The Effects of Retirement on Sense of Purpose in Life: Crisis or Opportunity?

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Abstract (Word Count: 149)

Does retirement lead to an existential crisis or present an opportunity to experience a renewed sense of purpose in life? Prior research has documented a negative association between retirement and sense of purpose in life, suggesting that retirement could lead people to feel aimless and lost. We revisit these findings using a quasi-experimental approach and identify the causal impact of retirement on purpose in life. In a nationally representative panel of American adults (N = 8,113), we apply an instrumental variable analysis and use the differences in the likelihood of retirement driven by Social Security retirement incentives in the US to find a sizable increase in purpose in life as an outcome of retirement. These improvements are driven by lower socioeconomic status individuals who retire from dissatisfying jobs. The findings suggest that retirement may provide an opportunity to experience a renewed sense of purpose, especially among socioeconomically disadvantaged populations.

Statement of Relevance (Word Count: 143)

Work provides people with a structure for living, goals, and a sense of identity; therefore, retirement is considered a developmental milestone that initiates significant changes in people's conceptions of self and life. However, it is unclear whether this important transition leads to an increase or a decrease in a general sense of purpose in life. While existing correlational evidence supports the idea that sense of purpose declines during retirement, our study uses rigorous quasi-experimental techniques to show that the effects of retirement on sense of purpose are *positive* and driven by lower socioeconomic status individuals who are dissatisfied with their work. The findings are important in the global context of aging populations and policy debates about increasing mandatory retirement ages to make older adults work longer. The findings suggest that policies that delay retirement may have adverse psychological impacts, especially on vulnerable populations.

Introduction

For many people, work is more than a paycheck. Work provides a social role and identity (Froidevaux, Hirschi, & Wange, 2018) and is considered an essential source of purpose in life (Ward & King, 2017). In retirement, people lose the roles, goals, and structure provided by work, which can create an existential vacuum and cause people to feel aimless and lost.

Consistent with this hypothesis, a meta-analysis documented a negative correlation between retirement and sense of purpose in life (N = 2,858) (Pinquart, 2002). More recent work found a positive link between retirement status and longitudinal declines in sense of purpose (Hill & Weston, 2017). However, these associations may not accurately reflect the causal impact of retirement on purpose in life; instead, they may capture the reverse relationship whereby retirement is driven by decreases in purpose. Or, the associations could be explained by unmeasured factors (e.g., illness, bereavement) that simultaneously change purpose while inducing the decision to retire.

To rule out these alternative explanations, we used a quasi-experimental approach that allowed us to estimate the causal impact of retirement on sense of purpose in life. Following prior studies (e.g., Charles, 2004; Gorry, Gorry, Slavov, 2018), our analysis took advantage of a variation in retirement that is driven by eligibility rules for Social Security retirement benefits in the US. Since benefits are offered to all citizens but only at specific ages (e.g., 62, 65), changes in Social Security eligibility status creates a variation in the likelihood of retirement independent of personal factors that could confound the relationship between retirement and purpose in life (e.g., bereavement, illness, or baseline levels of purpose). In a nationally representative longitudinal panel of Americans (N = 8,113), we used an instrumental variable analysis to isolate

this policy-driven variation in retirement and uncovered a positive causal impact of retirement on sense of purpose in life over 4-8 years.

We also used these data to examine whether the effects of retirement differed over the short (1-4 years) or long-term (4-8 years) and to explore respondent characteristics driving our results. The resource theory of retirement suggests that social, financial, and psychological resources could moderate the effects of retirement on well-being (Wang & Shi, 2014). Identity-based theories also highlight the possibility of *positive* changes in well-being upon retirement for those with lower work identification or higher job stress (Froidevaux et al., 2018). To address these theories, we documented for whom retirement may affect sense of purpose positively and why.

Method

Participants

We tested our hypotheses in a sample recruited from the Health and Retirement Study (HRS) - a longitudinal, nationally representative study of aging in the US (Health and Retirement Study, 2006-2016). In 2006 (Wave 1), 50% of the HRS panel were randomly chosen to complete a lifestyle questionnaire, which included questions about sense of purpose and included longitudinal follow-ups in 2010 and 2014. The remaining 50% of the sample completed this questionnaire in 2008 (Wave 2), with follow-ups in 2012 and 2016 (Sonnega et al., 2014). Our initial sample included 14,275 individuals who completed the lifestyle questionnaire.

