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Purposeful and Purposeless Aging: Structural Issues for Sense of Purpose and Their Implications for Predicting Life Outcomes

Gabrielle N. Pfund[1], Gabriel Olaru[2], Mathias Allemand[3], and Patrick L. Hill[4]
[1] Department of Medical Social Sciences, Northwestern University
[2] Department of Developmental Psychology, Tilburg University
[3] Department of Psychology, University Research Priority Program "Dynamics of Healthy Aging", University of Zurich
[4] Department of Psychological and Brain Sciences, Washington University in St. Louis

Despite the value of sense of purpose during older adulthood, this construct often declines with age. With some older adults reconsidering the relevance of purpose later in life, the measurement of purpose may suffer from variance issues with age. The current study investigated whether sense of purpose functions similarly across ages and evaluated if the predictive power of purpose on mental, physical, cognitive, and financial outcomes changes when accounting for a less age-affected measurement structure. Utilizing data from two nationwide panel studies (Health and Retirement Study: $n = 14,481$; Midlife in the United States: $n = 4,030$), the current study conducted local structural equation modeling and found two factors for the positively and negatively valenced purpose items in the Purpose in Life subscale (Ryff, 1989), deemed the purposeful and purposeless factor. These factors become less associated with each other at higher ages. When reproducing past findings with this two-factor structure, the current study found that the purposeful and purposeless factors predicted these outcomes in the same direction as would be suggested by past research, but the magnitude of these effects differed for some outcomes. The discussion focuses on the implications of what this means for our understanding of sense of purpose across the lifespan.

Public Significance Statement
Sense of purpose (i.e., the extent to which one feels that one has personally meaningful goals and directions guiding one through life) is a robust predictor of healthy aging. However, the current study highlights that the measurement of this construct may become more complicated as people age, which has implications for predicting certain well-being and cognitive functioning outcomes in the older sample.

Keywords: sense of purpose, purpose in life, age-related psychometrics, local structural equation modeling, successful aging

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An unfortunate juxtaposition in the lifespan developmental literature is the robust evidence that sense of purpose promotes healthy aging, while also showing mean-level declines in the construct as individuals get older. Sense of purpose can be understood as the extent to which one feels that they have personally meaningful goals and directions guiding them through life (Ryff, 1989, 1995). People with a higher sense of purpose live happier (Irving et al., 2017; Kim, Sun, Park, Kubzansky, & Peterson, 2013; Pfund et al., 2022), healthier (Willroth et al., 2021; Windsor et al., 2015), wealthier (Hill et al., 2016), and longer lives (Boyle et al., 2009; Hill & Turiano, 2014), relative to their lower purpose peers. However, while this construct has illustrated its predictive value throughout the entirety of the adult

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Gabrielle N. Pfund https://orcid.org/0000-0003-2928-752X
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Correspondence concerning this article should be addressed to Gabrielle N. Pfund, Department of Medical Social Sciences, Northwestern University, 625 N. Michigan Avenue, Chicago, IL 60611, United States. Email: gabrielle.pfund@northwestern.edu

lifespan (Pfund & Lewis, 2020), sense of purpose also shows a curvilinear relationship with age, wherein it increases from young to middle adulthood, but begins to decline as individuals age (Hill & Weston, 2019; Mann et al., 2021). However, to understand why these declines may be occurring, we must first establish whether our current assessment of this construct is consistent across ages.

The goals of the current study were to investigate whether the most frequently used sense of purpose measure, the Purpose in Life subscale (Ryff, 1989), demonstrates measurement invariance across age using longitudinal data from the Health and Retirement Study (HRS, 2006–2012) and Midlife in the United States (MIDUS). Little work has considered item-level and structural invariance for this construct. It could be the case that how sense of purpose is understood may experience developmental shifts alongside these lifespan declines. If, across age, sense of purpose does not show measurement invariance (i.e., the number of factors, item factor loadings, intercepts, and residual differ based on age) or structural invariance (i.e., the factor structure for the measure differs based on age), this variance could have implications for prediction. The utilization of these large, longitudinal data sets allows for the conceptual replication of past research on purpose predicting well-being, subjective health, cognitive functioning, and financial outcomes when using a less age-confounded factor structure for purpose.

Potential Measurement Invariance Issues for Sense of Purpose

One concern for purpose measurement invariance is the disconnect between empirical and layperson conceptualizations of the construct. For example, qualitative research has found that older adults differ in whether they view having a sense of purpose in life as relevant in their older age (Lewis et al., 2022). Themes that emerged through these semistructured interviews included that some older adults stated that they no longer thought they had or needed a purpose in life and that they were passed a point in their lives in which they could feel purposeful due to uncertainties about their health and the future. When thinking of measurement invariance, Purpose in Life subscale items such as "I enjoy making plans for the future and working to make them a reality" and "I live 1 day at a time, and I don't think about the future" (Ryff, 1989) could be problematic. Given that sense of purpose is strongly associated with having a broader time horizon (Pfund et al., 2022), this focus on the future could present challenges in older adulthood where individuals may still be goal-directed but fail to consider events far in the future given life expectancy limitations.

Another potential concern for the measurement invariance of this measure across ages results when considering purpose within developmental theories. For instance, identity theory suggests that older adulthood yields a focus on whether one feels integrity (i.e., a sense of accomplishment) or despair (i.e., a sense of failure) when reflecting on the lives that they have lived (Erikson, 1950). For an older adulthood to feel integrity, they must look back upon their lives and feel that the goals they had were met. Thus, items that are supposed to reflect lower sense of purpose levels like, "I sometimes feel as if I've done all there is to do in life" (Ryff, 1989), may be problematic in interpretation later in life. If an older adult believes they achieved all that they intended, scoring higher on this item may be developmentally appropriate and desirable and could instead suggest a life led with purpose, counter to the negative valence intended for the item. Meanwhile, for a younger adult to receive a low score on this item would be more likely to signify mental health concerns. These possible inconsistencies across aging may suggest that the assumed structure of the Purpose in Life subscale could function differently depending on one's chronological age.

The suggestion that this Purpose in Life measure may exhibit differential item functioning (Hill & Weston, 2019) or measurement concerns (Springer et al., 2011; Springer & Hauser, 2006) is not new. Past research using three waves of data from HRS has found that there was not measurement invariance for factor loadings of items based on work status (e.g., recently retired, employed). For example, the item "I sometimes feel as if I've done all there is to do in life" loaded more weakly onto to purpose latent variable for individuals who had been working throughout the entire study relative to those who had been retired throughout the study, retired during the study, or who have never worked (Hill & Weston, 2019). Though this study focuses on measurement invariance issues with an age-related transition rather than aging itself, it provides an initial foundation for anticipated issues with the Purpose in Life subscale. While there has been research which has found measurement invariance issues for the Psychological Well-Being scale broadly (e.g., Li et al., 2015; Nahkur & Casas, 2021; Sirigatti et al., 2013; Springer & Hauser, 2006), no research to this point has fully considered measurement invariance across age for the Purpose in Life subscale specifically, to the best of our knowledge.

In evaluation measurement invariance across ages specifically, past work has been limited by analytic approaches that have been utilized. In particular, many complicate invariance tests by forcing categorical distinctions for continuous variables, such as chronological age. These approaches force arbitrary age categorizes that would assume everyone in a given age "group" would be more similar to each other than someone at the highest point of the younger group would be to the lowest point of the older. This issue can be resolved through the use of local structural equation modeling (LSEM), which allows researchers to examine changes in the measurement model across age as a continuous variable (see, e.g., Hildebrandt et al., 2009, 2016; Olaru & Allemand, 2022). Instead of allocating participants to age groups, LSEM can estimate parameters of a model at each year of age by using sampling weights, where the weighting of participants decreases as the differences between ages increase.

Potential Structural Invariance Issues for Sense of Purpose

Another benefit of this analytic approach is the ability to also evaluate structural invariance, as one can consider whether single- or multifactor solutions for a measure are similar across ages. Recent work provides multiple reasons to suggest that sense of purpose may not be a single factor across the lifespan. Specific to older adulthood, qualitative work has shown that some individuals may believe they have fulfilled their purpose in life (Dewitte et al., 2021), which may yield a separate factor for items reflective of doing "all there is to do in life," which is assumed to reflect lower sense of purpose. Additional measures for sense of purpose have been explicitly designed with multifactor structures (Bronk et al., 2018; Bundick et al., 2006), a point that maps onto work on meaning in life (Costin & Vignoles, 2020). As such, there are multiple theoretical and empirical reasons to suggest that a single factor may not fully describe having a sense of purpose in life, especially when considering lifespan development.

Moreover, discrepancies exist in the literature regarding whether to focus on the benefits of being purposeful or the detriments of feeling purposeless. For obvious reasons, frequently purposeful and purposeless are conceptualized as two ends of the same continuum. That said, since the foundational work of Frankl (1971), purposelessness has been readily recognized as a potential factor impacting suicidal ideation (e.g., Heisel & Flett, 2004) and an important factor for counselors to understand (e.g., Shmotkin & Eyal, 2003). Most empirical work though simply assesses purposelessness using the commonly employed sense of purpose measures. This separation of factors may also be connected to aging-related trajectories on cognition and emotion. The "positivity effect" has been found in older adults, which reflects performance difference in younger and older adults as tasks are connected to emotional versus nonemotional information (Carstensen & Mikels, 2005). In other words, due to older adults' propensity to prefer attending to positive stimuli (Reed & Carstensen, 2012), these factors may connect differently later on in the lifespan as older adults' focus on the positive aspects of this construct (i.e., purposefulness) and disengage from the negative (i.e., purposelessness), while the differentiation may be less apparent in younger adults.

Other developmental reasons exist for why feeling purposeful and purposeless may mean something different, particularly in older adulthood. One reason noted earlier is individuals later in life may view their purpose as already achieved (Dewitte et al., 2021); if so, feelings of purposelessness (such as "living 1 day at a time") may mean something qualitatively different from previously in the lifespan, and could be more readily distinguished from items reflecting daily life engagement. Indeed, for these reasons, past researchers have noted the importance of having a purpose that can never be accomplished (e.g., Damon et al., 2003), which could yield feelings of purposelessness in late life (Pfund & Lewis, 2020). A related possibility is inherent in past work suggesting that while sense of purpose may decline during older adulthood (e.g., Hill & Weston, 2019; Pinquart, 2002), mean levels for sense of meaning actually may be highest during this developmental period (Steger et al., 2009). These contradictory findings may reflect the fact that older adults have a greater potential for knowing what matters to them and makes their lives meaningful, without the need for continued goal-directed engagement or making plans for the long-term future. If so, again the seemingly "negative" items in sense of purpose inventories may mean something different later in life, for reasons similar to the discussion of Eriksonian integrity noted earlier.

