Do all Components of Psychological Well-being Predict Cognitive Function?

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Abstract

Objectives: Sense of purpose, a component of psychological well-being, has been consistently associated with higher cognitive function and less cognitive decline. However, less is known about associations between the other five components of psychological well-being and cognitive outcomes. To address this gap, the current research examined which components of psychological well-being are most strongly associated with cognitive function.

Methods: A total of 3,742 participants from the Midlife in the United States study were included in analyses (M_{Age}=56.04, *SD*=12.26). Participants completed the Ryff Psychological Well-being Scales (1989) and the Brief Test of Adult Cognition. Multiple regression analyses were used to examine cross-sectional and prospective associations between psychological well-being components and cognitive function.

Results: All six components of psychological well-being were significantly and positively associated with cognition cross-sectionally (βs = 0.07-0.19), with personal growth and sense of purpose being most strongly associated with cognitive function. Moreover, higher levels of sense of purpose, personal growth, environmental mastery, and self-acceptance were associated with better cognitive function at the nine-year follow-up when controlling for baseline cognitive function (β = 0.03-0.05). No significant differences in the strength of associations across psychological well-being components emerged prospectively.

Discussion: These findings extend past research by demonstrating that, in addition to sense of purpose, other components of psychological well-being, especially personal growth, are also associated with cognitive function. These well-being components should be assessed as possible protective factors for cognitive function across the lifespan.

Keywords: Purpose, Personal Growth, Cognition, Lifespan sample

Cognitive function is important for engaging in daily tasks across the lifespan and is associated with physical (Lee et al., 2010), mental (Köhler et al., 2010), and social health (Haslam et al., 2014). Both normative changes in cognitive function and changes due to disease processes occur as individuals age. Thus, identifying factors that may support the preservation of cognitive function is important given that the number of individuals aged 65 and older living in the United States is projected to reach 95 million people by the year 2060 (Vespa et al., 2020). There is a growing emphasis on the value of considering modifiable risk and protective factors as targets to promote cognitive health across the lifespan (Livingston et al., 2020). Specifically, well-being is a promising protective factor that has strong associations with cognitive health (Willroth et al., 2023, 2024). However, some components of psychological well-being are understudied regarding their associations with cognitive health, limiting the field's understanding of mechanisms as well as its ability to translate this knowledge into testable interventions. The current research aimed to address this important open question by examining associations between specific components of psychological well-being and cognitive function in a general population lifespan sample.

Well-being and Cognitive Function

Well-being is a multidimensional construct that includes both hedonic (i.e., feeling good) and eudaimonic (i.e., living in accordance with one's full potential) components. One of the most common models of eudaimonic well-being is Ryff's Psychological Well-being Scales (Ryff, 1989). These scales are comprised of six components that philosophers and psychologists believe are important for living a fulfilling and meaningful life: sense of purpose, personal growth, autonomy, environmental mastery, positive relations with others, and self-acceptance. As individuals strive toward positive psychological well-being, each of the six components presents

challenges they must actively engage with and overcome (Ryff et al., 2021). For example, individuals must set and pursue goals (sense of purpose), be open to new experiences (personal growth), resist social pressures (autonomy), effectively utilize opportunities in their environment (environmental mastery), understand that relationships are reciprocal (positive relations), and acknowledge good and bad qualities in oneself (self-acceptance) to maintain each of the six components of psychological well-being (Ryff et al., 2021). This active engagement may be directly beneficial for cognitive health. Moreover, some components of psychological well-being may promote positive health behaviors, such as increased social and physical activity, reduced nicotine use, and better sleep habits (Kim et al., 2020; Lappan et al., 2020; Pfund et al., 2022), which in turn support cognitive health. Lastly, well-being may act as a buffer against the harmful effects of stress on cognitive function by reducing the likelihood of cardiovascular events and related risk factors (Boehm, 2021).

Prior research has found strong associations of psychological well-being with cognitive function (Guo et al., 2024; Willroth et al., 2022). However, most of these studies examined an overall psychological well-being composite, leaving open questions about which components of psychological well-being are most strongly related to cognitive outcomes. One notable exception is sense of purpose, which has been consistently and robustly associated with preserved cognitive function (Sutin et al., 2022, 2024; Windsor et al., 2015), lower risk for developing age-related neurodegenerative disease (Bell et al., 2022), and greater resilience to neuropathology (Boyle et al., 2012; Sutin et al., 2018, 2022; Willroth et al., 2022). However, most studies of the relationship between sense of purpose and cognitive outcomes have not assessed the other components of psychological well-being, making it unclear whether the protective effects observed in these studies are unique to sense of purpose.

This leads to the question: which components of psychological well-being drive its association with cognition? Does sense of purpose alone drive the psychological well-being-cognition relationship, or are other components of psychological well-being driving this relationship as well? Answers to these questions will be instrumental in disentangling which components of psychological well-being might be *most* impactful in the advancement of prevention and intervention research in healthy aging. Specifically, focusing on the lower-order components of psychological well-being will enable researchers to hone the mechanism of change and develop targeted and precise interventions aimed at maintaining cognitive function across the lifespan and into older adulthood (Hill et al., 2021). Prior research aimed at answering these questions is limited in part because most longitudinal studies of aging do not use long-form measures of psychological well-being, preventing the measurement of individual components with acceptable internal consistency.