Since our hypotheses only apply to individuals who transitioned from work to retirement, we excluded 3,367 individuals who, at any wave, reported that they were out of the labor force, unemployed, or disabled. We excluded observations with missing data on sense of purpose or labor force status in any given wave. This led to the exclusion of 2,400 individuals. We dropped observations if individuals used a proxy in a given wave (e.g., their spouse or child responded on

their behalf); this led to the exclusion of 58 individuals. After retaining participants who had at least two observations for our panel data analysis, the analytic sample consisted of 8,113 individuals and 21,714 person-wave observations. The exclusion criteria and changes in sample size are reported in detail in Table S1 and sample characteristics are described in Table S2.

Measures

Purpose in Life. Sense of purpose in life was assessed with a widely used seven-item scale that measures the extent to which people have goals and aims that give direction and meaning to their lives (Ryff & Keyes, 1995). The scale includes questions such as "I have a sense of direction and purpose in life" and "My daily activities often seem trivial and unimportant to me" (reverse scored) rated on a scale from 1 (*strongly disagree*) to 6 (*strongly agree*). By capturing people's degree of meaningful engagement with goals and daily activities, the sense of purpose measure captures productive engagement with life and existential concerns, which are critical issues at later stages of life (Ryff & Keyes, 1995).

Sense of purpose was measured in all waves of the HRS data ($M = 4.65$, $SD = 0.91$). The scores for the items were averaged and the final measure showed strong reliability at all waves ($\alpha_{t1} = .74$; $\alpha_{t2} = .77$; $\alpha_{t3} = .77$). The variable was set to missing if respondents left more than three items missing, which corresponded to less than .001% of the sample. The measure was standardized ($M = 0$, $SD = 1$) to report the results in standard deviation units.

Retirement. The HRS includes a battery of questions about retirement status. In one question, individuals are asked: "At this time do you consider yourself to be completely retired, partly retired, or not retired at all?". Other questions ask about employment status in the respondents' primary, second, and third jobs (e.g., working part-time, working full-time, retired, etc.). Using HRS data, the RAND Institute for the Study of Aging created a new dataset whereby certain

variables, including the labor force status variable, were imputed and standardized (RAND HRS Longitudinal File 2016 (V1), 2006). We used the labor force status variable in RAND HRS Longitudinal data files to construct the retirement variable (Bugliari et al., 2019).

The labor status variable in the RAND data classified individuals as 'fully retired' if (i) they reported that they were retired in any of the questions included in the survey, and (ii) they reported that they were not looking for employment. If respondents reported part-time employment and mention being retired, they were classified as partly retired. Individuals were classified as working full time if they reported working 35+ hours per week. Any respondent who worked less than this threshold were classified as working part-time. In the sample used in our analysis (N = 8,113), 56% were fully retired, 12% were partly retired, 26% were employed full time, and 5% were employed part-time based on RAND data. To create a dummy variable that measured retirement, we assigned a value of "1" to fully and partly retired and "0" to full-time and part-time working respondents (for a similar operationalization, see Gorry et al., 2018).

Prior research has defined retirement as an active withdrawal from work, which is described as a behavioral change that occurs over time (Wang & Shi, 2014). Since retirement was measured in all HRS waves, we could apply panel data methods to track changes in retirement status over time: from 0 (part-time or full-time working) to 1 (partial or full-time retired). As an exploratory analysis, we estimated the effects of transitioning from full-time work to full-time retirement and from full-time work to partial retirement (for an explanation of the models and results of this analysis, see Table S3).

Covariates. The panel data methods we applied focus on assessing within-person changes over time, which automatically controls for person-fixed factors that do not change over time. Therefore, our regression models do not include person-fixed covariates like gender, race, and

education. Instead, we include time-varying covariates which could change within-person over time and that were measured in all waves of the data as follows: marital status, age, household income, and perceived health. Across waves, marital status was coded as "1" if respondents were married or partnered and "0" if they were divorced, widowed, spouse absent, or never married. Age was measured in months, and age-squared and age-cubed were also used to account for any potential non-linear relationships with age. Household income equaled the sum of pensions and annuities, social security disability and retirement, unemployment and workers' compensation, other government transfers, and household capital income for the spouse and respondent in the last calendar year. A single-item measure provided a global assessment of one's health on a scale from 1 (*poor*) to 5 (*excellent*).

