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What is This?

Purpose in Life as a Predictor of Mortality Across Adulthood

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Abstract
Having a purpose in life has been cited consistently as an indicator of healthy aging for several reasons, including its potential for reducing mortality risk. In the current study, we sought to extend previous findings by examining whether purpose in life promotes longevity across the adult years, using data from the longitudinal Midlife in the United States (MIDUS) sample. Proportional-hazards models demonstrated that purposeful individuals lived longer than their counterparts did during the 14 years after the baseline assessment, even when controlling for other markers of psychological and affective well-being. Moreover, these longevity benefits did not appear to be conditional on the participants' age, how long they lived during the follow-up period, or whether they had retired from the workforce. In other words, having a purpose in life 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; prior research has demonstrated similar effects of a sense of *ikigai*, or a "life worth living," in a Japanese sample (Sone et al., 2008). However, these studies have focused on adults of late middle age and beyond (all samples had mean ages > 60 years), leaving the need to determine whether a similar effect can be found among younger adults.

Investigating whether the longevity benefits of purpose in life (or simply "purpose") extend across the adult years is valuable 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 risk of 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), and the content or character of people's goals differs with age and the amount of time perceived to be remaining in life (e.g., Lang & Carstensen, 2002). Therefore, it is important to examine whether purpose has similar longevity benefits before and after such age-related changes to goal structures.

The current study examined whether purpose offers similar longevity benefits for young, middle-aged, and older adults, using data from the Midlife in the United States (MIDUS) sample. First, we attempted to replicate past findings suggesting that purpose in life predicts longevity and to test their generalizability by using a younger sample. Second, we extended this work by controlling for psychosocial variables known to correlate with purpose, to determine whether the effects were unique to

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purpose. Third, we examined possible developmental fluctuations in the influence of purpose on longevity across the 14-year follow-up period 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

Data were drawn from MIDUS, a national longitudinal study of health and well-being (for a review, see Brim, Ryff, & Kessler, 2004). Beginning in 1994–1995, 7,108 participants were recruited from a nationally representative, random-digit-dialing sample of noninstitutionalized adults between the ages of 20 and 75 (mean age = 46.92 years, SD = 12.94). We used the full archived data file available to researchers (i.e., recruitment of the sample was based on the study's original goals). Once participants consented to the study, they completed a questionnaire by phone and a self-administered questionnaire at home. To be included in the current analyses, participants needed to have provided complete demographic information (e.g., age, sex, race, education, and work status), as well as to have completed the purpose-in-life scale. Compared with participants with full data (N = 6,163), those with missing data (who are therefore not included in the current analyses) were significantly younger, $t(7047)$ = 10.19, $p < .05$; were more likely to be male, $\chi^2(1, N = 2,027)$ = 17.03, $p < .05$, and retired, $\chi^2(1, N = 7,058)$ = 22.16, $p < .05$; and had lower levels of education, $t(7093)$ = 6.48, $p < .05$.

The sex distribution in our sample was generally balanced (52% female, 48% male). Education was coded on the basis of the highest level obtained as of 1995–1996; the 12-point scale ranged from 1 (*no schooling or some grade school*) to 12 (*professional degrees such as Ph.D. or M.D.*). Given that 91% of our sample identified themselves as 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 Ryff Scales of Psychological Well-Being (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; α = .36).

Other psychosocial variables

Three additional psychosocial variables were included in the models to examine the unique influence of purpose in life. Having positive relations with others was assessed using three additional items from a subscale of the Scales of Psychological Well-Being (Ryff, 1989; Ryff & Keyes, 1995). 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; α = .59).

Positive and negative affect were assessed with 12 questions (Mroczek & Kolarz, 1998), each of which began with "During the past 30 days, how much of the time did you feel . . ." and continued with one of the following words or phrases: "cheerful," "in good spirits," "extremely happy," "calm and peaceful," "satisfied," or "full of life" (for the six positive-affect questions) or "so sad nothing could cheer you up," "nervous," "restless or fidgety," "hopeless," "that everything was an effort," or "worthless" (for the six negative-affect questions). Participants answered the questions on a Likert scale ranging from 1 (*all of the time*) to 5 (*none of the time*). Responses were coded so that higher scores indicated more-positive affect (positive-affect items) or more-negative affect (negative-affect items). The mean rating for positive affect was 3.39 (SD = 0.73, range = 1–5; α = .91), and that for negative affect was 1.54 (SD = 0.62, range = 1–5; α = .87).