Despite these limitations, some recent studies have attempted to identify potential differences in how each component of psychological well-being is associated with cognitive function. One study explored the association between midlife well-being and later-life cognition using the 42-item version of the Ryff Psychological Well-being subscales in a longitudinal sample of women from the United Kingdom. Higher personal growth and lower self-acceptance at age 52 predicted better cognitive function at age 69 after controlling for childhood cognitive function, education, occupation, marital status, depression, smoking, and physical activity (Nakanishi et al., 2019). Notably, sense of purpose was not significantly associated with cognition in this sample, which is surprising given consistent findings from previous research. This may be due to differences in covariates used or perhaps due to the women-only sample given sex differences in psychological well-being across the lifespan (Matud et al., 2019).

Nevertheless, results from this study provide initial insights into the individual psychological well-being components that are associated with cognition.

Two other studies that used the 42-item Ryff Psychological Well-being scales have examined the relations between psychological well-being components and aspects of cognition. Researchers compared the six Ryff Psychological Well-being subscales to explore whether they differentiated a group of "super agers" (i.e., individuals with at or above normative episodic memory values for 50 to 65-year-old adults) from older adults with "average-for-age" cognition (Cook Maher et al., 2017) in the Northwestern University SuperAging Program. Results indicated that "super agers" reported higher levels of positive relations compared to older adults with "average for age" cognition and did not significantly differ on the other five psychological well-being subscales. Another study explored the relationship between the six Ryff Psychological Well-being subscales and inhibition, a component of executive function (Toh & Yang, 2024). Researchers found that inhibitory control was positively associated with personal growth and positive relations when controlling for sex, intelligence, income, extraversion, and neuroticism.

Taken together, prior research on individual components of psychological well-being and aspects of cognition is mixed. These studies have been limited by lack of gender diversity (Nakanishi et al., 2019), artificial dichotomization of cognitive function, and small sample sizes (Cook Maher et al., 2017), and comparisons limited to a single domain of cognitive function (Cook Maher et al., 2017; Toh & Yang, 2024). These factors may account for the generally mixed findings across studies.

Current Research

The current research aimed to: (1) understand how each of the six Ryff Psychological Well-being subscales was associated with cognitive function both cross-sectionally and prospectively across nine years in a general population lifespan sample, and (2) examine whether the strength of the associations between each psychological well-being component and cognitive function differed from one another. Based on previous research connecting sense of purpose and cognition, we hypothesized that higher levels of sense of purpose would be associated with better cognitive function cross-sectionally and prospectively. Given limited prior research on the other psychological well-being components, we did not make specific hypotheses about the other subscales or about whether the strength of associations between the subscales and cognition would differ.

We also had two exploratory aims. First, to address the absence of a comparison group in previous research conducted in an all-women sample (Nakanishi et al., 2019) and to provide context for any potential differences in outcomes, we examined whether sex moderated the relationship between psychological well-being and cognitive function. In unregistered analyses, we also examined whether age moderated this relationship given that the effects of well-being on cognitive function may become more pronounced as age- and disease-related cognitive changes become more pronounced. Second, we explored the unique associations of each psychological well-being component with cognition by controlling for the other subcomponents. We did not make specific hypotheses about either of our exploratory aims.

Methods

Participants and Procedures

The current preregistered research (https://osf.io/5ktx9/?view_only=2c5280eae0644d79986f9ed2dcb0e679) used data from the

second and third waves of the Midlife in the United States (MIDUS) study (https://midus.wisc.edu/) (Ryff et al., 2019; Ryff, Almeida, et al., 2021). MIDUS 2 was the first wave to include the long-form version of the Ryff Psychological Well-being Subscales as well as a cognitive assessment. We made one preregistration deviation and included two unregistered steps, both described in Supplementary Table 1. Participants were recruited for MIDUS 1 from 1995 to 1996 using a random-digit dialing sampling method in the United States. Participants ranged in age from 25 to 74, and twin and non-twin siblings were included in this sample. From 2004 through 2006, MIDUS 1 participants and an additional subsample of individuals from the Milwaukee, Wisconsin, area who identified as African American were included in MIDUS 2. From 2014 through 2016, MIDUS 2 participants were contacted again to participate in MIDUS 3 (Ryff et al., 2019).

Cross-sectional analyses included participants with complete well-being and cognition data at MIDUS 2 (N = 3,742) and at MIDUS 3 (N = 2,822). Prospective analyses required well-being and cognition data at MIDUS 2 and cognition data at MIDUS 3 (N = 2,415). Listwise deletion was used for participants who did not meet these criteria. Power analyses revealed that we had 90% power to detect small associations between psychological well-being and cognition (r = .066) with a sample size of N = 2,415 (the smallest sample size used in prospective analyses) and an alpha level of .05. See Table 1 for sample demographic characteristics.

Measures

Psychological Well-being Subscales

Psychological well-being components were assessed during MIDUS 2 and 3 using the 42-item Ryff Psychological Well-being Scale (Ryff, 1989). The scale includes six subscales: sense of purpose, personal growth, autonomy, environmental mastery, positive relations, and

self-acceptance. Each subscale has seven items, and participants responded to each item with options ranging from 1 (strongly agree) to 7 (strongly disagree). Items were reverse-scored as needed such that higher scores indicated higher psychological well-being. Item responses were then summed to construct each psychological well-being subscale score. Subscale scores were computed only for cases that had at least four items with valid values on the subscale. The mean value of participants' completed items on a given subscale was imputed for missing values on individual items. A composite well-being score was created by averaging the sum scores of the six well-being components. Internal consistency for the Ryff Psychological Well-being subscales in MIDUS 2 and MIDUS 3 was good to excellent (sense of purpose, $\propto = 0.69$ and 0.72; personal growth, $\propto = 0.74$ and 0.74; autonomy, $\propto = 0.69$ and 0.68; environmental mastery, $\propto = 0.77$ and 0.79; positive relations, $\propto = 0.77$ and 0.77; and self-acceptance, $\propto = 0.83$ and 0.83).