Why Sense of Purpose Matters: Past Findings With a Single-Factor Solution

These concerns hold significant implications, given the burgeoning literature on sense of purpose over recent decades, and because the majority of this literature has simply assumed a single-factor solution. The measurement of this construct has been largely using the Purpose in Life subscale (Ryff, 1989), including in the two large panel samples of use in the current study, MIDUS and the HRS. The current study will utilize these samples to evaluate whether past findings replicate with respect to financial, cognitive, health, and well-being outcomes cross-sectionally and longitudinally when modeling this variable following the guidance of the model evaluation and measurement invariance tests.

Sense of purpose predicts well-being, physical health, cognitive functioning, and financial outcomes. For example, sense of purpose also has been associated with fewer depressive symptoms, greater positive affect, and lower negative affect in both MIDUS and HRS (Hartanto et al., 2020; Hill et al., 2018; Irani et al., 2022; Kim et al., 2022).

People with a higher sense of purpose are at a lower risk for earlier mortality (Boyle et al., 2009; Hill & Turiano, 2014). These findings are at least partially due to how people with a higher sense of purpose are at less risk for a wide range of health outcomes, such as risk for cardiovascular events (Cohen et al., 2016; Kim, Sun, Park, Kubzansky, & Peterson, 2013; Kim, Sun, Park, & Peterson, 2013), physical disability (Mota et al., 2016). These results also reflect past research with HRS and MIDUS, wherein higher sense of purpose is associated with better self-rated (i.e., subjective) health (Kim et al., 2022; Willroth et al., 2021).

Cognitive health also appears to be promoted by a higher sense of purpose. In MIDUS, people with a higher sense of purpose performed better on tests of memory, executive functioning, and overall cognition (Lewis et al., 2017), and sense of purpose held both cross-sectional and prospective associations with objective memory performance (Dewitte et al., 2021). Furthermore, in HRS, sense of purpose has been positively associated with overall cognition scores as well as slower cognitive decline for older adults (Kim et al., 2019). Finally, sense of purpose has also been connected financial outcomes. In HRS, past cross-sectional research found that people with a higher sense of purpose have greater physical, investment, and retirement assets, while also having less debt (Pfund & Hill, 2022), and past longitudinal research with MIDUS found that people with a higher sense of purpose had higher household income and net worth initially and that sense of purpose predicted the extent to which these financial variables increased longitudinally (Hill et al., 2016). In the current study, we will evaluate how sense of purpose predicts household income in both samples.

The Current Study

Utilizing data from the HRS and MIDUS, two large sample data sets that often have been the basis for purpose-related findings, the current study has two primary goals. First, we will examine the factor structure of the Purpose in Life subscale (Ryff, 1989) in these two samples using a combination of exploratory and confirmatory factor analysis. We will also examine the measurement invariance of the Purpose in Life subscale across continuous age using LSEM (Hildebrandt et al., 2016; Olaru et al., 2019). Second, we build from this point by considering the implications of the resulting factor structure, by considering any differences in predictive validity on two areas of subjective outcomes, well-being and self-reported health, and two areas of objective outcomes, cognitive functioning and finances. We will investigate these associations with the single-factor solution and an empirically derived multifactor solution both cross-sectionally (i.e., associations at the same measurement occasion) and prospectively (i.e., initial sense of purpose predicting the outcomes in a subsequent measurement occasion) in using two separate analytic approaches. This process will help us determine whether a less age-confounded factor structure for the Purpose in Life subscale (Ryff, 1989) has implications for past work on which outcomes sense of purpose predicts.

Method

In this study, we reanalyzed publicly available and anonymous data from two panel studies. The analyses were not preregistered

as they were either exploratory or were predictions being made for sense of purpose that have been previously analyzed using the current data sets.

Participants and Procedure

MIDUS

The first wave of data collection took place in 1995–1996 by the MacArthur Midlife Research Network with 7,000 participants with ages ranging from 25 to 74. Around 9 years later in 2005–2006, participants responded to an extensive self-report survey on their income, health, and well-being and partook in phone calls to assess their cognitive functioning. Nine years later during 2013–2014, these participants responded to the same self-report survey items and completed the same cognitive functioning tasks via telephone (see Song et al., 2021 for attrition information).

Our analytic sample came from the second (2005–2006) and third (2013–2014) measurement occasions for MIDUS, which will be referred to as Time 1 and Time 2 hereafter in the current study. These waves were included because participants during the second and third occasions completed a longer version of the Purpose in Life subscale, allowing better opportunity to investigate its factorial structure and used the same items that as were used in HRS. To be included in the current analyses, participants had to have responded to at least one of the items in the Purpose in Life subscale in the Time 1 survey. This resulted in 4,030 participants (sex: 55.4% female, 44.6% male; race: 91.5% White, 3.7% Black and/or African American, 1.5% Native American or Alaska Native, 1.0% Asian, <0.01% Native Hawaiian or Pacific Islander) who were on average 56.21 years old ($SD = 12.38$) at Time 1 and 64.09 years old ($SD = 11.40$) at Time 2. Participants also reported on their retirement status and marital status, with 27.2% (out of 3,000) participants being retired and 71.0% (out of 4,024) being married at Time 1. At Time 2, a total of 26.7% (out of 1,684) participants reported to be retired and 67.2% (out of 2,893) to be married.

HRS

The first wave of data collection took place in 1992 as a comprehensive study of older adults with more participants being added at each wave. Starting in 1998, participants were followed up every 4 years alongside another cohort for whom data collection began in 2000. In 2006, additional survey information about well-being was included for the first time in the Leave Behind Questionnaire, which was then included for the first time in the other cohort's survey in 2008. This survey was mailed to participants then mailed back to researchers following completion. Participants had the option for telephone calls and others were randomly assigned to face-to-face interviews (see Banks et al., 2011 for attrition information).

Our second sample utilized two waves from the two separate cohorts of the HRS (Juster & Suzman, 1995). The first measurement occasions came from 2006 and 2008, as those were the first waves in which the Ryff's (1989) Purpose in Life subscale was measured as part of the Psychosocial Leave Behind Questionnaire. Data were collected from two separate cohorts in 2006 and 2008; then these cohorts were followed up again 4 years later in 2010 and 2012. Cohorts were combined in the current study; thus, Time 1 will refer to the 2006 and 2008 waves for each cohort, and Time 2 will refer to the 2010 and 2012 waves for each cohort. To be included in the current analyses, participants had to have responded to at least one of the Purpose in Life subscales in the Time 1 survey. The 2006 cohort included 7,751 participants at Time 1 and 4,446 participants at Time 2, while the 2008 cohort included 6,910 participants at Time 1 and 4,134 participants at Time 2. This resulted in a total N of 14,481 (sex: 59.3% female, 40.7% male; race: 93.0% White, 5.8% Black and/or African American, 1.2% other) participants, who were on average 68.22 years old ($SD = 10.52$) at the first and 71.34 years old ($SD = 9.99$) at the second measurement occasion. Participants also reported on their retirement status and marital status, with 48.6% (out of 14,481) participants being retired and 63.5% (out of 7,143) being married at Time 1. At Time 2, a total of 56.9% (out of 12,087) participants reported to be retired and 60.5% (out of 5,804) to be married.

Measures

Sense of Purpose

In both MIDUS and HRS, sense of purpose was assessed with the seven-item Purpose in Life subscale (Ryff, 1989). In MIDUS, participants responded their agreement on 6-point Likert scale from 1 (*strongly disagree*) to 6 (*strongly agree*); participants in HRS responded to the same items on 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Example items included "I enjoy making plans for the future and working to make them a reality" (high purpose) and "My daily activities often seem trivial and unimportant to me" (low purpose; reverse scored). The four negative items were reverse-scored; thus, higher scores on any item represented a higher sense of purpose. All items can be found in Table 1.

Household Income

In the MIDUS sample, the household income variable represents the total household income based on wages, pension, social security, and other sources and was capped at $300,000 prior to the data being publicly shared. For HRS, RAND, a global nonprofit institution focused on improving policy via empirically informed analyses, calculated and imputed missing values for household income using cross-wave information and the asset verification section of HRS (see Hurd et al., 2016 for more information on this process). Household income was represented as total income for the previous calendar year and was calculated as a summed total of both the respondents and spouses' earnings from their occupations, pensions, annuities, social security disability, social security retirement, unemployment and workers compensation, other government income, household income, and other income (Bugliari et al., 2019).

Cognitive Functioning

Participants in MIDUS participated in two different cognitive tasks via telephone calls via the Brief Test of Adult Cognition by Telephone and the Stop and Go Switch Task (Lachman & Tun, 2008; Tun & Lachman, 2006, 2008). These tasks were used to compute scores for both episodic memory and executive functioning (see Karlamangla et al., 2014 for review in MIDUS), and higher scores represented better cognitive functioning for a given variable. Participants in HRS participated in two separate cognitive tasks that reflected total word recall and mental status. Values were imputed for approximately 1% of the sample at each wave for

Table 1

Purpose in Life Subscale (Ryff, 1989) Items, Factor Loadings, and Reliability of the One- and Two-Factor Model in the MIDUS and HRS Samples

Item	MIDUS			HRS		
	One factor	Purposeful	Purposeless	One factor	Purposeful	Purposeless
1. I enjoy making plans for the future and working to make them a reality.	.68/.69	.72/.72	.01/—	.60/.60	.66/.70	.04/—
2. My daily activities often seem trivial and unimportant to me. (R)	.58/.58	.01/—	.66/.64	.52/.52	.04/—	.55/.58
3. I am an active person in carrying out the plans I set for myself.	.60/.60	.70/.63	−.05/—	.58/.58	.77/.70	−.06/—
4. I don't have a good sense of what it is I'm trying to accomplish in life. (R)	.66/.66	.16/—	.58/.74	.56/.56	.05/—	.61/.65
5. I sometimes feel as if I've done all there is to do in life. (R)	.27/.27	−.14/—	.46/.31	.53/.53	−.05/—	.69/.64
6. I live life 1 day at a time and don't really think about the future. (R)	.15/.15	−.13/—	.31/.19	.44/.44	.01/—	.50/.64
7. I have a sense of direction and purpose in my life.	.72/.72	.55/.73	.20/—	.59/.60	.56/.64	.11/—
Reliability (α/ω)	.70/.68	.73/.73	.54/.51	.74/.74	.72/.72	.68/.69

Note. Factor loadings for the exploratory factor analysis are on the left, and factor loadings for the confirmatory factor analysis are on the right in each column. Dashes indicate that a particular item is not being included for a factor. R = reverse scored; MIDUS = Midlife in the United States; HRS = Health and Retirement Study; α/ω = Cronbach's alpha/McDonald's omega (based on the confirmatory factor analysis).

immediate recall and 3% for total recall (see McCammon et al., 2019 for imputation and variable information). Total word recall is the sum of immediate and delayed recall on a list from a 10-item word list, meaning scores could range from 0 to 20 with higher scores representing great recall. Mental status is a composite of performance on a variety of tasks (e.g., serial 7 s, backward counting from 20, object naming, president naming), with scores ranging from 0 to 15 and higher scores representing better performance.

