 - 1.38)	1.16 (0.93 - 1.44)	1.10 (0.89 - 1.37)
<i>Other</i>		0.89 (0.66 - 1.19)	0.80 (0.60 - 1.07)	0.76 (0.56 - 1.01)
Education				
<i>Some grade school to GED</i>		ref.	ref.	ref.
<i>Graduated high school</i>		0.74 (0.65 - 0.86)	0.81 (0.71 - 0.94)	0.88 (0.76 - 1.02)
<i>Some college (no bachelor's degree)</i>		0.74 (0.64 - 0.86)	0.79 (0.68 - 0.91)	0.90 (0.77 - 1.04)
<i>Graduated college to doctorate or professional degree</i>		0.54 (0.46 - 0.63)	0.54 (0.46 - 0.63)	0.63 (0.54 - 0.74)
Marital status				
<i>Not married</i>		ref.	ref.	ref.
<i>Married</i>		0.76 (0.68 - 0.84)	0.78 (0.70 - 0.86)	0.78 (0.71 - 0.87)
Smoking				
<i>Not smoked</i>			ref.	ref.
<i>Smoked</i>			1.63 (1.47 - 1.81)	1.62 (1.46 - 1.79)
Alcohol consumption				
<i>None</i>			ref.	ref.
<i>Some</i>			0.91 (0.79 - 1.05)	0.94 (0.81 - 1.09)
<i>Much</i>			0.91 (0.78 - 1.06)	0.92 (0.79 - 1.08)
BMI				
<i>Normal</i>			ref.	ref.
<i>Overweight</i>			0.89 (0.79 - 0.99)	0.87 (0.78 - 0.97)

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<i>Obese</i>	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. Values are hazard ratios and 95% confidence intervals. N=5993.

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				
<i>Male</i>		ref.	ref.	ref.
<i>Female</i>		0.67 (0.61 - 0.74)	0.68 (0.62 - 0.76)	0.69 (0.62 - 0.76)
Ethnicity				
<i>Caucasian</i>		ref.	ref.	ref.
<i>African American</i>		1.19 (0.96 - 1.48)	1.20 (0.97 - 1.50)	1.12 (0.90 - 1.40)
<i>Other</i>		0.83 (0.62 - 1.12)	0.79 (0.59 - 1.06)	0.76 (0.56 - 1.01)
Education				
<i>Some grade school to GED</i>		ref.	ref.	ref.
<i>Graduated high school</i>		0.76 (0.66 - 0.88)	0.82 (0.71 - 0.94)	0.88 (0.76 - 1.01)
<i>Some college (no</i>		0.74 (0.64 - 0.85)	0.78 (0.68 - 0.91)	0.89 (0.77 - 1.03)
<i>Graduated college to doctorate or professional</i>		0.54 (0.46 - 0.63)	0.54 (0.47 - 0.63)	0.63 (0.54 - 0.73)
Marital status				
<i>Not married</i>		ref.	ref.	ref.
<i>Married</i>		0.80 (0.73 - 0.89)	0.80 (0.73 - 0.89)	0.79 (0.72 - 0.88)
Smoking				
<i>Not smoked</i>			ref.	ref.
<i>Smoked</i>			1.60 (1.45 - 1.78)	1.61 (1.45 - 1.78)
Alcohol consumption				
<i>None</i>			ref.	ref.
<i>Some</i>			0.90 (0.78 - 1.04)	0.94 (0.81 - 1.08)
<i>Much</i>			0.88 (0.75 - 1.03)	0.91 (0.78 - 1.07)
BMI				
<i>Normal</i>			ref.	ref.

<i>Overweight</i>	0.88 (0.79 - 0.99)	0.87 (0.78 - 0.97)
<i>Obese</i>	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. Life satisfaction and purpose in life were analyzed together. Values are hazard ratios and 95% confidence intervals. N=5993.