Cognitive Function

Cognitive function was assessed during MIDUS 2 and 3 using the Brief Test of Adult Cognition (BTACT). The BTACT includes five cognitive domains measured using six cognitive assessments: episodic memory (immediate and delayed word list recall, Rey Auditory Verbal Learning Tests), working memory (backward digit span, Wechsler Adult Intelligence Scale-3), phonemic fluency (category fluency, animals), inductive reasoning (number series), and processing speed (backward counting, 30 Seconds and Counting Task) (Tun & Lachman, 2006; Lachman et al., 2014). The BTACT was administered over the phone by interviewers. The current study used the composite score for overall cognition, which was calculated by taking the mean of z-scores for five subtests. Composite scores for overall cognition were calculated only for participants with scores on each subtest. Higher scores indicate better cognitive performance. Test-retest reliability was acceptable ($r = 0.78$).

Statistical Analyses

All data cleaning and analyses were conducted using R version 4.4.0 and RStudio with the haven (Wickham et al., 2023), psych (Revelle, 2007), effectsize (Ben-Shachar et al., 2020), car (Fox & Weisberg, 2011), broom (Robinson et al., 2024), and tidyverse (Wickham et al., 2019) packages. We used artificial intelligence (GPT-5) for assistance in editing R syntax used for generating figures. We used an alpha level of .05 for all hypothesis tests. We also report which associations remained statistically significant at an adjusted alpha level of .008 (.05/6 subscales = .008) to correct for the effects of multiple testing on our false positive error rate. We interpret standardized effect sizes in line with recommendations from Funder & Ozer (2019). In primary models, age and sex were included as covariates because these factors may impact both psychological well-being (Matud et al., 2019; Ryff, Boylan, et al., 2021) and cognitive health (Harada et al., 2013; Levine et al., 2021). We also report two unregistered sensitivity analyses: (1) unadjusted models excluding all covariates, and (2) models controlling for education, given recent research demonstrating the effect of education on well-being (Boylan et al., 2025).

Attrition Analyses

We compared participants who met inclusion criteria for cross-sectional analyses (N = 3,742) and who did not meet criteria (N = 1,813) on key sociodemographic factors (i.e., age, sex, education, race, ethnicity). We also compared the participants who met the inclusion criteria for prospective analyses (N = 2,415) with those who did not (N = 3,141) on key sociodemographic characteristics and MIDUS 2 well-being and cognitive function. Independent samples *t*-tests were used for continuous variables (Welch's two-sample *t*-tests were used when homogeneity of variance violations emerged), and chi-square tests were used for categorical variables.

Cross-Sectional Associations Between Psychological Well-being and Cognitive Function

In six separate multiple regression models, we tested cross-sectional associations between each psychological well-being subscale and overall cognitive function. Primary hypothesis tests were conducted in MIDUS 2, and analyses were repeated in MIDUS 3 to explore whether the results replicated across measurement occasions and in an older sample. We evaluated whether the 95% confidence intervals (CIs) around the standardized beta coefficients overlapped to test whether the magnitude of cross-sectional associations differed across the psychological well-being subscales. In unregistered sensitivity analyses, we also evaluated whether the 83% CIs overlapped, because 83% CIs correspond to an alpha level of .05 when comparing the difference between two coefficients, whereas 95% CIs correspond to an alpha level of .05 when comparing a coefficient to a constant value such as 0 (Austin & Hux, 2002).

Prospective Associations Between Psychological Well-being and Cognitive Function

In six separate multiple regression models, we tested whether each psychological well-being subscale at one timepoint (MIDUS 2) prospectively predicted cognitive function nine years later (MIDUS 3), controlling for baseline cognition. To test whether the magnitude of prospective associations differed across the six subscales, we evaluated whether the 95% CIs around the standardized beta coefficients overlapped. In unregistered sensitivity analyses, we also compared the 83% CIs (Austin & Hux, 2002).

Unique Associations of Psychological Well-being Components with Cognitive Function

We assessed the unique associations of each psychological well-being component and cognitive function by conducting a model with all six components as simultaneous predictors. Although the six psychological well-being subscales are strongly correlated with one another (*r*s = .25 to .77), the variance inflation factor was less than 4 for all predictors, indicating limited

problems with multicollinearity. A correlation matrix including psychological well-being subscales and cognitive function at both timepoints is reported in Supplementary Table 2.

Moderation by Sex and Age

We tested for sex moderation by including an interaction term (i.e., sexXpsychological well-being component) to each of the cross-sectional and prospective multiple regression models. In an unregistered exploratory analysis, we replicated this process with age moderation.

Results

Descriptive Statistics

Descriptive statistics at the analytic baseline are outlined in Table 1. The sample generally reported high levels of psychological well-being on average (i.e., above the midpoint of 28).