Self-Reported Health

In MIDUS, participants were asked separately about their physical health and mental health, each on a 5-point Likert scale. These items were: "In general, would you say your physical health is excellent, very good, good, fair, or poor?" and "What about your mental or emotional health? (Would you say your mental or emotional health is excellent, very good, good, fair, or poor?)." In HRS, participants were asked about their health broadly on a 5-point Likert scale with the item: "Would you say your health is excellent, very good, good, fair, or poor?" All three items were reverse-scored, so a higher score represented better subjective health.

Well-Being

Well-being was assessed with four separately analyzed variables for both samples: life satisfaction, positive affect, negative affect, and depressive symptoms. For life satisfaction, both MIDUS and HRS used the Satisfaction with Life Scale (Diener et al., 1985), where participants responded on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*) (see Footnote 1). To assess both positive affect and negative affect, MIDUS used the 20 item Positive and Negative Affect Schedule (PANAS) on how frequently participants felt certain emotions in the past 30 days on a 5-point Likert scale from 1 (*all the time*) to 5 (*none of the time*); items were reverse-scored so higher scores represent more frequently experiences of those emotions. In HRS, 2008–2012 surveys all included the same PANAS measure and Likert scale to assess both positive and negative affect. However, while the 2006 participants used the same response scale and 30-day window upon which to reflect, they responded to different emotions items (e.g., "restless or fidgety" for negative affect; "extremely happy" for positive affect). Finally, depressive symptomology was assessed in both samples with the nine-item Center for Epidemiological Studies Depression Scale (CESD-9). Participants marked whether they had experienced a depression-related symptom in the past week, such as "You felt depressed" or "You felt that everything you did was an effort." Higher scores represented greater depressive symptomology.

Analytic Plan

Measurement Model and Model Evaluation

After reverse scoring the four negatively valenced sense of purpose items, we examined the factor structure of the Purpose in Life subscale using exploratory factor analysis (EFA) with the *psych* (Revelle, 2020) and *EFAtools* (Steiner & Grieder, 2020) package in R. We used *maximum likelihood* extraction and *oblimin* rotation for oblique factors. To determine the number of factors, we used a combination of parallel analysis, the empirical Kaiser criterion, and sequential chi-square model tests based on recommendations in the literature (Auerswald & Moshagen, 2019). We then tested a one-factor solution and other competing models suggested by the EFA in confirmatory factor analysis with the *lavaan* package (Rosseel, 2012) in R. Factor loadings and item intercepts of the first item of each factor were constrained to 1 and 0, respectively (i.e., marker variable scaling). We used full-information maximum likelihood estimation to account for missing data. We evaluated overall model fit with a combination of the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR) based on common standards (acceptable/good fit: CFI $\geq$ .90/.95; RMSEA $\leq$ .08/.06; SRMR $\leq$ .08/.06; Bentler, 1990; Hu & Bentler, 1999).

LSEM

To examine the factor structure across age, we used LSEM (Hildebrandt et al., 2009, 2016; Olaru & Allemand, 2022; Olaru et al., 2019). LSEM is a nonparametric approach for examining moderation effects (e.g., age) on model parameters of a structural equation model (SEM). In contrast to multigroup approaches, it does not require the creation of artificial age groups and instead uses a sample weighting approach to achieve sufficient sample size and power for a model estimation at each year of age. For each model (i.e., each year of age), participants are weighted based on their distance to the target age

range, with much younger or much older participants receiving much smaller weights than participants closer to the target age, which receive smaller weights than participants with the target age. These weights follow a symmetrical Gaussian function with a maximum of 1 at the target age (for an illustration, see Olaru et al., 2019). Because of this sample weighting approach, LSEM does not require the removal of participants in smaller age groups, as for example in multigroup approaches with fixed age spans (e.g., groups for every decade of age). The breadth of the weighting function (i.e., weight given to participants not at the target age point) is based on the overall sample size and standard deviation of the moderator (i.e., age in this case; see Hildebrandt et al., 2009, 2016). As such, it can also be used on smaller samples, in which it will include a broader range of participants to ensure a high enough sample size for the model estimation (e.g., $N = 300$ in Hildebrandt et al., 2016).

We used LSEM to estimate the models in MIDUS from 35 to 80 years of age in the MIDUS data set, and 50–85 years of age in the HRS data. This refers to the targeted mean age for the weighted samples, but because of the symmetrical LSEM weighting function younger and older are still included in the model estimation. We chose these age ranges as more extreme values resulted in samples that did not provide robust parameter estimation (i.e., too large confidence intervals) and were skewed toward the middle of the age distribution (i.e., as the number of participants between 80 and 90 years of age is much higher than between 90 and 100 years, the weighting function would overrepresent younger participants; for an illustration, see Olaru et al., 2019). We used a bandwidth value of $h = 2$ for the weighting function, which was recommended in previous studies (Hildebrandt et al., 2009). LSEM was run with the *lsem.estimate* function in the R package *sirt* (Robitzsch, 2019). For MIDUS, the weighted sample sizes used for the model estimation ranged from Nw = 498.0 at age 35 to Nw = 403.5 at age 80 with a peak of Nw = 1,288.7 at age 53. For HRS, the weighted sample sizes ranged from Nw = 1,051.5 at age 50 to Nw = 1,400.1 at age 85 with a peak of Nw = 4,024.1 at age 69.

Measurement Invariance Across Age

To test for measurement invariance across age in LSEM, we used the *joint estimation* function in *lsem.estimate* (Robitzsch, 2019). LSEM estimates each model separately by default, whereas the joint estimation approach maximizes a common likelihood function and estimates the model across all age points simultaneously. This approach allows for parameter equality constraints and the estimation of global fit indices (instead of model fit for each year of age model) similar to multigroup confirmatory factor analysis. To test for measurement invariance across age, we compared model fit of (a) a model without parameter constraints (i.e., configural invariance), to (b) a model with factor loadings constrained to equality across age (i.e., metric invariance), to (c) a model with additionally constrained item intercepts across age (i.e., scalar measurement invariance), and to (d) a model with additionally constrained item residuals across age (i.e., strict measurement invariance). Measurement invariance is hierarchical in nature: being able to achieve scalar measurement invariance is dependent upon achieving metric invariance, which is dependent upon achieving configural invariance. Meeting metric invariance would indicate that the association between the purpose factor and each item remains stable across age. Scalar invariance would indicate that the age differences in all items means can be explained by age differences in the underlying purpose factor. And finally, strict measurement invariance would indicate that the item residual variance (i.e., the variance of each item not explained by the purpose factor) would be comparable across age. Measurement invariance was tested by evaluating the increase in model misfit between nested models based on a cutoff of $\Delta CFI = -.010$, $\Delta RMSEA = .015$, and $\Delta SRMR = .030/.015$ (metric/scalar measurement invariance; Chen, 2007; Cheung & Rensvold, 2002). If a change in fit was greater than these cutoffs, then measurement invariance would not be supported.

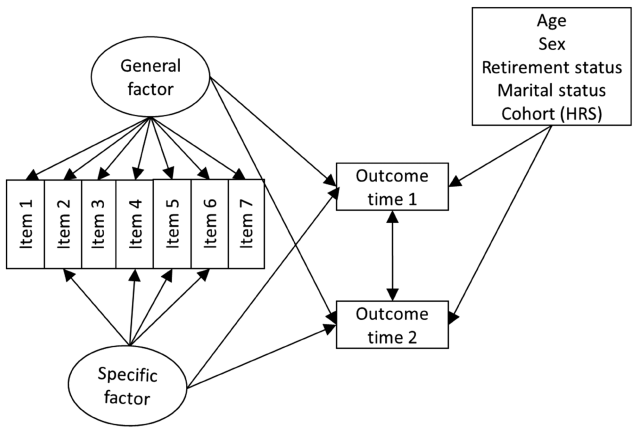
Prediction of Outcomes

We examined the association between the sense of purpose and the financial, cognitive, well-being, and physical health outcomes at the same and subsequent measurement occasions. We controlled for age, sex, retirement status, marital status, and cohort (specifically HRS) in all models (for associations with no control variables, or only age and sex as control variables, see Tables S7–S12 in the supplemental materials, which are available on the Open Science Framework [OSF] page https://osf.io/rh2df/). For factor structures with more than one factor, we examined each factor as a separate predictor to compare the magnitudes of the standardized effects. To examine whether additional factors would explain additional variance, we also used a bifactor model in which one factor was specified as the reference or general factor loading on all items, and additional factors loaded only on the corresponding items (i.e., specific factor; see S-1 bifactor model; Eid et al., 2017). This would allow us to identify the unique contribution of subfactors beyond a general purpose factor. An example of the bifactor model is illustrated in Figure 1.

The outcomes for MIDUS were total household income (including wages, pension, social security), episodic memory, executive functioning, self-reported physical and mental health, life satisfaction, positive affect, negative affect, and depressive symptoms. The HRS sample included the same outcomes with the exception of self-reported mental health, which was not assessed in the HRS study, and the cognitive functioning variables word recall and mental status.

Figure 1

Bifactor Model Used for Prediction



Note. HRS = Health and Retirement Study.

Data, Materials, and Code

All analyses were run in R Version 4.0.4 (R Core Team, 2021) with the packages *EFAtools* (Steiner & Grieder, 2020), *haven* (Wickham & Miller, 2020), *lavaan* (Rosseel, 2012), *psych* (Revelle, 2020), and *sirt* (Robitzsch, 2020). Analytic scripts and supplemental tables are available in an OSF repository (Pfund, Olaru, et al., 2023; https://osf.io/rh2df/). We used freely available panel data for this study, which can be downloaded free of charge from the corresponding MIDUS (https://www.icpsr.umich.edu/web/ICPSR/series/203) and HRS (https://hrs.isr.umich.edu/data-products) panel sites.

