Purpose in life and cognitive health: a 28-year prospective study

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ABSTRACT

Objectives: To examine the prospective association between purpose in life measured at three points across middle and older adulthood and cognitive outcomes assessed 8–28 years later.

Design: Prospective Study.

Setting: Wisconsin Longitudinal Study of Aging (WLS).

Participants: WLS participants who reported on their purpose in life at Round 4 (1992–1994; M_{age} = 52.58), Round 5 (2003–2007; M_{age} = 63.74), and/or Round 6 (2010–2012; M_{age} = 70.25) and were administered a cognitive battery at Round 7 (2020; M_{age} = 79.94) were included in the analysis (N = 4,632).

Measurements: Participants completed the Ryff measure of purpose in life and were administered the telephone interview for cognitive status and measures of verbal fluency, digit ordering, and numeric reasoning.

Results: Purpose in life measured at age 52 was related to better global cognitive function and verbal fluency but unrelated to dementia at age 80. In contrast, purpose in life at ages 63–70 was associated with lower likelihood of dementia, as well as better global cognitive function and verbal fluency at age 80. The effect sizes were modest (median Beta coefficient = .05; median odds ratio = .85). A slightly steeper decline in purpose in life between ages 52 and 70 was found for individuals with dementia at age 80.

Conclusions: Purpose in life is associated with healthier cognitive function measured up to 28 years later. Individuals with lower purpose, especially in their 60s or older, and with steeper declines in purpose, are more likely to have dementia at age 80.

Key words: well-being, dementia, cognitive aging, meaning, purpose

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Purpose in life is the feeling that one's life is goal-oriented and has direction (Ryff, 1989). It is a component of eudaimonic well-being that has been associated with better health outcomes in older adulthood (Musich *et al.*, 2018). Among these outcomes, purpose is associated consistently with better cognitive health (Sutin *et al.*, 2021c). Individuals who feel more purposeful tend to perform better on cognitive tasks (Estrella *et al.*, 2021), report fewer cognitive failures (Sutin *et al.*, 2023a), are less likely to develop pre-dementia syndromes (Sutin *et al.*, 2021b), and, ultimately, are less likely to develop dementia (Boyle *et al.*, 2010). That is, among individuals who are cognitively healthy at baseline, purpose in life is associated with lower risk of incident dementia over time, an association that has replicated in at least eight samples and is independent of clinical (e.g., diabetes) and behavioral (e.g., physical inactivity) risk factors (Sutin *et al.*, 2023b).

Previous research on purpose in life and risk of dementia has used samples that were, on average, in their 60s at the assessment of purpose in life and had, on average, 5.94 years of follow-up (Sutin *et al.*, 2023b). Thus, less is known about whether purpose in life measured in middle adulthood is associated with dementia at older ages. Purpose tends to be associated with better cognitive health across

adulthood, including better performance on cognitive tasks, regardless of age (Sutin *et al.*, 2022b). In addition, the association between purpose and dementia risk is not moderated by age, which suggests that this association is similar across relatively younger (including middle-aged adults) and relatively older adults (Sutin *et al.*, 2023b).

There is some evidence, however, that purpose during middle adulthood may not be associated prospectively with global cognitive function during the transition to older adulthood: purpose in life measured at age 52 was unrelated to cognitive performance at age 69 in a longitudinal sample of women (Nakanishi *et al.*, 2019). If replicated, and extended to dementia, this pattern would suggest that midlife purpose in life is associated concurrently with better cognitive function but that it may not help to maintain cognition into older adulthood. The present research addresses this prospective association with dementia, as well as global cognition and other cognitive domains that have been previously associated with purpose: verbal fluency, working memory, and numeric reasoning (Estrella *et al.*, 2021; Sutin *et al.*, 2023d; Wagner *et al.*, 2022).

The association between purpose in life and dementia has been examined primarily in the direction of purpose as a prospective predictor of cognitive decline (Kim *et al.*, 2019b) and dementia risk (Sutin *et al.*, 2023b). The opposite direction, however, is also possible: purpose in life may change with the onset of cognitive deficits. And, indeed, recent evidence suggests that purpose in life has steeper declines in individuals who develop cognitive impairment, particularly after the onset of cognitive deficits (Sutin *et al.*, 2023c). The present research extends this literature by testing whether dementia status in older adulthood is associated with the trajectory of purpose in life across middle-to-older adulthood.