Other Variables. We also examined the characteristics of the population that drove the effects of retirement in the current analysis. We used the following sociodemographic variables: gender (female = 1, male = 0), race (white = 1, other = 0), a person-fixed measure of education (college graduate = 1, other = 0), and a baseline measure of marital status (married/partnered = 1, other = 0). As economic variables, we used baseline measures of i) household income (see above), ii) total wealth: the value of assets (e.g., residence, real estate, vehicles) owned by the household minus debts (e.g., mortgage, home loans), and iii) labor income: the sum of the respondent's wage, bonuses, 2nd job or military earnings, professional practice, or trade income.

We also used two work-related characteristics at the baseline. First, occupation was measured based on 1980 US Census data. A respondent was coded as "1" if they were a "white-collar" employee, working in managerial and professional occupations or technical, sales, and administrative support occupations in their job with the longest tenure. All others (blue-collar and service workers) were coded as "0". Job satisfaction was constructed using the average

scores from nine questions that assessed satisfaction with various aspects of the job at the baseline wave (e.g., support, freedom, recognition, security) (1 = *strongly disagree*, 4 = *strongly agree*) (α = .80) (Karasek, 1979). Finally, we also used baseline sense of purpose in life and perceived health in understanding respondent characteristics.

Statistical Analysis

Main Analysis. We used an instrumental variable (IV) approach to identify the causal impact of retirement on sense of purpose in life. The IV is a commonly used statistical tool in economics to enable causal inferences from observational data when random assignment of a treatment is not feasible or ethical (Angrist & Pischke, 2008). The IV overcomes the limitations of correlational analysis in observational data which also plague the analysis of retirement and purpose in life. The associations between retirement and purpose in life may be driven by decreasing levels of purpose inducing the decision to retire (reverse causality) or unmeasured factors such as bereavement, illness, or retirement of loved ones that simultaneously lower sense of purpose while increasing the likelihood of retirement (omitted variable problem). Since these factors most likely yield opposing influences on retirement and purpose (the effects on purpose are negative and the effects on retirement are positive), the association between retirement and purpose could be biased towards zero, i.e., appear more negative than the true relationship between retirement and purpose.

The IV addresses these issues in correlational analysis by isolating an 'exogenous' variation in the likelihood of retirement, i.e., a variation that is created by an external factor which is independent of the outcome (purpose in life) and other determinants of the outcome (e.g., bereavement, illness). By using this exogenous variation in retirement and measuring its impacts on sense of purpose in life, the IV rules out the possibility that this relationship between

retirement and sense of purpose in life may be driven by reverse causality or omitted variables, and increases our confidence that the relationship will accurately capture the direct causal impact of retirement on sense of purpose in life.

In IV, a third variable (an instrument) is used to measure the external factor that creates the exogenous variation in the explanatory variable (retirement). Consistent with previous studies on the causal effects of retirement in health economics (e.g., Charles, 2004; Gorry et al., 2018), we used eligibility status for Social Security (SS) retirement benefits in the US as an instrument in our analysis. The US retirement policy allows individuals to claim 80% of their retirement benefits for the first time at age 62 or wait and claim 100% of benefits at the normal retirement ages, which, depending on their birth cohort, varies between ages 65 and 67 (M = 66, SD = .49, see Table S4). Prior studies have shown that SS eligibility is a strong determinant of retirement behavior in the US population (Fitzpatrick & Moore, 2018; Gorry et al., 2018). In addition, government-set retirement incentives apply to everyone who reaches a certain age; hence, one's date of birth and government policy are the only determinants of SS eligibility. Factors such as sense of purpose in life or other potential unobserved factors related to purpose should not have a direct effect on the timing of SS eligibility. Therefore, SS eligibility is a valid instrument that creates an exogenous variation in the likelihood of retirement enabling us to estimate the causal impact of retirement on sense of purpose in life.

In applying the IV analysis to current data, we first regressed retirement status on SS eligibility to test whether crossing the SS age thresholds predicted within-person changes in retirement over time (the first-stage regression). Here, SS eligibility was measured with two dummy variables that indicated whether or not the respondents were eligible for early retirement benefits (1 = age 62 or higher) and normal retirement benefits in a given wave (1 = ages 65-67 or

higher, see Table S4). We then used, in the second stage, the predicted values of retirement from the first-stage as a predictor of changes in people's self-reported sense of purpose over time. Note that these two steps were estimated simultaneously rather than separately in a regression.

