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Original Research Article

Cognitive Decline After Divorce and Widowhood: Is Marital Loss Always a Loss?

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Abstract

Background and Objectives: We used longitudinal data to determine whether the type of marital loss is associated with the rate of cognitive change before and after divorce or widowhood. Previous research found that relationship status was associated with older adults' cognitive performance: married persons performed better on memory assessments and had lower dementia risk than unmarried-cohabitating, never-married, divorced, and widowed persons. However, the end of a marriage may cause distress or reduce distress because a stressor disappears. Questions thus remain about the mechanisms by which marital change affects cognitive outcomes and, specifically, whether termination of marriage can improve cognitive performance for some.

Research Design and Methods: Using data from the 1998–2016 waves of the Health and Retirement Study (N = 23,393), we conducted two analyses. First, we used trajectory analysis to create clusters of participants with similar cognitive trajectories and tested the association between participants' cluster membership and marital loss type. Second, we used multilevel modeling to analyze the relationship between participants' cognitive scores while married and following divorce or widowhood and linked these to marital features.

Results: Participants who divorced showed no difference in trajectory distribution; widowed participants were more likely to be in the lower-performing and more quickly declining groups. Participants had lower rates of decline following divorce ($\beta = .136$, $p < .001$), while widowed participants had accelerated decline following spousal death ($\beta = -0.183$, $p < .001$) and an immediate decline following spousal death ($\beta = -0.113$, $p = .028$).

Discussion and Implications: We found that the type of marital loss was important, and predicted improvements in cognition for some and decrements for others, with individuals who were divorced performing best while those who were widowed or separated but not divorced performing worse.

Translational Significance: Is the loss of a spouse through divorce or widowhood always harmful to cognition? Widowhood is associated with both an immediate decline in cognition performance as well as accelerated cognitive decline with time. Divorce slows the rate of cognitive decline with time. It is necessary to treat divorce and widowhood as distinct forms of relationship end. Understanding the harms and benefits of the end of marriages allows us to better identify the factors in marriage and post-marital life that are cognitively beneficial and harmful, and to design policies and interventions to maximize the former and minimize the latter.

Keywords: Alzheimer's disease, Dementia, Marriage

Background

Spousal relationships are some of the most important for overall well-being, including cognitive health: marital status is associated with older-age cognition, with never-married, divorced, and widowed persons (and, in some studies, unmarried cohabitants) all at increased risk of dementia than married persons (Liu et al., 2020; Liu, Zhang, Burgard, et al., 2019; Liu, Zhang, Choi, et al., 2019; Sommerlad et al., 2018; Sundström et al., 2014, 2016; Thomas et al., 2017; Zhang et al., 2021). Spousal relationships may also be *sui generis* as a form of social connection: Freak-Poli et al. (2022) find that, even though widows did not experience increased social isolation, and thus maintained the same amount of social engagement as before their spouse died, they did nevertheless experience increased loneliness, indicating the limitations in substitutability between spousal and nonspousal relationships. Differences in cognitive outcomes between married and unmarried men are greater than for women; in the United States, these differences are also greater and more significant for Black people than white (Liu, Zhang, Choi, et al., 2019; Zhang et al., 2021). Studies have also found that marital loss (i.e., divorce and widowhood) imposes immediate physical and mental health costs on those who experience it (Ding et al., 2021), with varying

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rates of recovery (Bennett et al., 2005; Lin & Brown, 2020; Tosi & van den Broek, 2020).

One growing area of research is whether marriage loss through widowhood and divorce contributes to cognitive decline, and how the mechanisms of such effects may differ by gender, race, and other factors (Brown et al., 2020). Extant research into marital loss has focused on two related causal models: the resource model and the stress model. The resource model posits that marital loss also entails a loss of resources—financial, social, practical, and psychological—that are also risk factors for cognitive decline. The stress model posits that there are stressful features of losing a partner, such as grief and adjustment to a new routine, that are risks for cognitive decline. Wu-Chung et al. (2022) argue that, for widows, the stress of loss contributes to multifarious adverse health outcomes that make the survivor more susceptible to existing brain pathology, and thus, dementia. There is some evidence for both mechanisms, the assumption across the literature is that losing a spouse is generally deleterious to one's health (Liu, Zhang, Choi, et al., 2019; Thomas et al., 2017). However, while a recent meta-analysis found widowed persons at increased risk of dementia, it found no association between dementia risk and divorce (Andrew et al., 2018).

This existing work has shown how marital loss is associated with poorer cognitive performance, and, ultimately, increased Alzheimer's disease and related dementias risk. However, unanswered questions related to marital loss's effects, in particular, their nature, range, and timing of their effects: Do married persons' cognitive-assessment scores change after divorce or widowhood? What marital features contribute to the size of any effects of marital loss on cognition? These questions remain unanswered because of assumptions and methodological choices in existing studies. For example, many studies simply assume that the end of a marriage constitutes a *loss* and little consideration has been given to the potential for some people to gain from marital termination. Yet, existing research has shown that the benefits of marriage accrue more to men than women (Ploubidis et al., 2015); and feminist research on families has argued that marriage can be exploitative of and harmful to women (Friedan, 2001; Hochschild, 1989). Finally, relationship conflict, including (but not limited to) spousal abuse and intimate partner violence, have been shown to be harmful to mental and physical health (Caldwell et al., 2012; Cunningham & L. Anderson, 2023; Esquivel-Santoveña et al., 2013). In this context, the end of a marriage may not constitute a loss but rather a relief from stress, unhappiness, and even physical harm.