Results

Factor Structure

First, we examined the factor structure in the full data sets. Traditional parallel analysis and the empirical Kaiser–Guttman criterion suggested a two-factor solution in both data sets and both measurement occasions, whereas the sequential chi-square model test supported a three-factor solution in both samples. However, the three-factor solution yielded an inadequate third factor, represented by only two items with weak main loadings in MIDUS and no main loading in HRS. Because of this problematic factor structure, we focused on a one- and two-factor solution in the following analyses. Reliability, factor correlations, and factor loadings for the one- and two-factor solutions (EFA and confirmatory factor analysis) at the first measurement occasions can be found in Table 1 (see Table S1 in the supplemental materials, which is available on the OSF page https://osf.io/rh2df/ for the second measurement occasions). The results were nearly identical across the two measurement occasions of the same data set (see Table S1 in the supplemental materials, which is available on the OSF page https://osf.io/rh2df/). We also found support for strict measurement invariance across the two measurement occasions (see Table S2 in the supplemental materials, which is available on the OSF page https://osf.io/rh2df/). As such, we will focus on the first measurement occasions in the following. The factor loadings of the one-factor solution were adequate for the HRS sample, but below $\lambda < .30$ for Items 5 and 6 in the MIDUS sample. The factor loading pattern for the two-factor solution was similar across both samples, with all positively keyed items loading on the first factor (*purposeful* factor) and all reverse-scored negatively keyed items loading on the second factor (*purposeless* factor). In other words, high scores on the purposeful factor represent a higher sense of purpose and high scores on the purposeless factor represent a lower sense of purposelessness.

Given the separation based on positively and negatively keyed items, we also evaluated the factor structure when accounting for acquiescence bias. One approach to do so is to compute a mean score across scales with a balanced number of positive and negatively coded items (without reverse coding). However, this was only possible for MIDUS, in which the other 36 items from the Psychological Well-being Scale (Ryff, 1989) provided a balanced and sufficient number of positively and negatively coded items (no such inventory was available in HRS). We regressed the participants' mean scores across these 36 items onto all the sense of purpose items and used the residuals for the subsequent analyses. Results for the one- and two-factor structure in MIDUS after controlling for acquiescence bias can be found in Table S4 in the supplemental materials, which is available on the OSF page https://osf.io/rh2df/. Similar to the unresidualized data, the first four items split into a positive and negative factor when extracting two factors. Items 5 ("I sometimes feel as if I've done all there is to do in life") and 6 ("I live life 1 day at a time and don't really think about the future") did not load on any factor well. Apart from this, the main discrepancy to the unresidualized data were that Item 7 ("I have a sense of direction and purpose in my life") loaded on the purposeless factor at the first measurement occasion, but the purposeful factor at the second one. However, because this factor structure mostly resembled the original one, and it was not possible to control for acquiescence in HRS, we used the unresidualized data in the following.

Model Fit and Measurement Invariance

Model fit of the measurement models in the full sample and with measurement invariance constraints across age (LSEM) are presented in Table 2. The one-factor models yielded inadequate fit in both samples, as well as under configural measurement invariance constraints (i.e., RMSEA $> .08$) in the LSEM joint estimation. The two-factor model fitted the data well and achieved strict measurement invariance in the HRS sample. In this sample, factor loadings, item intercepts, and item residuals were stable across age (see Figure 2). In the younger, more age-heterogeneous MIDUS sample, only metric invariance was achieved. This suggests that the age-related mean-level differences in the items are not explained by the common factors. This issue seemed to be caused by Items 5 ("I sometimes feel as if I've done all there is to do in life") and 6 ("I live life 1 day at a time and don't really think about the future"), which showed stronger decreases across age compared to the other items of the scale (see Figure 2). Freeing these item intercepts increased the CFI to .953, which was nearly on par to the metric model (CFI = .955).

We used LSEM to test for measurement invariance across a continuous age variable, but also checked if we would find the same results using a more traditional multigroup approach across decades of age (e.g., 30–39; 40–49). The results (see Table S3 in the supplemental materials, which is available on the OSF page https://osf.io/rh2df/) generally aligned with the ones presented here, suggesting bad fit of the one-factor models, and issues with the equality of item intercepts across age (i.e., scalar measurement invariance: MIDUS: ΔCFI = −.46; but also HRS to a lesser degree: ΔCFI = −.12).

We also tested for measurement invariance across the two samples (i.e., HRS and MIDUS). To ensure that a lack of measurement invariance would not be caused by the large age differences between the two samples, we did so for both the unmodified items and for the item residuals after controlling for curvilinear age differences (by including standardized age and squared standardized age as predictors). The latter approach should eliminate age differences in the item responses between the samples. Results are presented in Table S5 in the supplemental materials, which is available on the OSF page https://osf.io/rh2df/. The results did not differ between the residualized and nonresidualized items. In both cases, the two-factor model showed substantially better fit than the one-factor model (e.g., CFI = .961 vs. 831; RMSEA = .061 vs. .131; SRMR = .027 vs. .063). However, metric measurement invariance was not reached across the two samples for any of the models. As such, the findings are not directly comparable between the two samples but can still be compared within samples across age (see Table 2).

We then examined if the two factors had differential associations with age. In the MIDUS data, the purposeful and purposeless factor

Table 2
Model Fit Statistics in the MIDUS and HRS Samples for One-Factor and Two-Factor Sense of Purpose and Measurement Invariance Across Age for Two-Factor Sense of Purpose

No. of factors and MI level	MIDUS					HRS				
	df	χ^2	CFI	RMSEA	SRMR	*df*	χ^2	CFI	RMSEA	SRMR
Structural equation modeling										
One factor	14	553.6	.906	.098	.047	14	3,985.1	.801	.140	.070
Two factor	13	314.7	.947	.076	.036	13	590.5	.971	.055	.025
Local structural equation modeling										
One factor										
Configural			.921	.090	.042			.814	.135	.067
Metric			.919	.076	.048			.812	.114	.069
Scalar			.876	.083	.062			.800	.103	.071
Strict			.839	.084	.076			.788	.095	.075
Two factor										
Configural			.958	.068	.032			.975	.052	.024
Metric			.955	.060	.039			.973	.046	.028
Scalar			.920	.071	.051			.968	.044	.030
Strict			.892	.072	.066			.961	.042	.033

Note. Degrees of freedom (*df*) and chi-square values for the local structural equation modeling joint estimation are inflated due to treating each year of age and the weighted samples as an independent group and are thus not reported. The other fit indices should be unaffected by the sample size, as well as the CFI differences between nested models. MIDUS = Midlife in the United States; HRS = Health and Retirement Study; CFI = comparative fit index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual; configural = no additional constraints across time or age; metric = factor loading equality constraints across age; scalar = factor loading and item intercept equality constraints across age; strict = factor loading, item intercept and item residual equality constraints across age; MI = measurement invariance.

correlated by $r = .10$ ($p < .001$) and $r = -.06$ ($p = .010$) with age, respectively. In the HRS data, the purposeful and purposeless factor correlated by $r = -.08$ ($p < .001$) and $r = -.20$ ($p < .001$) with age, respectively. As the purposeless factor was reverse-scored, these findings suggest that, in MIDUS, higher age is associated with both more purposefulness and purposelessness. Meanwhile, in HRS, higher age was associated with less purposefulness and more purposelessness. In both cases, the correlations differed significantly from each other ($p < .001$; tested by estimating the difference between the parameters in the model and using bootstrapping for the standard errors). To further investigate whether the differences in model fit between the MIDUS and HRS samples were age-related, we examined the model fit and factor correlations of the one- and two-factor[1] model across age using the default LSEM approach (i.e., estimating the model separately at each year of age). The findings are presented in Figure 3. Model fit of the one-factor model decreased with age in both the MIDUS (CFI = .929–.807; RMSEA = .088–.124; SRMR = .037–.065) and HRS sample (CFI = .875–.708; RMSEA = .120–.161; SRMR = .057–.086), in particular for samples older than 60 years of age. In contrast, model fit of the two-factor model was relatively stable across age in the MIDUS (CFI = .912–.969; RMSEA = .057–.105; SRMR = .027–.043) and HRS sample (CFI = .957–.978; RMSEA = .048–.064; SRMR = .021–.029). Model fit in the MIDUS sample around the age of 60–70 years was similar to the HRS fit, but decreased slightly around the age extremes, which might be attributed to the smaller sample size at the borders of the age distribution affecting the model fit indices (see, e.g., Iacobucci, 2010; Jackson, 2003). However, because the model fit at the low age extreme was still considerably better than at the high age extreme despite similar sample sizes, the model fit patterns seem to be primarily attributable to age differences.

As shown in Figure 3, both the MIDUS and HRS sample showed an approximately linear decrease in the correlation between the two factors from $r = .89$ at age 40 to .62 at age 80 (MIDUS; $p < .001$) and .68 at age 50 to .45 at age 85 (HRS; $p = .001$). The changes in these factor correlations suggest that the purposeful and purposeless factors became less associated with each other as age increased. We furthermore examined whether the reliability ω for the one- and two-factor model differed across age. Reliability for the composite factor (CP) decreased from .76 to .65 across age in MIDUS ($p < .001$), and .77–.71 in HRS ($p < .001$). In the two-factor model, the purposeful factor reliability decreased from .75 to .67 ($p = .018$; MIDUS) and .77 to .70 ($p = .002$; HRS). In contrast, the purposeless factor reliability was stable across age.