The present research uses nearly 30 years of data from the Wisconsin Longitudinal Study (Herd *et al.*, 2014) to address key questions about the relation between purpose in life, dementia, and cognitive function between middle and older adulthood. First, with three assessments of purpose when participants were on average in their early 50s, mid-60s, and early 70s, we examine the prospective association between purpose measured at each time point and likelihood of dementia assessed 8–28 years later, when participants were on average about 80 years old. Second, we examine the prospective association between purpose in life and several cognitive tasks to evaluate purpose as a prospective correlate of cognitive function, as well as surpassing the threshold for dementia. Third, we test whether these associations are moderated by age, sex, or education to evaluate generalizability across these sociodemographic groups. Finally, we model the trajectory of purpose in life over nearly 20 years to examine whether the intercept and slope of purpose differ between people without and with dementia at age 80.

Method

Participants and procedure

Participants were from the Wisconsin Longitudinal Study (WLS), an ongoing study of graduates from Wisconsin high schools in 1957 and a selected sibling (Herd *et al.*, 2014). Graduates and siblings have been followed periodically since high school, with the most recent assessment in 2020. Participants (graduates and siblings) reported on their purpose in life at Round 4 (1992–1994), Round 5 (2003–2007), and Round 6 (2010–2012) and were administered a cognitive battery at Round 7 (2020). All participants with relevant cognitive data from Round 7 ($N = 4,632$) were included in the analyses. Multiple imputation was used to impute missing data on purpose in life at each round before analysis ($n = 519$ values imputed at Round 4, $n = 403$ values imputed at Round 5, and $n = 562$ values imputed at Round 6; results based on unimputed data at each round are in supplemental material). Some analyses limited the analytic sample to participants who were the focal graduates and had data on purpose in life at all three rounds ($n = 2393$) to facilitate comparisons across ages.

Measures

PURPOSE IN LIFE
Items from Ryff's Purpose in Life scale (Ryff, 1989) were used to measure purpose at Rounds 4, 5, and 6. The exact items varied somewhat across rounds, but four items were the same at every round (I am an active person carrying out the plans I set for myself; I do not have a good sense of what it is I'm trying to accomplish in life; I sometimes feel as if I've done all there is to do in life; I used to set goals for myself, but now it seems like a waste of time). Participants rated these items from 1 (strongly agree) to 6 (strongly disagree). Items were reverse scored when necessary, and the mean was computed across the four items at each round (alpha = 0.67 at each round). Higher scores indicated greater purpose.

DEMENTIA
Interviewers administered the Telephone Interview for Cognitive Status (TICS; Crimmins *et al.*, 2011) at Round 7. The TICS included tasks that measured orientation, attention, working memory, conceptual reasoning, language skills, and episodic memory that were summed into a total score (possible range 0–50).

Dementia can be classified based on three specific tasks from the TICS: total recall, serial 7s, and backward counting (possible range 0–27). A score of 6 or less across these tasks has been validated as a threshold for dementia (Crimmins *et al.*, 2011; Langa *et al.*, 2017). Dementia was coded into no ($>6 = 0$) and yes ($\leq 6 = 1$).

COGNITIVE FUNCTION

In addition to the total TICS score, participants also completed verbal fluency, digit ordering, and numeric reasoning tasks at Round 7. Verbal fluency was measured by asking participants to list as many words that start with the letter F or L as they could in 60 s. For digit ordering, participants were read a list of numbers and had to repeat the numbers back in order from lowest to highest. The list started with three numbers and increased one number at a time up to eight numbers. The task ended after two failed attempts of the same list length. Numeric reasoning was measured with a number series task. Participants had to fill in one missing number in a series of numbers (e.g., 17 __ 12 8 [answer = 15]). Participants completed the first block and then the difficulty of the second block varied by how well the participant did on the first block. WLS applied Rasch scoring to the number series task to account for planned differences in the difficulty of the second block across participants.

