Purpose in Life as a Predictor of Mortality across Adulthood

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Abstract

Having a purpose in life has been nominated consistently as an indicator of healthy aging for several reasons including its potential for reducing mortality risk. The current study sought to extend these findings by examining whether purpose promotes longevity across the adult years, using data from the longitudinal MIDUS sample (mean age = 46.92 years, *SD* = 12.94). Proportional hazard models demonstrated that purposeful individuals lived longer than their counterparts during the 14 years after assessment, even when controlling for other markers of psychological and affective well-being. Moreover, these longevity benefits do not appear to be conditional on either the participants' age, how long they lived, or whether they had retired from the workforce. In other words, having a purpose appears to widely buffer against mortality risk across the adult years.

Accruing evidence suggests that finding a purpose for your life may add years to it. Indeed, studies have found that purposeful older adults experience a diminished mortality risk in American samples (Krause, 2009), even when controlling for known predictors of longevity (Boyle, Barnes, Buchman, & Bennett, 2009). Moreover, these benefits are not culture-specific, as work has demonstrated similar effects in a Japanese sample with respect to a sense of *ikigai*, or a "life worth living" (Sone, Nakaya, Ohmori, et al., 2008). However, these studies have focused on late middle age and older adults (all samples had mean ages > 60 years), leaving the need to examine whether similar findings exist for younger adults.

It is valuable to investigate whether the longevity benefits of purpose extend across the adult years for at least three reasons. First, individuals face very different mortality risks across adulthood, and it is uncertain whether purpose serves to help "buffer" individuals against those associated with early mortality. Second, with the onset of retirement comes increased health risks (Moon, Glymour, Subramanian, Avendaño, & Kawachi, 2012), and thus purpose may prove more beneficial later in life by combating the loss of life structure and organization that employment provides. Third, having a purpose suggests that one has committed to a set of clear goals for life (e.g., Hill, Burrow, Brandenberger, Lapsley, & Quaranto, 2010; McKnight & Kashdan, 2009). Given that the content or character of individuals' goals differs with age and the amount of perceived time remaining in life (e.g.,

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Lang & Carstensen, 2002), it is of interest to examine whether purpose imbues similar longevity benefits even in the face of potential changes to goal structures.

The current study examined whether purpose imbues similar longevity benefits for young, middle, and older adults, using data from the Mid-Life in the United States (MIDUS) sample (age range: 20–75 years). First, we sought to replicate past findings suggesting that purpose in life predicts longevity, and to increase their generalizability by using a younger sample. Second, we extended this work by controlling for psychosocial variables known to correlate with purpose, in order to demonstrate that the effects were unique to purpose. Third, we tested two interaction effects that examine possible developmental fluctuations in the influence purpose has on longevity across the 14-year follow-up of the study. Toward this end, we tested both age at death and retirement status as potential moderators. Taken together, these tests allow us to better understand whether purpose influences mortality risk similarly across developmental and life structural boundaries.

Method

Sample

Participants were drawn from the Midlife in the United States survey (MIDUS), a national longitudinal study of health and well-being (for review see Brim, Ryff, & Kessler, 2004). Beginning in 1994–95, 7,108 participants were recruited from a nationally representative random-digit-dialing sample of non-institutionalized adults between the ages 20–75 (M = 46.92 years, SD = 12.94). We employed the full archived data file available to researchers, where recruitment was based on the study's original goals. Once they consented to the study, participants complete a phone questionnaire as well as a self-administered questionnaire completed at home. To be included in the current analysis, participants needed to complete demographic information, such as age, sex, race, education, work status, as well as the purpose in life scale. Comparing participants with missing versus full data (N = 6,163) revealed that participants with missing data were significantly younger (t = 10.19; p < .05), were more likely to be male (χ^2 = 17.03; p < .05), retired (χ^2 = 22.16, p < .05), and had lower levels of education (t = 6.48; p < .05).

The sex distribution was generally balanced with 52% being female. Education was coded based on the highest level obtained as of 1995–96. A 12-point scale was constructed ranging from 1 (no schooling or some grade school) to 12 (professional degrees such as Ph.D. or M.D.). Given that 91% of the sample identified as Caucasian (white), a dummy variable was constructed to contrast whites against all other races in the analyses. Retirement status was assessed by asking participants, "As of right now, are you retired?"; 14% reported being currently retired.