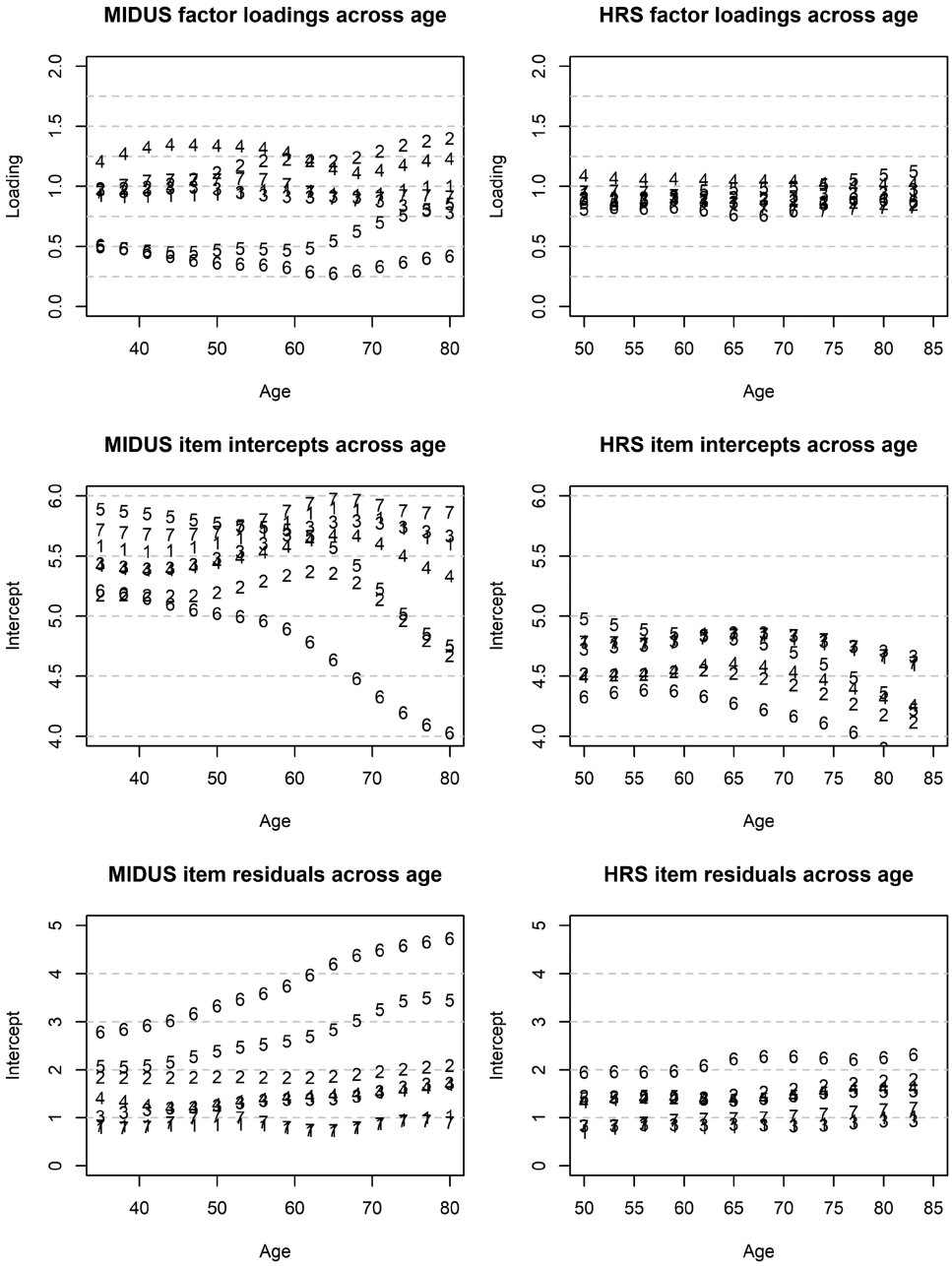
Prediction of Outcomes

We next examined whether the prediction of relevant life outcomes was dependent on whether the full scale (i.e., *composite*), only the positive (i.e., *purposeful*), or only the negative (i.e., *purposeless*) items was used. We regressed the purpose factors on each outcome and controlled for age, sex, marital status, and retirement status for both samples as well as cohort for the HRS. Means, standard deviations, sample sizes, and correlations between the purpose variables and outcomes of interest can be found in Table S6 for MIDUS and Table S7 for HRS in the supplemental materials, which are available on the OSF page https://osf.io/rh2df/. The standardized effect sizes are presented in the forest plots in Figures 4 (MIDUS) and 5 (HRS; see Tables S8 and S9 in the supplemental materials, which are available

[1] Model fit across age of the bifactor model was similar to the two-factor model. We thus did not present it here.

Figure 2

Factor Loadings, Item Intercepts, and Residuals Across Age



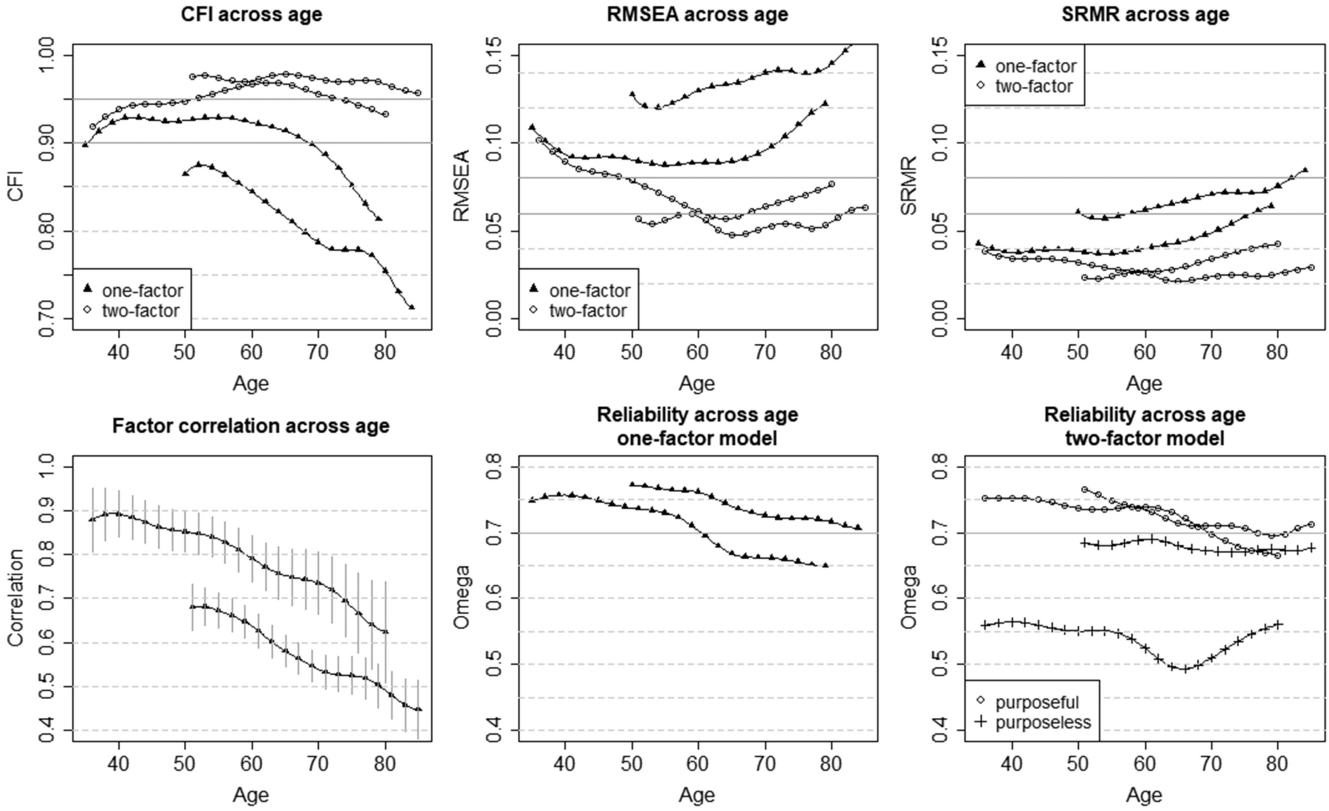
Note. Presented are the model parameters for the two-factor model estimated with local structural equation modeling across age. To estimate the parameters of interest freely (i.e., to not constrain the first factor loading to 1), factors variances and means were constrained to 1 and 0, respectively. Numbers indicate the original item number. MIDUS = Midlife in the United States; HRS = Health and Retirement Study.

on the OSF page https://osf.io/rh2df/ for exact values; see Tables S10–S13 in the supplemental materials, which are available on the OSF page https://osf.io/rh2df/ for associations without the inclusion of these covariates as well as the models in which only age and sex were included as covariates). Estimates are reported with 95% confidence intervals [in brackets]. If there is no overlap between 95% confidence intervals for estimates of the same outcome, that would indicate a significant difference in the strength of the effect sizes at approximately the $p < .01$ level (Payton et al., 2003).

For the MIDUS sample, the *composite*, *purposeful* factor, and *purposeless* factor predicted each of the outcomes when accounting for age, sex, marital status, and retirement status. Notably, the confidence intervals for prediction of nearly all outcomes overlapped across the purposeful and purposeless factor, so these findings will

Figure 3

Model Fit Statistics and Factor Correlations Across Age for Both Samples



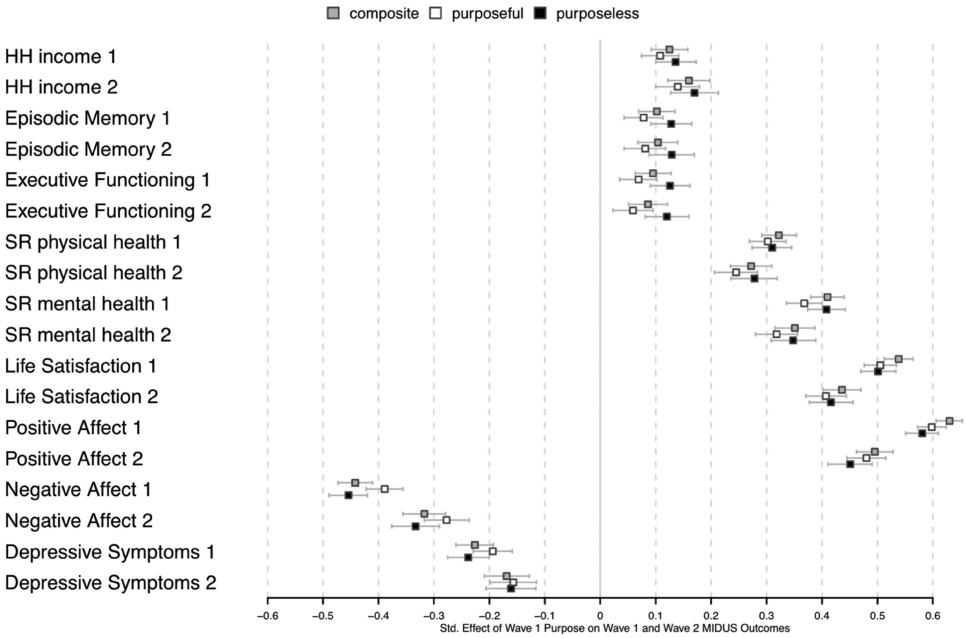
Note. The longer lines represent estimates in the MIDUS sample, the shorter lines in the HRS sample. Vertical lines for the correlations represent the 95% confidence interval. MIDUS = Midlife in the United States; HRS = Health and Retirement Study; CFI = comparative fit index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual.

be discussed based on the composite. For those with a higher sense of purpose, they reported a higher income cross-sectionally (β = .13 [.09, .16]) and longitudinally (β = .16 [.12, .20]). People with a higher sense of purpose also reported better cognitive functioning, scoring higher in episodic memory and cognitive functioning both cross-sectionally (both β = .10 [.07, .14]) and longitudinally (β = .10 [.07, .14] and .09 [.05, .12]). Regarding self-reported physical health, people with a higher sense of purpose perceived their physical and mental health to be superior at both time points (Time 1: β = .32 [.29, .35] and .41 [.38, .44]; Time 2: physical β = .27 [.24, .32] and β = .35 [.32, .39]). Finally, for well-being outcomes, people with a higher sense of purpose reported greater life satisfaction and positive affect (Time 1: β = .54 [.51, .56] and .63 [.61, .65]; Time 2: β = .44 [.40, .47] and .50 [.46, .53]), as well as less negative affect and fewer depressive symptoms both cross-sectionally and longitudinally (Time 1: β = −.44 [−.47, −.41] and −.23 [−.26, −.19]; Time 2: β = −.32 [−.36, −.28] and −.17 [−.21, −.13]). All associations were significant at the $p < .001$ level, with the exception of the purposeful factor and executive functioning at Time 2 ($p = .002$).