COVARIATES

Sociodemographic factors were age in years concurrent with each purpose assessment, sex (0 = male, 1 = female), and education in years. A variable that distinguished graduates from siblings (0 = graduates, 1 = sibling) was also included in the analyses. Because of differences in performance between the letters F and L, a dummy-coded variable that indicated task letter (0 = F, 1 = L) was included as an additional covariate for analyses of verbal fluency.

Analytic strategy

Logistic regression was used to examine the association between purpose in life and likelihood of dementia at Round 7, controlling for the sociodemographic factors. Three logistic regressions were tested, one for each round that had a measurement of purpose in life (i.e., 4, 5, and 6). We then did a sensitivity analysis that limited participants to graduates who reported on their purpose at all three rounds to evaluate the estimates on the same subsample and make comparisons across waves based on the same participants who were about the same age within each round. Linear regression was used to examine the association between purpose in life and performance on the four

cognitive tasks (TICS, verbal fluency, digit ordering, numeric reasoning), controlling for sociodemographic factors and letter for verbal fluency. We then did the same sensitivity analysis as for dementia. Moderation by age, sex, and education was tested with an interaction between purpose and each of these factors in the full sample. For the interpretation of moderation, we focused on interactions that replicated across at least two rounds. Finally, multilevel modeling was used to model change in purpose across Rounds 4–6 and to correlate the intercept and slope of purpose with dementia at Round 7. Thus, the multilevel analyses examined whether the trajectory of purpose in life across Rounds 4–6 varied by dementia status at Round 7. Maximum likelihood estimation was used, and all participants were included in the analysis because multilevel modeling can handle missing data for participants who may have only reported on their purpose at one or two rounds. Age, sex, education, and sample were included as covariates. We first tested an intercept-only model and then added the slope.

Results

Descriptive statistics are in Table 1. Correlations among study variables are in Supplemental Table S1. Across the full sample, 411 participants (8.9%) had a TICSm score in the dementia range at Round 7. Results of the logistic regressions are in Table 2 (for comparison, results of the logistic regressions for the full sample based on unimputed data are in Supplemental Table S2). Purpose in life measured in Round 4, at about age 52, was not associated significantly with likelihood of dementia measured 26–28 years later, at about age 80. Purpose in life was assessed at Round 5, at about age 63, and Round 6, at about age 70, however, was associated with greater likelihood of dementia at Round 7, at about age 80: For every standard deviation higher score in purpose at either Round 5 or Round 6, there was an approximately 20% reduced likelihood of dementia measured 13–17 or 8–10 years later.

The results of the sensitivity analyses that limited the sample to participants who had data on purpose at all three rounds and who were the focal graduates are also in Table 2. The pattern was the same as the full sample: Purpose at Round 4 was unrelated to dementia, whereas purpose at both Round 5 and Round 6 was associated with reduced likelihood of dementia at Round 7. The association was slightly stronger for purpose at Round 6 than at Round 5, but the confidence intervals overlapped more than 50%, and thus the estimates were not statistically different from each other.

Table 1. Descriptive statistics for all study variables in the total sample and by dementia status at wave 7 in the full and restricted samples