Note also that we applied the IV analysis in panel data, which enabled us to study within-person changes in retirement and sense of purpose in life using individual fixed effects (FE). By focusing on within-person changes, the FE method automatically controls for all factors that remain stable over time for each individual. These include, but are not limited to, person-specific factors such as early life experiences, personality, and genetic factors that are hard to observe and measure. This method also removes the need to control for *any* of the observable person-fixed determinants of purpose, including gender, race, and highest educational level.

Even though a valid IV does not require including further controls to obtain unbiased estimates, we also controlled for within-person changes in marital status, income, and perceived health from all waves in our models as a further robustness check. Similarly, we included age, age-squared, and age-cube from all waves to prevent the possibility that our model only captured the effects of aging on purpose in life. Holding constant the effects of aging in general, it is unlikely that these specific SS eligibility ages coincide with any abrupt changes in purpose directly or initiate special life events (apart from retirement) that could change average levels of purpose. This implies that changes in retirement status are likely the only channel through which SS eligibility ages can induce within-person changes in purpose in life. We clustered standard errors at the household level in all the models to control for potential non-independence of responses across members of the same family – 47% of the unique individuals in the data had another household member participating in the survey.

We also estimated whether the effects of retirement on sense of purpose in life varied over time by replacing the retirement dummy with i) a dummy variable indicating being retired for 1 to 4 years, and ii) a dummy variable indicating being retired for 4 to 8 years[1]. In this analysis, four instruments were used: dummy variables indicating being 1-4 years above the eligibility ages for early retirement (i) and normal retirement (ii), and 4-8 years above the eligibility ages for early retirement (iii) and normal retirement (iv).

The Validity of the Instrumental Variables. We provided statistical evidence to support that SS eligibility dummies are valid instruments by showing that (i) they created meaningful changes in the explanatory variable (retirement), but (ii) they were not directly related to the outcome (purpose in life) or its unobserved determinants beyond their effects on retirement. As shown in Figure S1, the probability of retirement increased with age, and there was a noticeably sharp and large increase in retirement between the ages of 61 to 62 when individuals first become eligible for early retirement benefits. The graph also documented a steady increase in retirement at normal pension eligibility (65-67)[2]. Importantly, as revealed by the first-stage regression analysis (see Table S5), controlling for changes in income, perceived health, marital status, and linear and non-linear relationships with age, changes in retirement status were predicted by early retirement eligibility (β = 0.17, 95% CI = [0.142,0.191], $p < .001$) and normal retirement eligibility (β = 0.10, 95% CI = [0.079,0.124], $p < .001$). To validate the strength of the instruments, a common recommendation is that the F-statistic that tests the joint significance of

[1] These periods were chosen due to the four-year intervals between survey waves, which constitutes the period over which we can assess changes in this data.

[2] The graph is less informative for tracking jumps in retirement as a result of reaching normal retirement ages because pension incentives are available to participants at different points between the ages of 65 and 67 based on respondents' specific birth cohort (Table S4). It is therefore not possible to directly observe these jumps for specific birth cohorts in the graph; however, the increase in retirement at these ages are still evident, although more evenly spread out in the graph.

the instruments in the first-stage regression model should be above 10 (Stock, Wright, & Yogo, 2002), which was supported in the current analysis (F (2, 6195) = 127.30, $p < .001$).

We also tested whether the instruments were statistically independent of unobserved variables or the outcome in the data (Sargan, 1958), which requires that the null hypothesis that supports the independence assumption is not rejected in Sargan-Hansen test. The null hypothesis in Sargan-Hansen test was not rejected in the FE-IV model without covariates (Column 2, Table 1) ($J = .422$; *chi-sq* $P = .516$) or with covariates ($J = .331$; *chi-sq* $P = .565$), providing evidence that the instruments were valid in enabling causal inferences. Altogether, these analyses provide support that our application of the instrumental variable analysis in the current data using SS eligibility dummies as IV is appropriate for estimating the causal impact of retirement on sense of purpose in life.

Complier Analysis. The IV analysis is considered similar to randomized controlled trials where people are randomly assigned to a treatment condition, but not everyone complies or fully participates in the treatment. This is also the case in the current analysis where not everyone who is treated (who reached retirement eligibility ages) complied with the treatment (shifted into retirement). There were individuals who, despite turning 62 or 65-67, continued to work and retired at other, later ages. Hence, the IV method only estimates the local average treatment effect (LATE). This is the causal effect of retirement among individuals whose decision to retire was directly influenced by reaching the SS eligible ages – that is, among the compliers. An important question is to understand who these compliers are in the current analysis.