Attrition Analyses

Attrition results are reported in Supplementary Tables 3-4. Results indicated that participants who met inclusion criteria for cross-sectional analyses were significantly older *(*t = -8.91, $p < .001$), more likely to identify as female ($\chi^2 = 14.16$, $p < .001$), White ($\chi^2 = 285.68$, $p < .001$), and non-Hispanic/Latinx ($\chi^2 = 4.29$, $p = .038$), and were more likely to have a bachelor's degree or higher ($\chi^2 = 75.04$, $p < .001$).

Participants who met the inclusion criteria for prospective analyses were significantly younger *(*t =3.99, $p < .001$), more likely to identify as female ($\chi^2 = 21.05$, $p < .001$) and White ($\chi^2 = 130.58$, $p < .001$) and were more likely to have a bachelor's degree or higher ($\chi^2 = 183.89$, $p < .001$). No significant difference emerged for ethnicity ($\chi^2 = 1.05$, $p = .304$). Participants who met inclusion criteria had significantly higher baseline cognitive function scores *(*t = -15.29, $p < .001$), environmental mastery *(*t = -5.53, $p < .001$), personal growth *(*t = -9.90, $p < .001$),

positive relations *(t* = -6.41, $p < .001$), sense of purpose *(t* = -9.27, $p < .001$), and self-acceptance *(t* = -4.78, $p < .001$) scores. No group differences were found for autonomy ($p = .658$).

Cross-Sectional Associations Between Psychological Well-being and Cognitive Function

Model results are reported in Table 2 (see Supplementary Table 5 for the complete regression output with covariates). Using alphas of .05 and .008, each of the six psychological well-being components was significantly and positively associated with cognitive function cross-sectionally in MIDUS 2 (all ps < .001). Effect sizes were generally small ($\beta = 0.08 – 0.17$) compared to the average effect size in psychology (Funder & Ozer, 2019). These significant, positive associations were replicated in MIDUS 3 (all ps < .001). Effect sizes were similar to those observed in MIDUS 2, ranging from small to medium ($\beta = 0.10 – 0.21$). When comparing effect sizes across psychological well-being subscales, the rank order of effect sizes from largest to smallest in MIDUS 2 was personal growth, followed by sense of purpose, environmental mastery, self-acceptance, positive relations, and autonomy. This rank order was largely replicated in MIDUS 3, except self-acceptance and positive relations reversed in order.

Next, we evaluated whether the CIs around these effect sizes overlapped to determine whether differences in the magnitude of effect sizes were statistically significant (see Figure 1). Based on 95% CIs, personal growth and sense of purpose were more strongly associated with cognitive function compared to autonomy in MIDUS 2. Based on 83% CIs, two additional significant differences emerged: personal growth was more strongly associated with cognitive function compared to positive relations and compared to self-acceptance.

See Figure 1 for a visualization of the strength of associations in MIDUS 2 and MIDUS 3. Results using 95% CIs from MIDUS 3 were similar to MIDUS 2, with personal growth and

sense of purpose more strongly associated with cognitive function compared to autonomy. Personal growth was also more strongly associated with cognitive function compared to self-acceptance. Additional differences emerged when using 83% CIs. Personal growth was more strongly associated with cognitive function compared to environmental mastery and positive relations.

Prospective Associations Between Psychological Well-being and Cognitive Function

Model results are reported in Table 3 (see Supplementary Table 6 for the complete regression output including covariates). Higher levels of sense of purpose, personal growth, environmental mastery, and self-acceptance predicted higher levels of cognitive function when controlling for baseline cognitive function, though effect sizes were generally very small (βs = .01 – .05). Associations with personal growth and environmental mastery and cognitive function remained significant at the corrected alpha level of .008 whereas sense of purpose and self-acceptance were no longer significant.

The rank order of effect sizes observed in cross-sectional analyses did not replicate in the prospective analyses. Based on the 95% and 83% CIs, there were no statistically significant differences between the strength of the prospective associations of psychological well-being subscales and cognitive function. The well-being composite is also presented in Tables 2 and 3 for comparison.

Unique Associations of Psychological Well-being Components with Cognitive Function

Model results for unique associations of psychological well-being components with cognitive function, above and beyond one another, are reported in Supplementary Table 7. In the MIDUS 2 sample, we found unique positive associations of sense of purpose, personal growth,

and environmental mastery with cognitive function, above and beyond the other well-being components.

In MIDUS 3, we replicated the unique positive cross-sectional associations of sense of purpose, personal growth, and environmental mastery with cognitive function. Unexpectedly, we found a unique negative association between self-acceptance and cognitive function.

Finally, when testing the unique prospective associations of psychological well-being components in MIDUS 2 with cognitive function in MIDUS 3, only personal growth and environmental mastery remained significant predictors of cognition.

Moderation by Sex and Age

Model results are reported in Supplementary Tables 8-9. Sex significantly moderated three associations between well-being and cognitive function in MIDUS 2. First, the interaction between personal growth and sex on cognitive function was statistically significant (β = 0.04, 95% CI [0.01, 0.06], p = .016), indicating that for women, higher levels of personal growth were more strongly associated with better cognitive performance. Second, the interaction between positive relations and sex on cognitive function was statistically significant (β = 0.04, 95% CI [0.01, 0.07], p = .012), indicating that for women, higher levels of positive relations were more strongly associated with better cognitive performance. The significant interactions between personal growth and sex and positive relations and sex were replicated in the MIDUS 3 sample. We did not observe any significant interactions of psychological well-being subscales with sex in predicting cognitive function in prospective analyses (i.e., all ps > .242).