VARIABLES	FULL SAMPLE			RESTRICTED SAMPLE		
	TOTAL	NO DEMENTIA	DEMENTIA	TOTAL	NO DEMENTIA	DEMENTIA
Sex (female)	56% (2596)	56.1% (2366)	56.0% (230)	57.5% (1376)	57.6% (1261)	56.9% (115)
Education	14.07 (2.49)	14.94 (.83)	13.15 (2.06)	14.00 (2.47)	14.07 (2.50)	13.24 (1.97)
Age						
Round 4	52.58 (3.69)	52.44 (3.71)	54.06 (3.17)	53.15 (.59)	53.14 (.58)	53.24 (.63)
Round 5	63.74 (3.73)	63.59 (3.74)	65.27 (3.21)	64.27 (.66)	64.26 (.65)	64.40 (.69)
Round 6	70.25 (3.89)	70.10 (3.93)	71.80 (3.02)	71.11 (.86)	71.10 (.86)	71.24 (.82)
Round 7	79.94 (3.82)	79.78 (3.86)	81.58 (2.83)	80.92 (.74)	80.90 (.72)	81.20 (.87)
Purpose in life						
Round 4	4.93 (.84)	4.94 (.83)	4.86 (.91)	4.96 (.82)	4.96 (.82)	4.88 (.90)
Round 5	4.86 (.82)	4.88 (.81)	4.68 (.91)	4.92 (.80)	4.94 (.79)	4.76 (.86)
Round 6	4.78 (.87)	4.80 (.86)	4.56 (.94)	4.80 (.86)	4.82 (.85)	4.58 (.92)
Round 7 Cognitive outcomes						
Dementia	8.9% (411)	0%	100% (411)	8.4% (202)	0%	100% (202)
Global cognition	32.24 (5.38)	33.24 (4.30)	21.90 (4.24)	32.22 (5.16)	33.12 (4.25)	22.39 (3.79)
Verbal fluency	11.54 (4.39)	11.78 (4.30)	8.67 (4.38)	11.56 (4.38)	11.77 (4.34)	8.92 (4.09)
Digit ordering	5.62 (3.17)	5.89 (3.06)	2.73 (2.78)	5.57 (3.15)	5.81 (3.05)	2.77 (2.88)
Numeric reasoning	533.73 (20.99)	535.43 (19.74)	512.56 (24.29)	533.22 (20.42)	534.61 (19.47)	515.24 (23.64)

Note. Descriptive statistics are either mean (standard deviation) or percentage (n). The full sample includes all participants who contributed data to the analyses. The restricted sample is limited to participants who reported on their purpose in life at all three rounds and who were in the graduate sample.

Table 2. Association between purpose in life at Round 4, Round 5, and likelihood of dementia at Round 7

PREDICTOR	ROUND 4 PREDICTORS			ROUND 5 PREDICTORS			ROUND 6 PREDICTORS		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
				Full Sample					
Age	1.72	1.51, 1.97	< 0.001	1.74	1.53, 1.98	< 0.001	1.74	1.52, 1.99	< 0.001
Sex (female)	0.87	0.71, 1.08	0.210	0.89	0.72, 1.10	0.273	0.88	0.71, 1.09	0.236
Education	0.63	0.56, 0.72	< 0.001	0.65	0.57, 0.74	< 0.001	0.66	0.58, 0.74	< 0.001
Sample	0.84	0.66, 1.08	0.179	0.82	0.64, 1.05	0.122	1.01	0.80, 1.28	0.922
Purpose in life	0.93	0.84, 1.03	0.144	0.85	0.77, 0.94	0.002	0.85	0.76, 0.94	0.001
				Restricted Sample[a]					
Sex (female)	0.87	0.65, 1.17	0.360	0.89	0.66, 1.20	0.456	0.91	0.67, 1.22	0.521
Education	0.66	0.56, 0.80	< 0.001	0.68	0.57, 0.82	< 0.001	0.69	0.58, 0.83	< 0.001
Purpose in life	0.96	0.83, 1.12	0.636	0.85	0.74, 0.99	0.036	0.81	0.70, 0.93	0.003

Note. Full Sample: $N = 4632$, $n = 411$ with dementia. Restricted Sample $N = 2393$, $n = 202$ with dementia. OR = odds ratio. CI = Confidence Interval.

[a] The restricted sample is limited to participants who reported on their purpose in life at all three rounds and who were in the graduate sample (age was not included in this model because participants were all about the same age at each wave in the restricted sample).

The associations between purpose at each round and the four cognitive function tasks are in Table 3 (for comparison, results of the linear regressions for the full sample based on unimputed data are in Supplemental Table S3). A different pattern emerged than for dementia. Specifically, purpose in life measured at Round 4, Round 5, and Round 6 was consistently associated with better performance on the full TICS and the verbal fluency task at Round 7; this pattern was similar when the sample was restricted to participants in the graduate sample who reported on their purpose at each of the three rounds. The only exception was the association between purpose at Round 4 and the full TICS was not significant. Purpose was not associated consistently with digit ordering or numeric reasoning across the full and restricted samples.