Following Angrist and Pischke (2008), we described complier characteristics using the coefficients of the eligibility age dummies from the first stage regression. When estimated in the full sample, these coefficients measured the probability of complying (moving into retirement) in

response to early and normal retirement eligibility ages for the general population. When estimated in a restricted sample (e.g., college graduates), the coefficients measured the probability of compliance in that subpopulation. By dividing the probability in the restricted sample by the probability in the full sample, we are able to calculate the relative likelihood that a complier of early or normal retirement eligibility is from a subgroup of the population (e.g., a college graduate) compared to the full sample, which represents the general population (see Table S6 in Supplementary Material).

Note that any differences in pre-retirement characteristics between compliers vs. the full sample determines 'for whom' the causal estimates apply but they do not threaten the internal validity of the estimates (that the IV estimates measure unbiased causal relationships). Since the timing of SS eligibility cannot be determined by individual characteristics, eligibility-driven changes in the likelihood of retirement can be assumed to be independent of these factors. Additionally, our application of within-person analysis prevents pre-retirement, person-fixed factors from affecting our results.

Because the IV estimates were based on the compliers' responses to the instruments, one question is whether our results can be generalized outside the context of our study. To answer this question, it is useful to know that at least a third of the US population retires at the age of 62, the age at which retirement benefits first become available (Fitzpatrick & Moore, 2018). In addition, age-based rules for retirement eligibility are used many countries around the world. Therefore, the age thresholds used as instruments in our analysis are relevant for large groups of the population in the US and many other countries, lending further support for the external validity of the IV estimates.

For completeness, we discuss our empirical strategy in detail here. To replicate earlier findings in the literature which documented a negative association between retirement and sense of purpose in life (Hill & Weston, 2017; Pinquart, 2002), we first regressed sense of purpose in life on retirement in a standard ordinary least squares (OLS) regression analysis using cross-sectional data from the baseline wave (1). Next, we provided within-person estimates of the relationship between retirement and sense of purpose in life in an FE regression (2). We then combined the FE model with the IV approach to identify the causal effects of retirement on purpose in life which represent the main findings of the present research (3). We used this step-by-step analysis to document the biases in the correlational estimates and how these biases could be addressed through the application of more advanced models. We also explored whether being retired for shorter vs. longer periods of time differentially impacted sense of purpose (4) and examined the characteristics of the individuals whose sense of purpose has been impacted by changes in retirement status induced by pension eligibility ages (5).

Results

Main Analysis: The Effects of Retirement on Sense of Purpose in Life

Does retirement increase or decrease sense of purpose in life? To provide an initial test of this question, in Figure 1 we document the raw data relationship between sense of purpose in life and age using cross-sectional data from all waves. Consistent with previous work (Springer et al., 2011), Figure 1 shows that sense of purpose declined as a function of age among middle-aged and older adults, but the figure also demonstrated a noticeable increase in sense of purpose *following* the SS eligibility ages for early (62) and normal retirement (between 65 and 67 with an average of 66), which are demarked with vertical lines. This figure provides graphical evidence that the act of retirement may increase sense of purpose in life. Further, it highlights the

possibility that declines in sense of purpose over time (or factors related to this decline) may increase retirement behavior, creating a negative bias in the relationship between retirement and sense of purpose. By progressing from basic correlational analysis to more advanced methods that tackle these biases, we can observe whether the correlational estimates were indeed biased in the current data.