Purpose in Life

Purpose in life was captured by three questions from the psychological well-being scale (Ryff, 1989; Ryff & Keyes, 1995). Participants used a Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree) to provide answers to the following items: "Some people wander aimlessly through life, but I am not one of them"; "I live life one day at a time and

don't really think about the future"; and "I sometimes feel as if I've done all there is to do in life" ($M = 5.50$; $SD = 1.21$; range = 1–7; $\alpha = .36$).

Other Psychosocial Variables

Three additional psychosocial variables were added to the models to examine the unique influence of purpose in life. Having positive relations with others was assessed using three additional items from the psychological well-being scale. Using the same Likert scale, participants responded to the following questions: "Maintaining close relationships has been difficult and frustrating for me"; "People would describe me as a giving person, willing to share my time with others"; and "I have not experienced many warm and trusting relationships with others" ($M = 5.40$; $SD = 1.36$; range = 1–7; $\alpha = 0.59$). Positive and negative affect was captured with 12 total questions (Mroczek & Kolarz, 1998). Participants used a Likert scale ranging from 1 (All of the time) to 5 (None of the time) to answer the following questions for positive affect: "During the past 30 days, how much of the time did you feel: cheerful, in good spirits, extremely happy, calm and peaceful, satisfied, and full of life?" ($M = 3.39$; $SD = 0.73$; range = 1–5; $\alpha = 0.91$). For negative affect: "During the past 30 days, how much of the time did you feel: so sad nothing could cheer you up, nervous, restless or fidgety, hopeless, that everything was an effort, and worthless?" ($M = 1.54$; $SD = 0.62$; range = 1–5; $\alpha = 0.87$). Responses were coded so that higher scores indicated more positive or negative affect.

Our selection process for covariates was informed by three primary directives. First, we focused on variables known to correlate with purpose in life, to rule out some of the most meaningful and likely alternative explanations. While previous work has examined the role of purpose on mortality, unique from negative emotionality (Boyle et al., 2008), the current work is novel in controlling for both positive and negative emotions concurrently. In addition, no research to our knowledge has examined whether purposeful individuals live longer while controlling for other aspects of psychological well-being. Along this front, we focused on positive relations with others, because some have suggested that pursuing one's purpose in life necessitates the inclusion of others (Damon, 2008). Second, again to focus on likely alternatives, we chose those correlates of purpose that are known influences on longevity. Previous reviews have outlined the potential associations between mortality risk and positive affect (Pressman & Cohen, 2005), negative affect (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002), and social relationships (Holt-Lunstad & Smith, 2012). Third, in explaining the potential role of purpose on longevity, previous research has tended to focus on explanations involving physical health or disability, with mixed results (Boyle et al., 2008; Krause, 2009). As such, we focused instead on emotional and psychological well-being, to increase the relative novelty of the current investigation.

Vital Status

Mortality data on participants was obtained through a National Death Index (NDI) search through January 2010. Survival time with delayed entry consisted of each participant's age at entry into the study (i.e., age at MIDUS 1) and the age the participant died. Due to reasons of confidentiality, only the month and year of death were provided to MIDUS investigators. Participants that were still alive at the end of the follow-up were censored and their age at

this point was utilized. The mean survival time for decedents was 8.01 years ($SD = 3.90$; range = 2 months to 14 years).

Data Analysis

A series of proportional hazards models (Cox, 1972) were conducted to examine the association between purpose in life and mortality risk using SAS statistical software (SAS Institute Inc., 2002–2004). For the time metric, a delayed entry method was employed which utilizes both age at baseline data and attainted age over the follow-up period. This technique is beneficial because it only includes participants in the 'risk set' that actually have a risk of dying at a certain point during the follow-up. For example, when examining the hazard of dying at age 40, any participant older than 40 at baseline (i.e., when they completed the MIDUS 1 questionnaire) would be removed from the analysis and not included in this specific risk set.