Table 3. Association between purpose in life at Round 4, Round 5, and Round 6 and cognitive function at Round 7

PURPOSE IN LIFE	TICS		VERBAL FLUENCY		DIGIT ORDERING		NUMERIC REASONING	
	β	p	β	p	β	p	β	p
	Full Sample							
Round 4	0.04	0.002	0.06	< 0.001	0.02	0.107	0.00	0.725
Round 5	0.07	< 0.001	0.08	< 0.001	0.06	< 0.001	0.04	0.012
Round 6	0.08	< 0.001	0.07	< 0.001	0.06	< 0.001	0.04	0.007
	Restricted Sample[a]							
Round 4	0.04	0.084	0.05	0.022	− 0.01	0.676	0.02	0.395
Round 5	0.07	< 0.001	0.05	0.009	0.02	0.243	0.05	0.013
Round 6	0.07	< 0.001	0.05	0.021	0.03	0.125	0.03	0.194

Note. Full Sample $N = 4632$. Restricted Sample $N = 2,393$. Beta coefficients are standardized beta coefficients from linear regression controlling for Age (full sample only), sex, education, and sample (full sample only). Verbal fluency also controls for letter used in the task (F, L). TICS = Telephone Interview for Cognitive Status. [a]The restricted sample is limited to participants who reported on their purpose in life at all three rounds and who were in the graduate sample (age was not included in this model because participants were all about the same age at each wave in the restricted sample).

Table 4. Multilevel models of change in purpose between Rounds 4 and 6 and dementia at Round 7

PREDICTOR	MODEL 1					MODEL 2				
	B	*SE*	p	LCI	UCI	*B*	*SE*	p	LCI	UCI
Intercept	0.20	0.04	< 0.001	0.11	0.28	0.19	0.04	< 0.001	0.11	0.27
Time	− 0.01	0.001	< 0.001	− 0.01	− 0.01	− 0.01	0.001	< 0.001	− 0.01	− 0.01
Age	0.11	0.02	< 0.001	0.06	0.16	0.11	0.02	< 0.001	0.06	0.16
Sex	0.19	0.03	< 0.001	0.14	0.24	0.19	0.03	< 0.001	0.14	0.24
Education	0.20	0.01	< 0.001	0.18	0.23	0.20	0.01	< 0.001	0.18	0.23
Sample	− 0.13	0.03	< 0.001	− 0.18	− 0.07	− 0.13	0.03	< 0.001	− 0.18	− 0.07
Time × Age	− 0.01	0.002	< 0.001	− 0.01	− 0.003	− 0.01	0.001	< 0.001	− 0.01	− 0.003
Dementia	− 0.11	0.04	0.013	− 0.20	− 0.02	− 0.05	0.05	0.347	− 0.15	0.05
Time × Dementia	–	–	–	–	–	− 0.01	0.003	0.007	− 0.01	− 0.002
AIC	28,835.62					28,837.92				

Note. $N = 4,632$. Model 1 is the intercept-only model. Model 2 is Model 1 with further inclusion of the slope. Bs are standardized coefficients from the multilevel model analysis.

There was little evidence that the associations were moderated by sociodemographic factors (Supplemental Table S4 and Table S5). The one significant interaction between purpose and age on likelihood of dementia at Round 5 was not significant at Rounds 4 or 6. None of the other interaction terms was significant. Age, sex, and education likewise did not consistently moderate the association between purpose and the four cognitive tasks, with two exceptions. First, the association between purpose and the full continuous TICS score was stronger among females than males. This interaction was significant at all three rounds. Second, the association between purpose and numeric reasoning was moderated by education, such that purpose was associated with better numeric reasoning among participants with relatively less education, whereas it was unrelated among participants with relatively higher education. This interaction was significant with purpose measured at Round 4 and Round 5 but not at Round 6.

Finally, the associations between the intercept and slope of purpose between Round 4 to Round 6 and dementia at Round 7 from the multilevel models are in Table 4. Consistent with the logistic regressions, the intercept of purpose was associated negatively with dementia, which indicated that higher average purpose was associated with lower likelihood of having dementia. The addition of a time × dementia interaction suggested that decreases in purpose between Rounds 4 and 6 were also associated with dementia at Round 7, with slightly steeper declines in individuals with dementia at Round 7. This model, however, was only a slightly better fit than the intercept-only model (i.e., Δ in AIC > 2).