The results for these predictions in the HRS sample were a bit more complex across the purpose composite, purposeful factor, and purposeless factor. As with the MIDUS sample, sense of purpose predicted higher household income, cognitive functioning, self-reported health, and well-being both cross-sectionally and longitudinally (see Figure 5; all $ps < .001$). However, the 95% confidence intervals between the purposeful (in the following referred to as PF) and purposeless (PL) factors did not overlap with respect to at least one time point for all outcomes, except for household income and self-reported health. The directions of these effects were consistent across measures, but the magnitudes varied in some cases between outcomes. More specifically, the purposeful factor was a stronger predictor of life satisfaction (Time 1: $\beta_{PF} = .42$ [.41, .44] vs. $\beta_{PL} = .31$ [.30, .33]; Time 2: $\beta_{PF} = .34$ [.32, .36] vs. $\beta_{PL} = .29$ [.27, .31]) and positive affect (Time 1: $\beta_{PF} = .35$ [.33, .36] vs. $\beta_{PL} = .31$ [.29, .32]; overlap at Time 2). In contrast, the purposeless factor was a significantly stronger predictor of word recall (Time 1: $\beta_{PF} = .11$ [.09, .14] vs. $\beta_{PL} = .19$ [.16, .22]; Time 2: $\beta_{PF} = .08$ [.06, .11] vs. $\beta_{PL} = .19$ [.16, .21]), mental status (overlap at Time 1; Time 2: $\beta_{PF} = .09$ [.05, .13] vs. $\beta_{PL} = .23$ [.19, .27]), negative affect (overlap at Time 1; Time 2: $\beta_{PF} = -.30$ [−.28, −.32] vs. $\beta_{PL} = -.35$ [−.33, −.37]), and depressive symptoms (Time 1: $\beta_{PF} = -.35$ [−.34, −.37] vs. $\beta_{PL} = -.38$ [−.36, −.40]; overlap at Time 2). The CP containing all items generally showed at least the same magnitude of outcome associations as the subfactors with the stronger association (i.e., overlapping confidence intervals). In two cases, the composite was an even better predictor than the individual factors: positive affect at Time 2 ($\beta_{CP} = .55$ [.54, .57] vs. $\beta_{PF} = .47$ [.45, .49] vs. $\beta_{PL} = .48$ [.46, .50]) and depressive

Figure 4

Sense of Purpose Composite, Purposeful Factor, and Purposeless Factor for Financial, Cognitive, Health, and Well-Being Predictions at Wave 1 and Wave 2 Controlling for Retirement Status, Marital Status, Age, and Sex for MIDUS Sample



Note. MIDUS = Midlife in the United States; HH = household; SR = self-reported; Std. = standardized.

symptoms at Time 1 ($\beta_{CP} = -.43$ [−.41, −.45] vs. $\beta_{PF} = -.35$ [−.34, −.37] vs. $\beta_{PL} = -.38$ [−.36, −.40]).

Bifactor Model Prediction

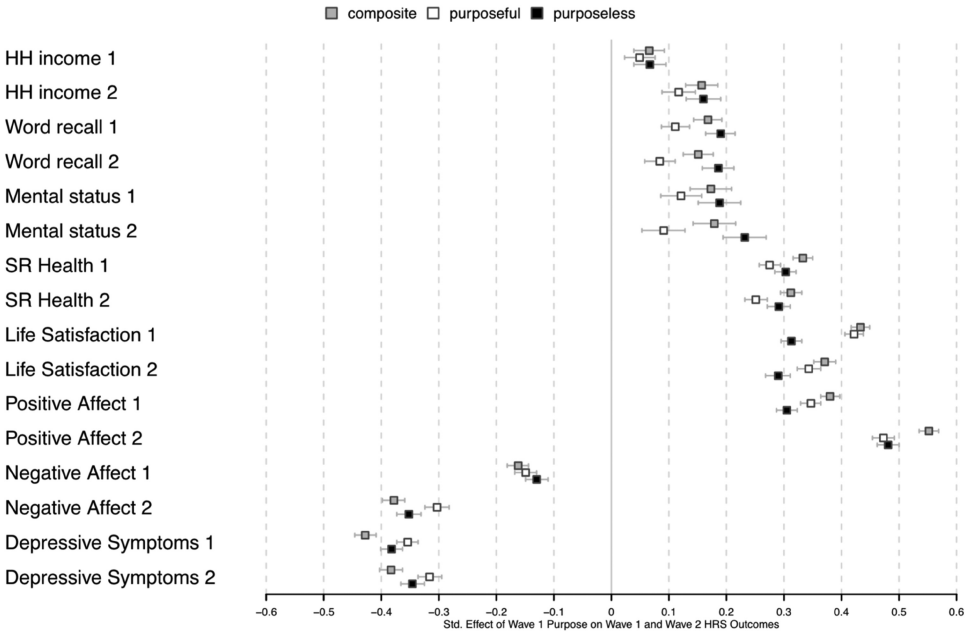
To better disentangle the prediction of the outcomes by the general sense of purpose variance common to both factors and the unique variance of the negatively keyed *purposeless* items, we used a bifactor model in which the general *purposeful* (PG) factor loaded on all items, and a specific *purposeless* factor loaded onto only the negative items (PN). In other words, the general factor contained the shared variance and the unique variance for the positively keyed items. The two factors were uncorrelated, so that the specific factor only represents the unique variance common to the negatively keyed items. Model fit of the bifactor model was acceptable in both samples (MIDUS: CFI = .961, RMSEA = .075, SRMR = .027; HRS: CFI = .974, RMSEA = .060, SRMR = .023). The regression coefficients of the two factors on the outcomes are presented in Tables S14 (MIDUS) and S15 (HRS) in the supplemental materials, which are available on the OSF page https://osf.io/rh2df/ and a visualization of these findings can be found in Figures 6 (MIDUS) and 7 (HRS).

Relative to the previous models in which the purposeful and purposeless factors were correlated, the differences between the two factors were much larger in the bifactor model. For MIDUS, the negative factor was a stronger predictor for episodic memory (Time 1: $\beta_{PG} = .07$ [.04, .11] vs. $\beta_{PN} = .16$ [.11, .21]; Time 2: $\beta_{PG} = .07$ [.04, .11] vs. $\beta_{PN} = .19$ [.13, .23]) and executive functioning both cross-sectionally and longitudinally (Time 1: $\beta_{PG} = .05$ [.01, .08] vs. $\beta_{PN} = .28$ [.23, .33]; Time 2: $\beta_{PG} = .04$ [.01, .08] vs. $\beta_{PN} = .26$ [.20, .32]). Meanwhile, the general purpose factor was a better predictor for self-reported mental health (Time 1: $\beta_{PG} = .39$ [.36, .42] vs. $\beta_{PN} = .16$ [.11, .21]; Time 2: $\beta_{PG} = .33$ [.29, .37] vs. $\beta_{PN} = .14$ [.07, .20]), life satisfaction (Time 1: $\beta_{PG} = .53$ [.50, .56] vs. $\beta_{PN} = .07$ [.02, .12]; Time 2: $\beta_{PG} = .41$ [.38, .45] vs. $\beta_{PN} = .16$ [.10, .22]), positive affect (Time 1: $\beta_{PG} = .63$ [.61, .66] vs. $\beta_{PN} = .04$ [−.12, .09]; Time 2: $\beta_{PG} = .41$ [.38, .45] vs. $\beta_{PN} = .16$ [.10, .22]), negative affect (Time 1: $\beta_{PG} = -.43$ [−.46, −.39] vs. $\beta_{PN} = -.12$ [−.17, −.06]; Time 2: $\beta_{PG} = -.30$ [−.34, −.26] vs. $\beta_{PN} = -.10$ [−.16, −.03]), and depressive symptoms (Time 1: $\beta_{PG} = -.22$ [−.25, −.18] vs. $\beta_{PN} = -.07$ [−.12, −.02]; Time 2: $\beta_{PG} = -.16$ [−.21, −.12] vs. $\beta_{PN} = -.03$ [−.10, .03]) at both Time 1 and Time 2. Based on the preset alpha level, the negative factor was not a predictor for Time 1 positive affect or Time 1 and Time 2 depressive symptoms, and the general factor did not predict Time 2 executive functioning ($p > .010$). For self-reported physical health, the general factor was a better predictor at Time 1 but there were no differences for Time 2 (Time 1: $\beta_{PG} = .30$ [.26, .33] vs. $\beta_{PN} = .18$ [.13, .23]; Time 2: $\beta_{PG} = .24$ [.20, .28] vs. $\beta_{PN} = .20$ [.14, .26]). Finally, there were no differences in effect sizes for household income at Time 1 or Time 2 in the MIDUS sample (Time 1: $\beta_{PG} = .10$ [.06, .13] vs. $\beta_{PN} = .16$ [.11, .21]; Time 2: $\beta_{PG} = .13$ [.09, .17] vs. $\beta_{PN} = .18$ [.12, .24]). In summary, the specific negative item factor was a stronger predictor of cognitive ability, whereas the general factor was a superior predictor of all other outcomes except for income—for which both factors were comparatively strong predictors.