To examine whether the effects of purpose were constant across all ages of adulthood, we conducted three tests to assess the proportionality of the purpose variable. First, the most definitive test of proportionality is to examine the significance of a purpose by death-age interaction included in the proportional hazard model. A significant interaction would indicate non-proportionality and the hazard of dying could be plotted against death-age to illustrate how the hazard of dying associated with purpose in life varies as a function of time. Using a delayed entry method in the time metric is especially important when investigating death-age interaction effects because it removes individuals from the risk set who are not young/old enough or alive to be included in the calculation of the hazard of dying during a specified time. Thus, this method allows for a more nuanced estimation of the hazard of dying at a given age and allows for an estimation of more intra-individual/longitudinal change in the effects purpose has on mortality risk.

We also assessed proportionality of purpose effects by estimating martingale residuals (Lin, Wei, & Yang, 1993) based on 1000 random simulations that compare the observed residuals for purpose against the simulated residuals for purpose. If the residuals display markedly different patterns the Kolmogorov-Smirnov type test would be statistically significant ($p < 0.05$) and would also provide evidence of non-proportionality. Lastly, Schoenfeld residuals were estimated by computing the difference between the values of purpose for each person who died minus the expected value for each person who died. If the correlations between the Schoenfeld residual and death-age are significant, there would be additional evidence of non-proportionality.

Results

Over the 14-year follow-up, 569 participants died (approximately 9% of the sample). Broken down by age group, 8 died between 28–39 years of age, 38 between 40–49, 93 between 50–59, 156 between 60–69, 194 between 70–79, and 80 died at age 80 or beyond. Tests of differences between survivors and deceased showed that the deceased were significantly older ($t = 29.28$; $p < .05$), more likely to be male ($\chi^2 = 9.82$; $p < .05$), less educated ($t = 7.88$; $p < .05$), less likely to be employed ($\chi^2 = 547.53$, $p < .05$), but did not differ in race ($\chi^2 = 0.45$; $p = .49$). Importantly, deceased individuals scored lower on purpose

in life (t = 10.65; p < .05) and positive relations with others (t = 3.13, p < .05), but did not differ on positive or negative affect (both p's > .05).

Results from the proportional hazards model are presented in Table 1. All predictors were standardized before entry for ease of interpretation. Model 1 presents the model results without any moderation. By including baseline age as a covariate, the effect of age is removed as it is absorbed into the unspecified baseline hazard. Thus, the model is accounting for the strong baseline age differences in mortality risk (HR = 2.03) so that the effects of purpose are net of baseline age effects, as well as the other covariates included in the model. Results replicate the previous work, demonstrating that purpose predicted a lower mortality risk (HR = 0.85, CI: 0.78–0.93) net of covariates. In other words, for every one standard deviation increase in purpose, the risk of dying over the next 14 years diminished by 15%.[1]

Since Model 1 basically represents the 'averaged effect' of purpose across all death-ages included in the 14 year follow-up period, we next examined whether the hazards of purposelessness (or benefits of purposefulness) differed across the follow-up by including the purpose by death-age interaction term (Model 2). This interaction failed to reach significance (HR = 1.00, CI: 1.00–1.01, p = 0.32). Additional analyses confirmed the pattern of proportionality since the martingale residuals did not show a pattern of marked deviance as indicated by the non-significance of the Kolmogorov-Smirnov type test (p = 0.70. Likewise, all correlations between the Schoenfeld residuals and death-age were non-significant. In other words, purpose attenuated the risk of mortality relatively proportionally for younger, middle, and older adults across the 14-year follow-up period.

Finally, we investigated the role of purpose during retirement by including a purpose by retirement status interaction term in the model. Results are presented in Model 3. This interaction also failed to reach significance (HR = 1.00, CI: 0.97–1.03, p = 0.97). Therefore, again purpose appears to hold similar benefits across different adult groups.