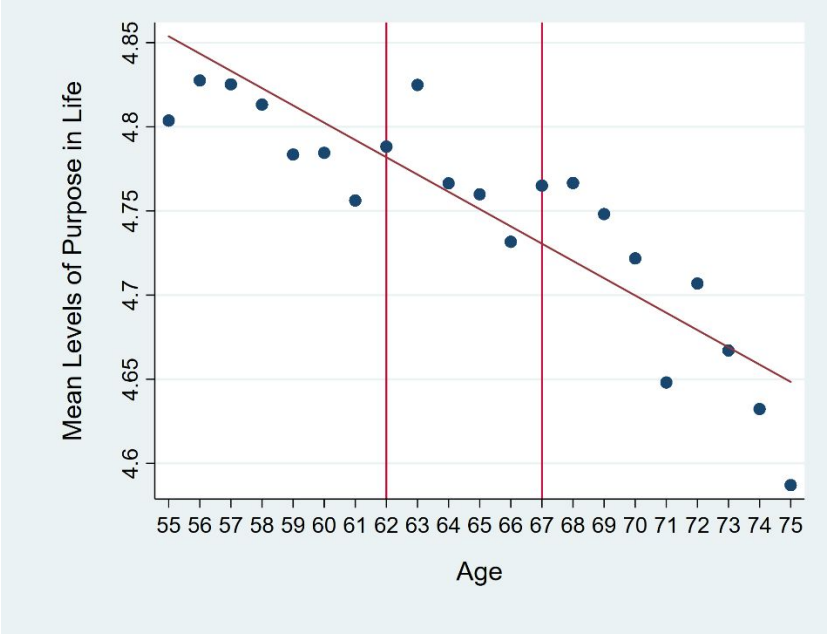

Fig. 1. Mean Levels of Sense of Purpose as a Function of Age. Vertical lines represent Social Security retirement eligibility ages in the US. Data was drawn from Health and Retirement Study (2006-2016).

We wanted to test if, in the absence of the FE-IV strategy, we could replicate earlier findings that have shown a negative association between retirement and sense of purpose (Hill & Weston, 2017; Pinquart, 2002). The standard OLS in regression analysis in baseline cross-sectional data has shown this possibility. As reported in Table 1, Column 1, there was a negative association between retirement and sense of purpose controlling for the effects from aging (β = -0.21, 95% CI = [-0.271, -0.152], $p < .001$). Next, we studied the associations between within-person changes in retirement and purpose while holding constant person-specific confounding factors in

an FE model in panel data. As reported in Column 2, this also produced a negative coefficient for retirement (β = -0.08, 95% CI = [-0.120, -0.035], $p < .001$) however the size of the association was smaller and *less* negative. This suggests that the initial correlations may have been biased towards zero due to the confounding factors unaccounted for in the model.

Next, we combined the IV analysis with FE to estimate the causal impact of retirement on sense of purpose. This method tackled the sources of bias that cannot be accounted for in the within-person analysis such as those that arise from reverse causality and unobserved factors that are not fixed at the individual level but vary over time (e.g., changes in health, bereavement). As reported in Columns 3 and 4 in Table 1, in the FE-IV model, retirement had a positive effect on sense of purpose (β = 0.32, 95% CI = [0.072, 0.574], p = .012), even after controlling for changes in marital status, household income and perceived health (β = 0.29, 95% CI = [0.043, 0.541], p = .021). As shown in Column 5 in Table 1, the positive effects were larger in magnitude and more precisely estimated for people who had been retired for four years or less (β = 0.37, 95% CI = [0.081, 0.664], p = .012) vs. between four to eight years (β = 0.20, 95% CI = [-0.148, 0.554], p = .257).

The effects remained positive when we estimated the effects of shifting from full-time work to full-time retirement (Column 1, Table S3) and the effects of shifting from full-time work to part-time retirement (Column 2, Table S3). Nevertheless, the effects were not significant, likely due to the smaller sample size available.

Results continued to hold when i) we used survey weights to adjust the sample for representativeness; ii) we excluded individuals who returned to employment after retiring (2% of the sample), iii) we adjusted the model to include changes in spousal retirement status, which was not included in the main analysis due to a large number of missing data (see Columns 3-4 in

Table S3, Supplementary Material). Excluding individuals whose household income or full-time job earnings were above the 91st or 95th percentile did not change these findings in a meaningful way (Table S7, Supplementary Material).