The interaction between environmental mastery and age predicting cognitive function was statistically significant in MIDUS 2 (β = 0.04, 95% CI [0.01, 0.07], p = .016), indicating that for older adults, higher levels of environmental mastery were more strongly associated with

better cognitive performance. We did not observe any significant interactions of psychological well-being subscales with age in predicting MIDUS 3 cognitive function cross-sectionally or prospectively (i.e., all *p*s > .292).

Sensitivity Analyses

Full results of the sensitivity analyses without covariate adjustment are provided in Supplementary Tables 10-11. Model results for sensitivity analyses including education are provided in Supplementary Tables 12-13.

Discussion

The current research examined the relationships between six components of psychological well-being and cognitive function. Consistent with our hypotheses, results suggest that sense of purpose is associated with cognitive function both cross-sectionally and prospectively. Additionally, each of the other five psychological well-being components (i.e., personal growth, autonomy, environmental mastery, positive relations, and self-acceptance) was associated with cognitive function cross-sectionally. Only three other components (personal growth, environmental mastery, self-acceptance) were associated with cognitive function prospectively. When considering unique associations above and beyond the shared variance of psychological well-being components, personal growth and environmental mastery were the only components that were *uniquely* associated with cognitive function prospectively.

The strength of associations between psychological well-being components and cognitive function was generally small, especially prospectively. This may be partly explained by the age-heterogenous sample. Prior research (Sutin et al., 2024; Windsor et al., 2015) that reported medium to large effects used older adult samples, while Nakanishi and colleagues (2019) used a sample with a younger average age and found effect sizes comparable to ours. This may suggest

that psychological well-being is more strongly associated with cognitive function in later life, when the effects of age- and disease-related processes are more likely to impact cognitive function. We did not observe age moderation here; however, late older adulthood was not well-represented in this sample. Given that the mean age of participants in the current sample was 56 at MIDUS 2 and 64 at MIDUS 3, it is possible that there were too few individuals experiencing even normative changes in cognitive function to detect larger effects. Despite this, we still observed effects in this broad lifespan sample, suggesting that associations between psychological well-being and cognitive function are robust and may be meaningful across the lifespan. Indeed, small effect sizes can be cumulatively meaningful at the population level (Matthay et al., 2021).

Significant differences in the strength of associations between psychological well-being and cognitive function emerged cross-sectionally, not but prospectively. This suggests that the components associated with cognitive function prospectively (i.e., sense of purpose, personal growth, environmental mastery, self-acceptance) may be equally important for maintaining cognitive health. These components may be especially involved in goal-driven behaviors that are important for brain health. Although prior research has linked sense of purpose to goal-driven health behaviors (Kim et al., 2020; Pfund et al., 2022), it remains unclear whether similar mechanisms underlie the associations with personal growth, environmental mastery, and self-acceptance. Notably, although prior research has focused almost exclusively on sense of purpose, our results suggest that personal growth rather than sense of purpose exhibited the strongest and most consistent associations with cognitive function, perhaps highlighting the possibility that this component may be especially linked to cognitive function. Consistent with the current research, past studies have reported significant positive associations between personal growth and

cognitive function (Cook Maher et al., 2017; Nakanishi et al., 2019). The willingness to try new things, such as learning new skills that facilitate personal growth, has been linked to brain health by promoting neuroplasticity (Marzola et al., 2023). Thus, it is possible that individuals who engage with new and challenging information or activities that promote personal growth across the lifespan may have a stronger resilience to cognitive decline over time. Together, these findings underscore the importance of eudaimonic aspects of well-being beyond hedonic components (e.g., life satisfaction, happiness) that have traditionally characterized healthy aging research (Ryff, 2024). Further, recent research exploring associations between psychological well-being components and trajectories of mild cognitive impairment and dementia found that both personal growth and sense of purpose declined three and six years prior to a diagnosis of mild cognitive impairment (Guo et al., 2024).

We tested for generalizability of these findings by sex and age and found significant moderation by sex for personal growth and positive relations in MIDUS 2 and MIDUS 3 cross-sectional analyses. Observed sex differences suggest that higher levels of these well-being components may be more beneficial for women than for men. Prior research suggests that social relationships are more beneficial for women (Shin & Park, 2023), who are also at greater risk for cognitive decline (Mielke et al., 2022). It is possible that women who report higher levels of positive relations may be more likely to experience the protective effects of social networks against cognitive decline (Mahalingam et al., 2023; Samtani et al., 2022). Regarding personal growth, individuals who identify as female may tend to engage in health behaviors associated with personal growth and cognitive health (e.g., physical activity, healthy diets, and social interactions). We also observed a significant interaction between age and environmental mastery in MIDUS 2 cross-sectional analyses. Prior research suggests that environmental mastery

increases with age (Springer et al., 2011). Therefore, environmental mastery may act as a compensatory factor in older adulthood such that individuals with higher levels of mastery may be more effective at coping with stressors associated with aging. Indeed, the Selective Optimization with Compensation model suggests that older adults adapt to change by strategically selecting goals, optimizing their efforts to achieve them, and using compensatory strategies when optimization becomes unattainable (Baltes & Baltes, 1990). Evidence of moderation did not replicate in prospective analyses, suggesting that these effects may not translate to long-term benefits for specific sociodemographic groups.