The general and negative factors also demonstrated differences in prediction strengths for HRS. The negative factor was only a stronger

Figure 5

Sense of Purpose Composite, Purposeful Factor, and Purposeless Factor for Financial, Cognitive, Health, and Well-Being Predictions at Wave 1 and Wave 2 Controlling for Retirement Status, Marital Status, Age, and Sex for HRS Sample



Note. HRS = Health and Retirement Study; HH = household; SR = self-reported; Std. = standardized.

predictor for Time 2 word recall and Time 2 mental status (word recall: $\beta_{PG} = .09$ [.06, .11] vs. $\beta_{PN} = .16$ [.14, .19]; mental status: $\beta_{PG} = .09$ [.05, .13] vs. $\beta_{PN} = .22$ [.18, .26]), but neither of the Time 1 variables (word recall: $\beta_{PG} = .11$ [.09, .14] vs. $\beta_{PN} = .16$ [.13, .19]; mental status: $\beta_{PG} = .12$ [.09, .16] vs. $\beta_{PN} = .15$ [.11, .19]). The general purpose factor was a stronger predictor for self-reported health (Time 1: $\beta_{PG} = .28$ [.26, .30] vs. $\beta_{PN} = .18$ [.16, .20]; Time 2: $\beta_{PG} = .25$ [.23, .27] vs. $\beta_{PN} = .18$ [.16, .20]), life satisfaction (Time 1: $\beta_{PG} = .43$ [.41, .44] vs. $\beta_{PN} = .09$ [.07, .11]; Time 2: $\beta_{PG} = .35$ [.33, .37] vs. $\beta_{PN} = .11$ [.09, .13]), positive affect (Time 1: $\beta_{PG} = .35$ [.33, .37] vs. $\beta_{PN} = .13$ [.11, .15]; Time 2: $\beta_{PG} = .48$ [.46, .50] vs. $\beta_{PN} = .25$ [.23, .28]), negative affect (Time 1: $\beta_{PG} = -.15$ [−.17, −.13] vs. $\beta_{PN} = -.06$ [−.08, −.03]; Time 2: $\beta_{PG} = -.31$ [−.33, −.29] vs. $\beta_{PN} = -.21$ [−.24, −.19]), and depressive symptoms (Time 1: $\beta_{PG} = -.36$ [−.38, −.34] vs. $\beta_{PN} = -.22$ [−.24, −.20]; Time 2: $\beta_{PG} = -.32$ [−.34, −.30] vs. $\beta_{PN} = -.20$ [−.23, −.18]) at Time 1 and Time 2. Besides the two Time 1 cognitive variables, the only other overlap in prediction magnitudes for the general and negative purpose factors in the HRS sample were for Time 1 and Time 2 household income (Time 1: $\beta_{PG} = .05$ [.02, .08] vs. $\beta_{PN} = .05$ [.02, .08]; Time 2: $\beta_{PG} = .12$ [.09, .15] vs. $\beta_{PN} = .12$ [.08, .15]). The HRS findings replicate the effects found in the MIDUS sample: The specific negative item factor was a stronger predictor of cognition-related variables, whereas the general purpose factor was a superior predictor of all other outcomes except for income.

Does adding a purposeless factor improve the prediction of outcomes? To answer this question, we present the explained variance in each outcome based on the one- and bifactor model in Table 3. A larger R^2 for the bifactor model would suggest that the purposeless factor provides a unique contribution to explaining differences in the outcomes. In HRS, the differences in variance explained for each outcome between models were negligible, with the exception of some increases in the explanation of differences in cognitive abilities and depressive symptoms. In MIDUS, the bifactor model explained more variance in household income, cognitive functioning, and self-reported physical health, but not in the mental health or subjective well-being indicators.

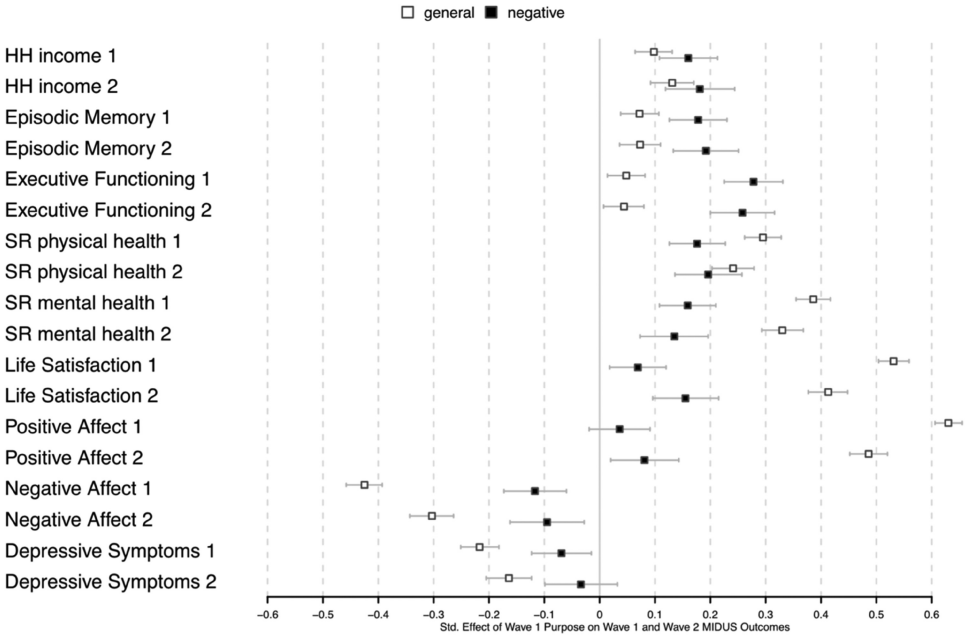
Discussion

The current study had two main goals. First, it sought to consider the measurement of the Purpose in Life subscale from a lifespan developmental perspective. In this regard, we found that the Purpose in Life subscale as a one-factor structure showed poor model fit, which decreased for samples with higher age. A two-factor structure separating between positively (i.e., *purposeful*) and negatively (i.e., *purposeless*) keyed items showed superior model fit in both samples. Furthermore, the two-factor purpose structure displayed strict measurement invariance across age in the older HRS sample, but only metric measurement invariance across the more age-heterogeneous MIDUS sample, which is in part due to two items not loading as strongly onto the purposeless factor.

Accordingly, the second goal of the current study was to evaluate whether these measurement structure issues had implications for the robust predictions by the one-factor Purpose in Life subscale. Previous research with the HRS and MIDUS samples has found that a higher sense of purpose is associated with greater better well-

Figure 6

Comparison of Prediction of Financial, Cognitive Functioning, Subjective Health, and Well-Being Outcomes for Purpose in Life General and Method Factor in the MIDUS Sample



Note. MIDUS = Midlife in the United States; HH = household; SR = self-reported; Std. = standardized.

being (Hartanto et al., 2020; Hill et al., 2018; Irani et al., 2022; Kim et al., 2022), subjective health (Kim et al., 2022; Willroth et al., 2021), superior cognitive functioning (Kim et al., 2019; Lewis et al., 2017), and better financial outcomes (Hill et al., 2016; Pfund & Hill, 2022). In the current study, we found that these findings were consistent with any factor solution used. In both studies, people who scored higher on the general purpose factor, the purposeful factor or lower on the purposeless factor reported higher household income, better cognitive functioning, better subjective health, greater life satisfaction, positive affect, as well as less negative affect and depressive symptoms. These findings held when using Time 1 purpose to predict Time 1 and Time 2 outcomes and accounting for cohort (only in HRS), retirement status, marital status, sex, and age. With the exception to the cognitive variables (and household income and physical health in MIDUS), the sense of purpose composite or general factor predicted life outcomes just as well as the models separating between purposefulness and purposelessness. In the following, we discuss the implications of the current study for research on the lifespan development, measurement, and outcome prediction of sense of purpose.

Implications for Lifespan Development

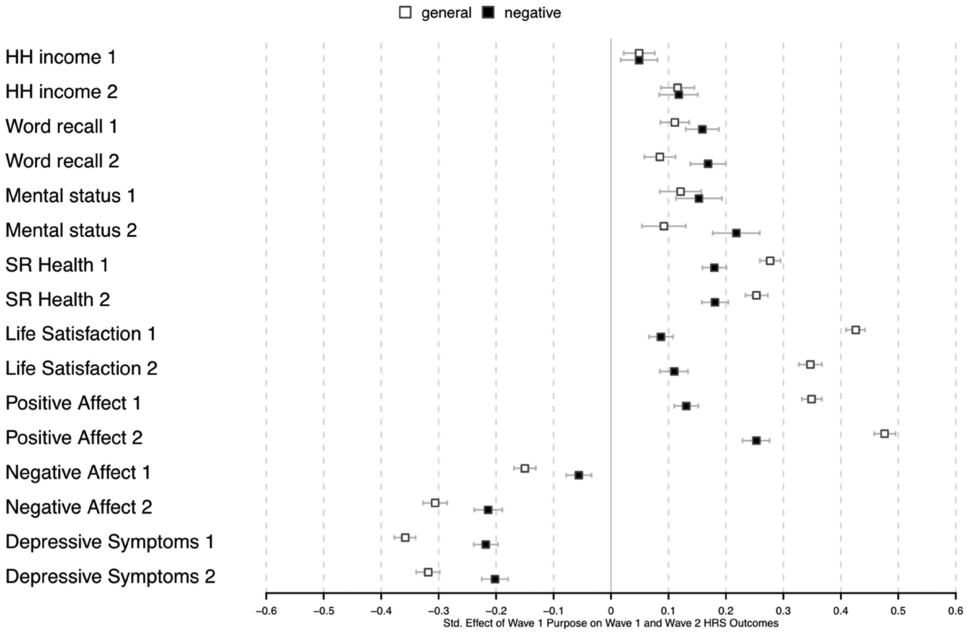
A major takeaway from the current work is that sense of purpose is becoming more complicated at higher ages. A potential explanation for this two-factor structure in older adults may result from the normative cognitive declines in older adulthood (e.g., Salthouse, 2000). Purpose is a conceptually a higher order cognitive construct insofar that it organizes one's long-term planning in pursuit of and engagement with personally important self-directions, thus, requiring degrees of future orientation (Lewis, 2020). With sense of purpose and changes in cognitive functioning often being tied together (Boyle et al., 2010; Lewis et al., 2017), age-related cognitive functioning patterns may underlie these patterns in differences in the single versus multifactor structure.

Moreover, a noted issue of the Purpose in Life subscale (Ryff, 1989) is the way in which some of these negative items are confounded with depression (Scheier et al., 2006). Given the known connections between depressive symptoms and cognitive decline (Wilson et al., 2002; Yaffe et al., 1999), further work should explore whether this conceptual connection helps explain why purposelessness may hold unique value for cognitive outcomes. Relatedly, another possibility is that the age impacts the interpretation of the components of living a purposeful life. For instance, activity engagement is a central component of sense of purpose, represented more explicitly in other measures (Scheier et al., 2006), and qualitative work has found that activity engagement is a central component to older adults' conceptualization of purpose (Lewis et al., 2022). As such, work is needed that includes additional items related to sense of purpose, beyond the Purpose in Life subscale, to better capture whether these age-related differentiation effects are clarified with greater coverage of the construct.