Discussion

The present research used nearly 30 years of longitudinal data to examine the prospective associations between purpose in life and cognitive function and dementia. With the longest follow-up to date, purpose in life measured on average when participants were in their early 50s was unrelated to likelihood of dementia about 28 years later. In contrast, purpose in life measured when participants were either in their mid-60s or early 70s was associated with lower likelihood of dementia between eight and 17 years later. Purpose measured at all three rounds was associated with better global cognitive function and verbal fluency, whereas it was largely unrelated to digit ordering and numeric reasoning. The effect sizes for both dementia and the cognitive function measures were modest but consistent with the broader literature on purpose and cognitive health (Sutin *et al.*, 2023d). There was only modest evidence for moderation by sociodemographic factors. Finally, the multilevel model suggested that individuals with lower levels and steeper declines in purpose over about 20 years were more likely to have dementia in their 80s.

Previous research on purpose in life and dementia risk has relied on samples that were, on average, about 69 years old and that had on average nearly six years of follow-up (Sutin *et al.*, 2023b). The present research suggests that age might matter: The average age of 52 at Round 4 was about 15 years younger than the average age across the eight samples in the previous meta-analysis. This null association is consistent with one previous study of women that found purpose measured in the early 50s was unrelated to cognitive function about 17 years later (Nakanishi *et al.*, 2019).

One potential explanation for this pattern of findings is reverse causality. That is, the neurodegeneration prior to dementia onset could lead to lower purpose; thus, the observed association at older ages could be due to disease processes that reduce purpose rather than purpose acting as a protective factor against the development of dementia. While some findings in the WLS are consistent with reverse causality, other evidence is not. For example, if reverse causality accounts for the relation between purpose and lower risk of dementia, the association between purpose and dementia should get stronger the shorter the interval between the measurement of purpose and dementia. In the present sample, however, the association between purpose at Round 6 and dementia was not statistically stronger than the association between purpose at Round 5 and dementia, which is what to be expected if the association was due solely to reverse causality. A more parsimonious interpretation of the weaker and null association between the age 52 purpose and age 80 dementia is that associations generally weaken over time, as changes in life circumstances, events, and idiosyncratic processes are more likely to occur the longer the follow-up time.

Purpose measured earlier in middle adulthood may be too distal of a predictor of dementia to be detected. Purpose in middle adulthood, however, may set in motion a cascade that helps protect cognitive health in older adulthood. Individuals with more purpose, for example, tend to have fewer clinical risk factors for poor cognitive health: They are less likely to have cardiovascular disease (Kim *et al.*, 2019a), diabetes (Hafez *et al.*, 2018), inflammation (Sutin *et al.*, 2023f), obesity (Fischer *et al.*, 2023a), or depression (Boreham and Schutte, 2023) than individuals with less purpose. Purpose is likewise associated with healthier lifestyles, including greater engagement in physical activity (Sutin *et al.*, 2023e) and less substance use (Fischer *et al.*, 2023b). These clinical and behavioral profiles help support healthier cognitive aging (Norton *et al.*, 2014). Purpose in life is also associated with greater engagement (Sutin *et al.*, 2023d) and social integration (Sutin *et al.*, 2022a) that likewise tend to support cognitive health (Fancourt *et al.*, 2020; Luchetti *et al.*, 2020). It is possible that these processes are more relevant as adults transition from middle-to-older adulthood than earlier in middle adulthood.

It is of note that purpose in life at each round was prospectively associated with better global cognitive function and better verbal fluency. These findings contrast with Nakanishi *et al.* (2019) who did not find a significant prospective association between purpose and global cognitive function over a 17-year follow-up. The present analysis does, however, replicate previous research that found a positive association between purpose and better global cognitive function (Kim *et al.*, 2019b) and higher verbal fluency (Sutin *et al.*, 2022b). This pattern suggests that purpose, even measured in the early 50s, does support better cognitive health nearly 30 years later.