Limitations and Future Directions

Although the current research provides initial insights into which components of psychological well-being may be most strongly associated with cognitive function, the following limitations should be considered. First, participants reported generally high levels of psychological well-being, which may not generalize to individuals experiencing very low psychological well-being.

Second, our findings are largely representative of individuals who identify as White and who live in the United States. Outcomes of this research may be different for individuals with other racial and ethnic identities who are disproportionately impacted by cognitive decline due to neurodegenerative disease processes (Kornblith et al., 2022). Specifically, the resource substitution hypothesis suggests that individuals with access to fewer resources (e.g., social, economic, health) may "substitute" them with the resources presented as available to them (e.g., psychological resources such as well-being), to avoid the accumulation of negative effects (Mirowsky & Ross, 2005; Shanahan et al., 2014). In contrast, the disabling hypothesis suggests that a lack of social, economic, and health resources may disable the effects of alternative

psychological resources such that the protective effect of well-being may be reduced for individuals with fewer resources (Shanahan et al., 2014). Both hypotheses suggest that the effects of putative protective factors, such as psychological well-being, may differ across groups with differential access to resources.

Third, the current research was conducted in a general population lifespan sample. Future research should examine whether the components of psychological well-being are differentially related to cognitive function in healthy older adults and in older adults with neurodegenerative diseases. To accomplish this, it will be important to incorporate reliable, long-form measures of psychological well-being subscales across Alzheimer's disease research centers and large-scale aging studies so we can assess whether the results from the current research generalize to these populations. It will also be important to assess whether the strength of associations differs for individuals with neurodegenerative disease processes and whether this is impacted by the stage of the disease process.

Finally, we cannot draw causal inferences from the current research given its observational nature. Components of psychological well-being may support cognitive function (Nakanishi et al., 2019); cognitive function may support psychological well-being (Wilson et al., 2013); or third variable confounders may cause both high levels of cognitive function and high levels of psychological well-being. Indeed, evidence suggests that the relationship between well-being and cognitive function is likely bidirectional (Pfund et al., 2025). Well-being and cognitive function are characterized by stable, between-person associations as well as co-occurring, within-person change. Thus, more measurement occasions of psychological well-being and cognitive function are needed to tease apart these potential reciprocal relationships. Additionally, evidence suggests that well-being can be modified via positive psychological interventions

(Friedman et al., 2019; Ruini & Ryff, 2016), further calling on the need for experimental methods.

Conclusions

The current research demonstrated that each of the six psychological well-being components is associated with cognitive function in a general population lifespan sample. Specifically, personal growth and sense of purpose emerged as more strongly associated with cognitive function cross-sectionally, and personal growth emerged as uniquely associated with cognitive function prospectively. These results support the existing focus on sense of purpose in the cognitive aging literature while also highlighting the value of considering other components of psychological well-being, perhaps especially personal growth. Although more research is needed to understand whether these associations are causal, identifying specific psychological well-being factors associated with cognitive function has the potential to inform the development of more precise prevention and treatment models across the lifespan. Given that all components of well-being were associated with cognitive health, at least cross-sectionally, it may be beneficial to design holistic interventions that target each well-being component or personalized interventions based on individuals' unique well-being profiles.

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Conflicts of Interest

The authors report no conflicts of interest.

Data Availability

All data cleaning and analytic scripts are available on OSF (https://osf.io/bxv6w/?view_only=1fdf5a6f697545c28a294d5dbe7b4b20). Data are publicly available, and researchers may access data by creating an account via the Inter-university Consortium of Political and Social Research (https://www.icpsr.umich.edu/web/pages/) or MIDUS Portal (https://midus.colectica.org/Account/Login?returnUrl=%2F) websites. Research questions, hypotheses, and planned analyses were preregistered on the Open Science Framework (OSF; https://osf.io/5ktx9/?view_only=2c5280eae0644d79986f9ed2dcb0e679).

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Table 1. *Descriptive statistics at analytic baseline (MIDUS 2)*

Variable	*N*	*M (SD)*	Range	%
Age	3,742	56.04 (12.26)	32 – 84	
Education				
High school degree or lower	1,241			33.21%
Some college	1,098			29.38%
Bachelor's degree or higher	1,398			37.41%
Sex				
Female	2,099			56.36%
Male	1,643			44.12%
Race				
White	3,248			87.15%
Black or African American	330			8.85%
Native American or Alaska Native Aleutian Islander/Eskimo	53			1.42%
Asian	18			0.48%
Native Hawaiian or Pacific Islander	3			0.08%
Other	75			2.01%
Ethnicity				
Non-Hispanic/Latinx	3,631			97.40%
Hispanic/Latinx	97			2.60%
Psychological Well-being				
Sense of purpose	3,742	38.57 (6.94)	10 – 49	
Personal growth	3,742	38.57 (6.85)	11 – 49	
Autonomy	3,742	37.20 (6.94)	10 – 49	
Environmental mastery	3,742	38.14 (7.39)	8 – 49	
Positive relations	3,742	40.55 (6.97)	14 – 49	
Self-acceptance	3,742	38.15 (8.18)	7 – 49	
Cognitive function (MIDUS 2)	3,742	0 (1)	-2.89 – 3.63	
Cognitive function (MIDUS 3)	2,822	-0.04 (0.71)	-2.59 – 2.03	

Note. MIDUS = Midlife in the United States. Overall cognition was measured using z-scored composite scores on the BTACT. The midpoint for psychological well-being components is 28.