Discussion

Recent research has focused on whether finding a purpose may promote greater longevity (Boyle et al., 2009; Krause, 2009; Sone et al., 2008). The current study added to this literature in four important ways. First, we again demonstrate that purpose predicts greater longevity in adulthood, using a more representative sample across adult ages allowing for greater generalizability. Second, we show that the benefits of purpose cannot be explained by indicators of psychological and affective well-being, underscoring the unique role that purpose may play in this process. Indeed, even when selecting variables known to be relevant for understanding mortality risk in general and in this sample, we find that the benefits of purpose hold true. Third, from a theoretical perspective we find that endorsing a strong purpose in life continues to have meaningful reductions in the risk of dying and that maintaining a stronger purpose in life can be equally important during younger ages as it is

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[1]We performed the same analysis separately for each of the purpose in life items. Two items were marginal predictors of mortality (HR: 0.95 (CI: 0.90–1.01) and HR: 0.96 (CI: 0.92–1.00), both p's < .09), and the third was a significant predictor (HR: 0.95 (CI: 0.91–1.00), p < .05). Therefore, the results were similar across all single-item purpose indicators.

at much older ages. Fourth, our results suggest that the benefits of purpose are not conditional on retirement status.

These findings suggest the importance of establishing a direction for life as early as possible (see also Hill, Burrow, & Sumner, 2013). Similarly, research has demonstrated that increasing goal commitment during college can have effects on well-being into middle adulthood (Hill, Jackson, Roberts, Brandenberger, & Lapsley, 2011). However, it remains a question for future research whether the pathways by which purpose influences mortality risk fluctuate across the adult years, given that the risk factors for early mortality differ greatly from those present in older adulthood.

The current study is limited in key respects that should serve as directions for future work. First, our sample was predominantly white, limiting our ability to examine the effects of purpose across racial and ethnic groups. However, previous work does suggest that the longevity benefits associated with purpose are not conditional on race (Boyle et al., 2009). Second, it would be valuable to include a more comprehensive measure of purpose in life, to improve the reliability of the construct. That said, the predictive value of the brief measure is now clear given the current and previous (Ryff & Keyes, 1995) findings. Moreover, in line with past work (Boyle et al., 2009; Sone et al., 2008), purpose continued to predict mortality risk even when looking at the single indicators (see footnote). Third, while the current sample was not ideal for testing potential mediators, such tests may be possible in the future with additional assessments, and a longer timeframe for the study.

In conclusion, the current study adds significantly to the literature, underscoring the potential for purpose to influence healthy aging across adulthood. As such, this work points to the need for further investigation on why finding a purpose may add years to your life. For instance, given the link between purpose and agency (Hill et al., 2013), it may be important to examine daily physical activity and goal achievement as pathways linking purpose to healthy aging. Therefore, just like a purpose, the current study should provide researchers with a direction on where to go, rather than providing a final endpoint or conclusion.

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Table 1

Predicting mortality risk from purpose in life, control variables, and the age by purpose interaction.

Predictors	Model 1 Hazard Ratio (CI)	Model 2 Hazard Ratio (CI)	Model 3 Hazard Ratio (CI)
Age	2.03* (1.51–2.71)	2.02* (1.51–2.71)	2.02* (1.51–2.71)
Sex (Male)	1.50* (1.26–1.78)	1.49* (1.25–1.77)	1.50* (1.26–1.78)
Minority (Other)	1.19 (0.87–1.62)	1.19 (0.88–1.63)	1.19 (0.87–1.62)
Education	0.88* (0.81–0.96)	0.88* (0.81–0.96)	0.88* (0.81–0.96)
Retirement	1.28* (1.02–1.59)	1.27* (1.02–1.59)	1.45 (0.19–11.19)
Positive Relations	0.97 (0.88–1.06)	0.97 (0.88–1.07)	0.97 (0.88–1.06)
Positive Affect	0.96 (0.86–1.07)	0.96 (0.86–1.07)	0.96 (0.86–1.07)
Negative Affect	1.09 (0.99–1.22)	1.09 (0.98–1.21)	1.09 (0.98–1.22)
Purpose	0.85* (0.78–0.93)	0.67 (0.41–1.08)	0.85* (0.78–0.93)
Age x Purpose	-	1.01 (1.00–1.01)	-
Retire x Purpose	-	-	1.00 (0.97–1.03)
−2 LL	7680.00	7679.00	7680.00
AIC	7698.00	7699.00	7700.00

Note:

*indicates $p < .05$.

CI indicates a 95% confidence interval around the hazard ratio. Purpose, positive relations with others, positive affect, and negative affect were all standardized prior to entry.