Our process for selecting covariates was informed by three primary criteria. First, to rule out some of the most meaningful and likely alternative explanations, we focused on variables known to correlate with purpose in life. Although previous work has examined the effect of purpose on mortality separate from the influence of negative affect (Boyle et al., 2009), the current work is novel in that we controlled for positive and negative emotions concurrently. In addition, to our knowledge, no research has examined whether more purposeful individuals live longer, while controlling for other aspects of psychological well-being. We focused on positive relations with others, because some researchers have suggested that pursuing one's purpose in life necessitates the inclusion of others (Damon, 2003). Second (again to focus on likely alternatives), we chose those correlates of purpose that are known to influence longevity. Previous reviews have outlined 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 effect of purpose on longevity, researchers have tended to focus on physical health or disability, with mixed results (Boyle et al., 2009; Krause, 2009). Therefore, to increase the novelty of the current investigation, we focused instead on emotional and psychological well-being.

Death status

Mortality data on participants were obtained from the MIDUS data (obtained by the MIDUS researchers from the National Death Index) through January 2010. For reasons of confidentiality, only the month and year of death were provided to MIDUS investigators. Participants who were still alive at the end of the follow-up were censored, and their age at that point was used. The mean survival time for decedents was 8.01 years (SD = 3.90, range = 2 months to 14 years).

Data analysis

To examine the association between purpose in life and mortality risk, we constructed a series of proportional-hazards models (Cox, 1972) using SAS statistical software (Version 9.1.3). For the time metric, we used a delayed-entry method incorporating both age at baseline (i.e., when the MIDUS data were collected) and age attained by the end of the follow-up period. This technique was beneficial because it included in a risk set only participants who actually had a risk of dying at a given point during the follow-up. For example, when we examined the hazard of dying at age 40, we removed from the analysis and from this specific risk set any participant older than 40 at baseline.

To examine whether the effects of purpose were constant across all ages of adulthood, we conducted three tests assessing the proportionality of the purpose variable. First, the most definitive test was to examine the significance of a Purpose × Age at Death interaction included in the proportional-hazards model. A significant interaction would indicate nonproportionality. Using a delayed-entry method in the time metric was especially important for investigating interactions with age at death because it removed from the risk set individuals who were alive or who were too young or too old to be included in the calculation. Thus, this method allowed for a more nuanced estimation of the hazard of dying at a given age and allowed for an estimation of more intra-individual or longitudinal change in the effects of purpose on mortality risk.

We also assessed proportionality of purpose effects by estimating martingale residuals (Lin, Wei, & Ying, 1993) that compared the observed residuals for purpose with the residuals for purpose obtained in 1,000 random simulations. If the residuals displayed markedly different patterns, the Kolmogorov-Smirnov test would be statistically significant (p < .05) and would also provide evidence of nonproportionality. Finally, Schoenfeld residuals were estimated by computing the difference between the value of purpose for each person who died and the expected value for each person who died. If the correlations between the Schoenfeld residual and age at death age were significant, there would be additional evidence of nonproportionality.

Results

Over the 14-year follow-up period, 569 participants died (approximately 9% of the sample). Eight participants died between 28 and 39 years of age, 38 between 40 and 49 years, 93 between 50 and 59 years, 156 between 60 and 69 years, 194 between 70 and 79 years, and 80 at 80 years or beyond. Tests of differences between survivors and decedents showed that the deceased were significantly older, $t(7047)$ = 29.28, p < .05; were more likely to be male, $\chi^2(1, N = 7,027)$ = 9.82, p < .05; were less educated, $t(7093)$ = 7.88, p < .05; and were less likely to be employed, $\chi^2(1, N = 7,058)$ = 547.53, p < .05. Survivors and decedents did not differ in race, $\chi^2(1, N = 6,176)$ = 0.45, p = .49. Decedents scored lower than survivors on purpose in life, $t(6289)$ = 10.65, p < .05, and positive relations with others, $t(6290)$ = 3.13, p < .05, but did not differ from survivors on positive or negative affect (both ps > .05).

Results from the proportional-hazards models are presented in Table 1. All predictors were standardized before entry for ease of interpretation. Model 1 did not include any potential moderators. Because baseline age was a covariate, the effect of age was absorbed into the unspecified baseline hazard. Thus, the model accounted for the strong age differences in mortality risk at baseline (hazard ratio, or HR, = 2.03), and the effects of purpose were determined after effects of baseline age and the other covariates included in the model were removed. Results replicated previous findings: Greater purpose predicted a lower mortality risk, HR = 0.85; 95% confidence interval (95% CI) = [0.78, 0.93]. In other words, for every 1-SD increase in purpose, the risk of dying over the next 14 years diminished by 15%.[1]