Although purpose tends to be associated with better cognitive function (Estrella *et al.*, 2021; Sutin *et al.*, 2023d), not all studies find it is associated with performance in specific domains (Cattaneo *et al.*, 2022; Zahodne *et al.*, 2018). And, indeed, the current analysis failed to find a consistent association between purpose and either digit ordering or numeric reasoning. The latter null association was somewhat surprising, given that some previous work had found a positive association between purpose and numeric reasoning (Sutin *et al.*, 2023d). There

is a need to test the association between purpose and multiple domains of cognitive function to identify whether differences across studies are a failure to replicate or whether there are meaningful differences in the association between purpose and specific cognitive domains.

There was little evidence that sociodemographic factors moderated the association between purpose and either dementia or cognitive function. Previous research finds that the association between purpose and cognitive health is generally similar across sociodemographic factors (Lewis *et al.*, 2017; Sutin *et al.*, 2021a; Wilson *et al.*, 2021). Surprisingly, the association between purpose and global cognitive function was stronger among females than males, an association apparent at each measurement of purpose. Given that previous research on purpose and cognitive function has not found such a sex difference, this moderation should be considered with caution until replicated. There is some evidence that purpose has a stronger association with cognitive function in less economically robust environments (Sutin *et al.*, 2022b). The present research found some support that purpose may be more helpful for numeric reasoning among individuals with relatively less education. Again, this moderation should be interpreted with caution until replicated, particularly because the interaction was specific to reasoning and did not extend to the other cognitive tasks.

There was some evidence from the multilevel models that change in purpose over about 20 years was associated with dementia. This evidence could be interpreted as supporting the reverse causality hypothesis, such that those who develop dementia may have neurodegeneration that leads to loss of purpose that is apparent before cognitive deficits. Across this time period, however, there are many life events that could decrease purpose that are related to dementia and possibly unrelated to neurodegeneration. Retirement, for example, is a significant life event associated with subsequent declines in purpose (Lewis and Hill, 2020). Widowhood, which the likelihood increases with age, is also associated with lower purpose (Koren and Lowenstein, 2008). Such events may precipitate both declines in purpose and hasten the development of dementia. Recent research also suggests that purpose in life decreases more following the onset of cognitive impairment than before impairment (Sutin *et al.*, 2023c). The present research, however, did not have data on the timing of cognitive impairment; more research is needed to better evaluate the timing of changes in purpose and dementia.

The present research builds on recently published literature in International Psychogeriatrics on purpose in life and neuropsychiatric conditions. For example, Fischer *et al.* (2023c) reported on the cross-sectional association between purpose in life and aspects of social and psychological functioning in veterans. The present research extends the positive associations to aspects of cognitive functioning measured years later. In addition, apathy is common in dementia (Collins *et al.*, 2023), and the decline in purpose associated with dementia found in the present research may contribute to the development of apathy after disease onset. Purpose may also be related to apathy in preclinical stages, which further increases risk of incident dementia (Connors *et al.*, 2023).

The present study has several strengths, including three assessments of purpose in life and nearly 30 years of follow-up. There are also limitations that need to be considered. Dementia, for example, was only measured once and not concurrently with the purpose assessments. However, it is unlikely that participants had dementia in their 50s or 60s. If they had dementia 20–30 years earlier, it is likely that they would have progressed too far to be able to participate in the Round 7 assessment. Relatedly, with one assessment of dementia, it was not possible to determine the timing of its development, particularly regarding change in purpose over time. In addition, mortality in the WLS likely underestimated the association between purpose and cognitive function because participants with lower purpose may have been more likely to die younger and thus were not included in the Round 7 cognitive assessment. Finally, the WLS sample is white and from one state within the United States. As such, the associations may not generalize to other populations. The findings should thus be interpreted in the context of these limitations.

Despite these limitations, the overall findings are consistent with the broader literature on purpose in life and cognitive health and add new information on the prospective association between purpose and dementia. Future research would benefit from more frequent assessments of both purpose in life and cognitive function and dementia to better pinpoint when purpose is most protective and when purpose could be leveraged for interventions to improve cognitive outcomes in older adulthood.

Conflict of interest

None.

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Description of author(s)' roles

A. Sutin designed the study, obtained, and analyzed the data and wrote the paper. M. Luchetti, Y. Stephan, and A. Terracciano provided critical feedback throughout the project and assisted with writing the paper.

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Data availability

The data used in this research is available to the public from the WLS website (https://researchers.wls.wisc.edu/).

Supplementary material

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