This differentiation between the purposeful and purposeless factors across age leads to a few primary future directions. Using qualitative methods like cognitive interviews would be another valuable approach to begin to unveil these differences. Specifically, researchers could collect data from older and younger adults asking them to explain how they interpret each item in a measure to investigate whether thematic differences arise based on age. This process would help clarify whether the decoupling occurring with older

Figure 7

Comparison of Prediction of Financial, Cognitive Functioning, Subjective Health, and Well-Being Outcomes for Purpose in Life General and Method Factor in the HRS Sample



Note. HRS = Health and Retirement Study; HH = household; SR = self-reported; Std. = standardized.

adults is valence-related, tied to response styles, or whether the conceptualization of purposeful versus purposeless is more meaningful later on in the lifespan.

Furthermore, research should consider whether the trajectories of these purposeless and purposeful items look differently across the lifespan. Cross-sectionally, the younger MIDUS sample had a small, positive association with the purposeful factor and a small, negative association with the purposeless factor. Meanwhile, in the older HRS sample, both factors were negatively associated with age, and the purposeless factor had a significantly stronger,

Table 3

Explained Variance in Each Outcome Depending on Factor Used

MIDUS	Com	Bi	ΔR^2	HRS	Com	Bi	ΔR^2
HH income 1	.016	.035	.019	HH income 1	.004	.004	.000
HH income 2	.026	.050	.024	HH income 2	.021	.023	.002
Episodic memory 1	.010	.037	.027	Word recall 1	.029	.037	.008
Episodic memory 2	.011	.042	.031	Word recall 2	.024	.036	.012
Executive functioning 1	.009	.080	.071	Mental status 1	.031	.038	.007
Executive functioning 2	.007	.068	.061	Mental status 2	.035	.057	.022
SR physical health 1	.104	.118	.014	SR health 1	.112	.109	−.003
SR physical health 2	.074	.097	.023	SR health 2	.099	.098	−.001
SR mental health 1	.168	.174	.006				
SR mental health 2	.123	.127	.004				
Life satisfaction 1	.289	.287	−.002	Life satisfaction 1	.178	.178	.000
Life satisfaction 2	.190	.195	.005	Life satisfaction 2	.144	.139	−.005
Positive affect 1	.396	.399	.003	Positive affect 1	.455	.433	−.022
Positive affect 2	.245	.243	−.002	Positive affect 2	.308	.293	−.015
Negative affect 1	.196	.194	−.002	Negative affect 1	.221	.211	−.010
Negative affect 2	.101	.101	.000	Negative affect 2	.146	.142	−.004
Depressive symptoms 1	.051	.052	.001	Depressive symptoms 1	.049	.059	.010
Depressive symptoms 2	.028	.028	.000	Depressive symptoms 2	.045	.060	.015

Note. MIDUS = Midlife in the United States; Com = R^2 based on one-factor (composite) model; Bi = R^2 based on the bifactor model; ΔR^2 = difference in explained variance between bifactor model and the composite purpose factor, with positive numbers representing that the bifactor model explained more variance; HRS = Health and Retirement Study; HH = household; SR = self-reported.

negative association with age relative to the purposeful factor. These findings suggest that (a) trajectories could differ based on the factor being considered and (b) higher age may be more strongly tied to declines in the purposeless factor than the purposeful factor. These differences may explain some of the mixed evidence that life events predict sense of purpose trajectories (e.g., Hill et al., 2021; Hill & Weston, 2019; Yemiscigil et al., 2021). One possibility is that the effects of life events, such as health issues, may be clarified when separately evaluating purposefulness and purposelessness.

Implications for Measurement

The current findings highlight that sense of purpose becomes more complex with age insofar that these purposeful and purposeless items become less associated with each other. That said, this structural decoupling in older adults may not be unique to sense of purpose, with previous research finding weaker (negative) associations between positive and negative affect with increasing age (Carstensen et al., 2000, 2011). Some research in the affect literature has highlighted that individuals often respond to semantically and experientially distinct items similarly simply due to items have a similar valence (Pettersson & Turkheimer, 2013). However, in the current study, we find that this pattern is not consistent across ages. In the current work, this differentiation based on valence could be due to older adults' tendency to engage less with negative stimuli relative to their engagement with positive ones. This possibility would align with the positivity effect, and older adults' default to focus on stimuli that helps maintain or enhance well-being (Carstensen & Mikels, 2005; Reed & Carstensen, 2012). Thus, the weaker magnitude of correlation between these two factors could be due to older participants engaging more with the positive items and less with the negative ones, while younger participants do not show differing patterns of engagement.

Age-related response styles provide an alternative explanation for this decoupling. Some research has found that older age is associated with greater social desirability (Ausmees et al., 2022), acquiescence bias (Meisenberg & Williams, 2008; Rammstedt et al., 2017), and more extreme response styles (Schneider, 2018). Of these response styles, acquiescent responding most clearly connects to why the purposeful and purposeless factors would become less associated with each other at higher ages. However, meta-analytic work and large, international studies have also found that older adults are less likely to exhibit acquiescent responding (Batchelor & Miao, 2016; He, Bartram, et al., 2014; Stone et al., 2019), or that age was unassociated with acquiescence (He, Van de Vijver, et al., 2014). Furthermore, when accounting for acquiescence bias in MIDUS, the main difference was that Items 5 and 6—which already loaded weakly on the general factor—did not load on the purposeless factor as well. However, the lack of balanced scales in HRS limited our ability to replicate this in the older age sample. These findings highlight that, while response style may be a valuable consideration for future work on the current question, these aging-related patterns are complicated. Some research has highlighted that the associations between age and more extreme response styles can be partially, if not completely, mediated by cognitive functioning (Schneider, 2018). With method factors based on negatively keyed items being in part connected to individuals' own response styles (DiStefano & Motl, 2006; Gnambs & Schroeders, 2020; Kam & Meyer, 2015), the decoupling of these two factors with age may be due to age being a proxy for cognitive functioning. This could also connect to the purposeless and negative factors being stronger predictors with the cognitive functioning variables.

Implications for Prediction

Finally, the current study holds implications for purpose predictions. This study continued to find that sense of purpose predicted better cognitive functioning, physical health, financial outcomes, and well-being both cross-sectionally and longitudinally, replicating a vast array of the past research using a one-factor structure (Hartanto et al., 2020; Hill et al., 2016, 2018; Irani et al., 2022; Kim et al., 2022; Lewis et al., 2017; Pfund & Hill, 2022; Willroth et al., 2021). Of the differences between the purposeful and purposeless factor, findings surrounding cognitive functioning were most notable. Scoring higher on purposelessness consistently predicted poorer cognitive functioning over scoring lower on purposefulness. The domain of cognitive functioning was also the only one in which the bifactor model explained systematically more variance than the general factor in both data sets. With past work finding that cognitive functioning at least partially mediates the association between age and certain response styles (Schneider, 2018), these negatively keyed items could be picking up on the ways in which declining cognitive functioning is often associated with age. The more sample-specific cases in which the bifactor model outperformed the one-factor model (e.g., household income and physical health in MIDUS; depressive symptoms in HRS) may also be reflective of underlying differences in the cognitive abilities (e.g., cognitive ability levels and income [Heckman et al., 2006]; depression and cognitive ability levels [McDermott & Ebmeier, 2009]).

Limitations and Future Directions

This study took a rigorous approach to the current question by utilizing two large, longitudinal panel studies. While using data sets that have repeatedly been employed is a concern, in the current study, doing so in the current study allowed us to replicate and extend these findings to better gauge the robustness of past results. That said, the current design has three primary limitations. First, research would benefit from investigating the measurement aspect of this question longitudinally and move beyond factor structures at the between-person level. Future endeavors should evaluate whether the differentiation of these facets occurs within-person as they age to further establish whether this decoupling is a cohort effect versus an actual developmental effect. Moreover, future work would benefit from considering *why* this age-related decoupling is occurring. If these effects are developmentally driven, research could consider whether these differences are based on changes in cognitive functioning, life transitions, or developmental changes in response styles (whether that be carelessness or an orientation toward positive stimuli). With research highlighting that factors for high-order constructs can separate based on valence that do not map onto individuals' experiences of them (Pettersson & Turkheimer, 2013), combined qualitative and quantitative efforts to understand interpretations of these items across the lifespan would help clarify to what extent aging-related differences are rooted in interpretation, personal significance, or more measurement-related concerns.

Third, the current studies employed predominantly white samples from the United States, which raises concerns about the

generalizability of the current findings. Thus, the current research should be extended in a more diverse sample—both in other countries and in populations that are not majority white or cisgender. From a methodological perspective, given that differences in response styles have been connected to various sociodemographic and country-level differences (Meisenberg & Williams, 2008). Future research should evaluate whether this decoupling in the purposeful and purposeless factors occurs across age in more generalizable samples, and whether the patterns found with prediction are consistent.

One final consideration propelled by the current research extends both to purpose research and measurement more broadly. This article focused on the factor structure and effect on predictions for the Purpose in Life subscale (Ryff, 1989), given it is the most widely employed measure and the one available in both data sets. However, due to concerns about this measure's conflation with future-orientation and depressive symptoms (Scheier et al., 2006), other measures have been developed to assess sense of purpose. As such, future research should investigate whether these measurement properties are unique to the Purpose in Life subscale or purpose measures more broadly. Additionally, using the current study's approach with other constructs would further elucidate whether this separation of factors based on positively and negatively valenced items throughout the lifespan is unique to sense of purpose or occurs across a wide range of psychological measures. These future investigations would clarify to what extent these age-related differences in the structure of sense of purpose are unique to this construct versus a broader issue related to measurement.

Conclusion

Sense of purpose has long been understood as a lifespan development construct, both due to the trajectories found as people age as well as the benefits incurred for those who score high on it (Pfund & Lewis, 2020; Pinquart, 2002). As we move forward, whether we consider this construct *sense of purpose* or the more multifaceted components of purposefulness and purposelessness is in part dependent upon a researcher's focus in two primary areas: (a) lifespan development and (b) the outcome of interest one may be predicting. However, when focused on structure, developmental trends, and age variability, two-factor solutions may be more valuable, as these factors are less distinct in younger adults. Moving beyond this initial foundation, the current study demonstrates that age may play a role in one's comprehension of sense of purpose, and, thus, how researchers should model and measure it. Future research should consider whether the age-based structural issues we found in the current samples extend to within-person developmental trajectories, other purpose measures, and other psychological constructs. Despite these measurement difficulties, the current study provides support for these future endeavors because sense of purpose—regardless of using a single factor, two-factor, or general and method factor structure—remains a robust predictor of a wide range of desirable lifespan developmental outcomes.

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