Table 1. The Impact of Retirement on Sense of Purpose in Life

Model:	OLS	FE	FE-IV	FE-IV	FE-IV
	(1)	(2)	(3)	(4)	(5)
	Purpose in Life	Purpose in Life	Purpose in Life	Purpose in Life	Purpose in Life
Retired	-0.21***	-0.08***	0.32**	0.29**	
	[-0.271, -0.152]	[-0.120, -0.035]	[0.072,0.574]	[0.043,0.541]	
Retired: 1-4 years					.37**
					[.081, .664]
Retired: 4-8 years					.20
					[-.148, .554]
Age	0.01	0.00	0.01	0.00	-0.00
	[-0.008,0.019]	[-0.012,0.015]	[-0.009,0.019]	[-0.009,0.018]	[-0.024,0.020]
Age Squared	-0.00	-0.00	-0.00	-0.00	0.00
	[-0.000,0.000]	[-0.000,0.000]	[-0.000,0.000]	[-0.000,0.000]	[-0.000,0.000]
Age Cube	-0.00	-0.00	-0.00	-0.00	-0.00
		[-0.000,0.000]	[-0.000,0.000]	[-0.000,0.000]	[-0.000,0.000]
Married				0.03	
				[-0.026,0.088]	
HH Income (log)				0.01*	
				[-0.001,0.023]	
Health				0.07***	
				[0.051,0.090]	
Year FE	NO	YES	YES	YES	YES
Individual FE	NO	YES	YES	YES	YES
R-squared	0.02	0.04	-	-	-
Observations	8,113	21,714	21,714	21,692	21,714

Note: The first regression model was estimated with ordinary least squares (OLS). The second model included individual fixed effects (FE). The third and fourth models were estimated with an instrumental variable (IV) method combined with individual fixed effects (FE). Three waves of data were drawn from two cohorts of the Health and Retirement Study (Cohort 1: 2006-2010-2014 and Cohort 2: 2008-2012-2016). Purpose in life and health measures were standardized ($M = 0$, $SD = 1$). Income was measured by total household income and logarithmically transformed. Being married was coded as a dummy variable. Age was measured in months. Errors were clustered at the household level in all models. 95% confidence intervals were reported in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

Additional Analysis: Who Drives the Effects of Retirement on Sense of Purpose?

We also shed light on the characteristics of the individuals whose retirement decision was impacted by the early and normal SS age cut-offs (compliers). The compliers were individuals whoseretirement decision led to an improvement in their sense of purpose, according to the IV-FE estimates. Hence, the analysis provided an explanation for the average positive effect in our sample.

Our analysis of complier characteristics showed that, compared to the full sample, people who retired early (at age 62) were 44% less likely to have high satisfaction in their pre-retirement jobs. They were less likely to have a higher socioeconomic status; as indicated by a 36% lower likelihood of having a college degree, 16% lower likelihood of working in a white-collar occupation, 19% lower likelihood of having above-median wealth, and 48% lower likelihood of having above-median earnings among early retirement eligibility compliers compared to the full sample. There were no meaningful differences in demographics and perceived health, and notably, sense of purpose in life between compliers of early retirement eligibility and the full sample. Compliers of normal retirement eligibility were 20% more likely to be female compared to the full sample, but they did not differ meaningfully along the other critical dimensions. Full descriptive statistics are shown in Table S2 in Supplementary Material.

Discussion

Consistent with previous research (Hill & Weston, 2017; Pinquart, 2002), we found a negative cross-sectional association between retirement and sense of purpose in life. However, after applying a quasi-experimental method addressing the limitations of correlational analysis, we observed a *positive* causal impact of retirement on purpose in life. This effect was concentrated over the first four post-retirement years and amongst lower-SES individuals who were dissatisfied in their jobs.

The findings suggest that retirement can foster well-being as a result of improved psychological resources from leaving a non-satisfactory job (Froidevaux, Hirschi, Wange, 2018) even when people have less financial resources available upon retirement (Wang & Shi, 2014). The results contribute to limited research on factors that causally increase sense of purpose in older ages, a period when sense of purpose tends to show a decline (Springer et al., 2011), yet

predicts positive health outcomes (Kim et al., 2017) and longevity (Hill & Turiano, 2014). Note that sense purpose is considered a motivational factor that gives rise to a general sense of meaning in life (Ward & King, 2017), so, the findings also shed light on what makes life meaningful and for whom.

People associate work with low pleasure, despite finding it rewarding (White & Dolan, 2009). This implies that retiring may increase happiness but decrease purpose. Studies have shown retirement-induced increases in life satisfaction (Gorry et al., 2018) and decreases in depression (Charles, 2004). Yet, we did not find evidence of an asymmetric, negative impact on purpose, possibly because work is not as strong a source of purpose for lower-SES, older adults. Building upon our global assessment of purpose in life, future research can use domain-specific measures to more directly examine the pleasure or purpose people may derive from work vs. retirement activities (e.g., leisure).

Overall, our analysis demonstrates that retirement, as a crucial developmental milestone, may be something to be celebrated rather than feared for many people. In particular, the findings suggest that the policies to increase mandatory retirement ages may have adverse impacts on the well-being of socioeconomically vulnerable populations.

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