Because Model 1 basically represents the averaged effect of purpose across all death ages included in the 14-year follow-up period, we examined whether the hazards of purposelessness (or benefits of purposefulness) differed across the follow-up period by including a Purpose × Age at Death interaction term in Model 2 (Table 1). This interaction failed to reach significance, HR = 1.01, 95% CI = [1.00, 1.01], p = .32. Additional analyses confirmed the pattern of proportionality. The martingale residuals did not show a pattern of marked difference

Table 1. Results of Models Predicting Mortality Risk From Purpose in Life, Control Variables, and the Age at Death × Purpose Interaction

Predictor	Model 1		Model 2		Model 3	
	HR	95% CI	HR	95% CI	HR	95% CI
Age at baseline	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 (non-White)	1.19	[0.87, 1.62]	1.19	[0.88, 1.63]	1.19	[0.87, 1.62]
Education level	0.88*	[0.81, 0.96]	0.88*	[0.81, 0.96]	0.88*	[0.81, 0.96]
Retirement status	1.28*	[1.02, 1.59]	1.27*	[1.02, 1.59]	1.45	[0.19, 11.19]
Positive relations with others	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 at Death × Purpose	—	—	1.01	[1.00, 1.01]	—	—
Retirement Status × Purpose	—	—	—	—	1.00	[0.97, 1.03]

Note: Purpose, positive relations with others, positive affect, and negative affect were all standardized before entry into the models. For Models 1, 2, and 3, −2 × log likelihood values were 7,680, 7,679, and 7,680, respectively. Akaike information criterion values for Models 1, 2, and 3 were 7,698, 7,699, and 7,700, respectively. HR = hazard ratio; 95% CI = 95% confidence interval.
*$p < .05$.

between the observed residuals and the residuals obtained in the simulations, as indicated by the nonsignificance of the Kolmogorov-Smirnov test ($p = .70$). Likewise, all correlations between the Schoenfeld residuals and age at death were nonsignificant. In other words, purpose attenuated the risk of mortality at relatively the same proportion for younger, middle-aged, and older adults across the 14-year follow-up period.

Finally, we investigated the role of purpose during retirement by including a Purpose × Retirement Status interaction term in Model 3 (Table 1). This interaction also failed to reach significance, HR = 1.00, 95% CI = [0.97, 1.03], $p = .97$. Thus, this model also suggests that purpose has similar benefits across different adult groups.

Discussion

Recent research has focused on whether finding a purpose in life may promote greater longevity (Boyle et al., 2009; Krause, 2009; Sone et al., 2008). The current study contributes to this literature in four important ways. First, we demonstrated that greater purpose predicts greater longevity in adulthood using a sample that was more representative because it included a greater age range than previous work, which allows for greater generalizability. Second, we showed that the benefits of purpose cannot be explained by indicators of psychological and affective well-being (Table 1), which underscores the unique role that purpose may play in influencing longevity. Indeed, even when we controlled for variables known to be relevant for understanding mortality risk, we found that the benefits of purpose held true. Third, from a theoretical perspective, we found that maintaining a strong purpose in life can be as important at younger ages as it is 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). Likewise, research has demonstrated that increasing goal commitment during college can have effects on well-being into middle adulthood (Hill, Jackson, Roberts, Lapsley, & Brandenberger, 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 mortality in early adulthood differ greatly from those in older adulthood.

The current study is limited in key respects that should suggest directions for future work. First, our sample was predominantly White, which limited 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, as in past work (Boyle et al., 2009; Sone et al., 2008), purpose predicted mortality risk even when we tested the effects of the single indicators (see Note 1). Third, although the current sample was not ideal for testing potential mediators, such tests may be possible in the future with additional assessment occasions and a longer period for the study.

In conclusion, the current study underscores the potential for purpose to influence healthy aging across adulthood and points to the need for further investigation on why finding a purpose may add years to one's 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, as a purpose would, the current study should provide researchers with a direction in which to go rather than a final endpoint or conclusion.

Author Contributions

P. L. Hill developed the study concept and was the primary author of the manuscript. N. A. Turiano organized and analyzed the data file and assisted with writing and editing the manuscript.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Note

1. In an analogous model, each of the purpose-in-life items was included as a separate predictor. Two items were marginal predictors of mortality: "Some people wander aimlessly through life, but I am not one of them," $HR = 0.95$, 95% CI = [0.90, 1.01], $p < .09$, and "I live life one day at a time and don't really think about the future," $HR = 0.96$, 95% CI = [0.92, 1.00], $p < .09$. The third was a significant predictor: "I sometimes feel as if I've done all there is to do in life," $HR = 0.95$, 95% CI = [0.91, 1.00], $p < .05$. Therefore, the results were similar across all single-item indicators of purpose.

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