Table 2. *Cross-sectional associations between well-being subscales and cognitive function*

Variables	β	p	R^2	95% CI	83% CI
MIDUS 2 (N = 3,742)					
Sense of purpose	0.15	< .001	.19	0.12, 0.18	0.13, 0.17
Personal growth	0.17	< .001	.19	0.14, 0.20	0.15, 0.19
Autonomy	0.08	< .001	.17	0.05, 0.11	0.06, 0.10
Environmental mastery	0.14	< .001	.19	0.11, 0.17	0.12, 0.16
Positive relations	0.11	< .001	.18	0.08, 0.14	0.09, 0.13
Self-acceptance	0.12	< .001	.18	0.09, 0.15	0.10, 0.14
Well-being composite	0.16	< .001	.19	0.13, 0.19	0.14, 0.18
MIDUS 3 (N = 2,822)					
Sense of purpose	0.18	< .001	.21	0.15, 0.22	0.16, 0.21
Personal growth	0.21	< .001	.22	0.18, 0.24	0.19, 0.24
Autonomy	0.10	< .001	.18	0.07, 0.14	0.08, 0.13
Environmental mastery	0.16	< .001	.20	0.13, 0.19	0.14, 0.18
Positive relations	0.15	< .001	.19	0.11, 0.18	0.12, 0.17
Self-acceptance	0.14	< .001	.19	0.11, 0.17	0.12, 0.16
Well-being composite	0.19	< .001	.21	0.16, 0.23	0.17, 0.22

Note. β = standardized beta coefficient; p = p-value; R^2 = multiple R-squared; CI = confidence interval; MIDUS = Midlife in the United States. The effects presented for each of the six well-being domains control for age and sex. See Supplementary Table 5 for the associations of these covariates with cognitive function.

Table 3. *Prospective associations between well-being subscales (MIDUS 2) and cognitive function (MIDUS 3)*

Variables	β	p	R^2	95% CI	83% CI
Sense of purpose	0.03	.010	.66	0.01, 0.05	0.01, 0.05
Personal growth	0.05	< .001	.66	0.02, 0.07	0.03, 0.06
Autonomy	0.01	.346	.66	-0.01, 0.04	-0.01, 0.03
Environmental mastery	0.04	< .001	.66	0.02, 0.07	0.03, 0.06
Positive relations	0.02	.055	.66	0.00, 0.05	0.01, 0.04
Self-acceptance	0.03	.008	.66	0.01, 0.06	0.02, 0.05
Well-being composite	0.03	.001	.66	0.02, 0.06	0.02, 0.06

Note. β = standardized beta coefficient; p = p-value; R^2 = multiple R-squared; CI = confidence interval; MIDUS = Midlife in the United States. The effects presented for each of the six well-being domains control for age, sex, and baseline cognition from MIDUS 2. Sample size for prospective analyses is N = 2,415. See Supplementary Table 6 for the associations of these covariates with cognitive function.

Figure 1. *Strength of cross-sectional associations between well-being subscales and cognitive function in MIDUS 2 and MIDUS 3*

Note. MIDUS = Midlife in the United States. Asterisks indicate effects that remained significant after correcting for multiple testing. The black, dashed error bar depicts the 83% CI, which corresponds to an alpha level of .05 when comparing two effects. The blue error bar depicts the 95% CI, which corresponds to an alpha level of .05 when comparing an effect to a constant value (i.e., 0).

Alt text: Figure depicting the cross-sectional associations between well-being components and cognitive function in MIDUS 2 and MIDUS 3 samples using effect sizes. Confidence intervals demonstrate the significance and strength of associations.

Figure 2. *Strength of prospective associations between well-being subscales in MIDUS 2 and cognitive function in MIDUS 3*

Note. MIDUS = Midlife in the United States. Asterisks indicate effects that remained significant after correcting for multiple testing. The black, dashed error bar depicts the 83% CI, which corresponds to an alpha level of .05 when comparing two effects. The blue error bar depicts the 95% CI, which corresponds to an alpha level of .05 when comparing an effect to a constant value (i.e., 0).

Alt text: Figure depicting the prospective associations between well-being components and cognitive function in MIDUS 2 and MIDUS 3 samples using effect sizes. Confidence intervals demonstrate the significance and strength of associations.

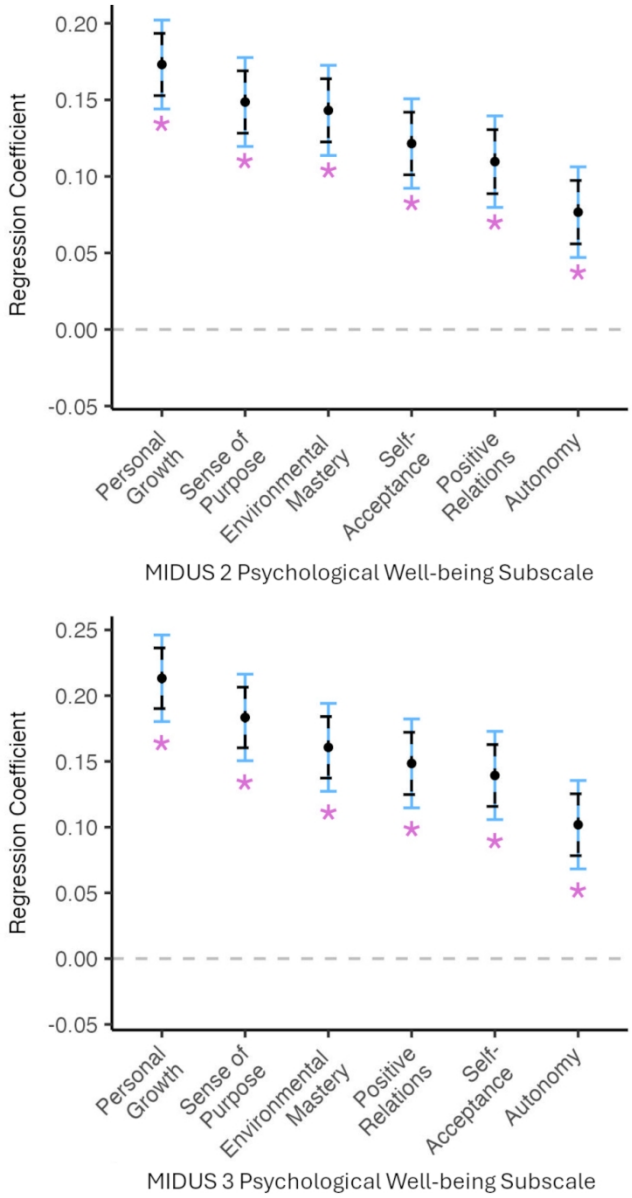

Figure 1. Strength of cross-sectional associations between well-being subscales and cognitive function in MIDUS 2 and MIDUS 3

95x177mm (250 x 250 DPI)

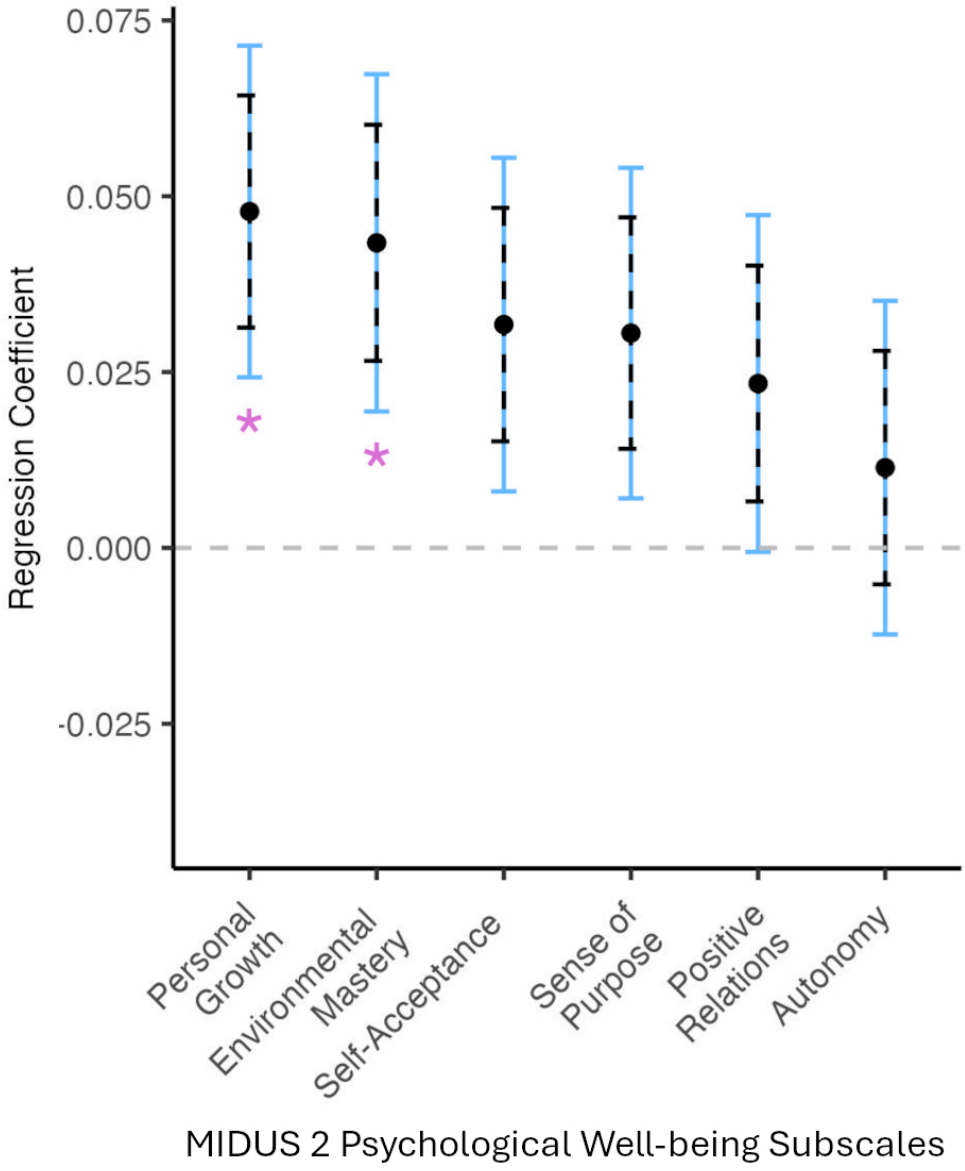

Figure 2. Strength of prospective associations between well-being subscales in MIDUS 2 and cognitive function in MIDUS 3

95x114mm (250 x 250 DPI)