Methodologically, this study complements existing studies (Brown et al., 2020; Liu et al., 2020; Liu, Zhang, Burgard, et al., 2019; Liu, Zhang, Choi, et al., 2019; Zhang et al., 2021) by utilizing longitudinal data to consider divorce and widowhood not simply as marital statuses to be held as constant, but as *changes* in relationship status as expressed in the language of "marital loss" or "dissolution." Longitudinal data enable us to analyze cognitive outcomes for individuals during and after marriage. This is important not only to understand the diversity of responses to marital loss but also to address questions of causality and the timing and duration of such responses. For temporality, the potential cognitive costs of stress responses like grief and adjusting to a new routine may be durable or temporary; differentiating between them requires including temporal factors through longitudinal study design. Thus, our study differs from existing longitudinal studies—even those that treat marital status as time-varying—by analyzing both immediate effects and a separate, post-marriage duration variable. Although the latter approach has been used in studies of bereavement following widowhood (Freak-Poli et al., 2022) as well as other later-life changes like retirement (Clouston & Denier, 2017), our use of it to study cognition and marital status, our inclusion of both immediate and long-term variables, and our application of this approach to divorce, are all novel.

Using data from the Health and Retirement Study (HRS), we aim to begin addressing some of these questions by looking at whether a relationship ending alters individuals' cognitive trajectories. We do so through two methods of analysis: first, we use trajectory analysis to determine whether marital loss changes individuals' likelihood of following one cognitive trajectory or another; and second, using multilevel modeling (MLM) to compare individuals' rates of cognitive change before and after they are divorced or widowed. To address questions of timing and duration, we analyze for both immediate, short-term effects of marital loss and longer-term changes to cognitive trajectories following loss. Unlike previous analyses, our study seeks to imagine the range of trajectories following the termination of a marriage to determine the prevalence of increased decline, stable change, and decreased decline/improvement following marital loss and to determine whether the type of marital termination is a predictor for different cognitive outcomes.

Method

Data

The HRS is a large population-based longitudinal study of the aging experiences of Americans aged 51 and older (Health and Retirement Study, 2018). The HRS began in 1992; since 1998, the study has moved to a steady-state design, following participants biennially and, every six years, adding new participants from more recent cohorts. The study includes questions about finances, work and retirement plans, and health, including a cognitive assessment. Our analysis uses information collected between 1998 and 2016.

Ethics

This project involves secondary analysis of anonymized, publicly available data. It is exempt from review by the institutional ethics committee and has been certified as such by our institution's Institutional Review Board. HRS obtained informed consent from all participants in its study prior to each wave of participation (Health and Retirement Study, 2018).

Inclusion and Exclusion Criteria

We included HRS participants from 1998–2016 (N = 42,236 participants; 422,360 observations) with complete cognition data who were married, married living apart, or separated (but not divorced) at baseline; we only included data from participants during wave for which they were at least 51 years old. The HRS began collecting cognition data in the third wave (1996); because of a marital-status coding anomaly in that year, in which separation and divorce were coded together, we used data starting from the fourth wave in 1998. We excluded participants who: were partnered or otherwise not married at baseline, defined as their first wave of age-eligible participation; those who were missing cognitive-assessment data for

all waves; and those who did not reach age 51 years prior to 2016 or departing the study. After applying these criteria, 22,147 participants remained.

Measures

Cognition

The HRS collected immediate and delayed word-recall (10 words each) data beginning in the first wave; from the third wave onward, it also assessed mental status using a version of the Telephone Interview for Cognitive Status, which includes vocabulary, naming, and numeracy questions. Recall and mental status scores are combined into a cognitive-function score. Beginning in 2000, the HRS imputed results for cases in which portions of the test were missing (McCammon et al., 2022). Interviews of proxy informants do not have objective cognitive-assessment scores, so we opted not to use them.

Following earlier studies (Liu et al., 2020), we tabulated a score that consists of the subset of HRS cognitive-assessment questions that are administered to all participants, regardless of age: immediate and delayed word-recall (10 points each), Serial 7s (subtracting 7 from a number, then again from the result, 5 times; 5 points), and counting backward (2 points). There are 27 points possible (Crimmins et al., 2011).

To adjust for the effects of learning through repeated exposure to this cognitive assessment (Clouston & Denier, 2017), we also included a binary variable to indicate whether it was the participant's first assessment in the HRS.

Marital loss

We sought to investigate the timing and duration of post-marriage cognitive changes. To test the timing, that is, whether there was an immediate post-marriage change in cognition, we also coded a binary variable to indicate whether there was a change from married (or separated) to divorced or widowed.

To test the duration of change, we coded a second, count variable set to 0 when a participant is married (including "Separated" and "Married, but living apart"); after divorce or being widowed, it is set to 1 and increases by 1 for every wave of participation as long as the participant remains unmarried. It is set back to 0 when a participant remarries. Divorce and widowhood can both happen for the same participant, and both can happen more than once.

Marital features

We included five variables to test for marital features: (1) number of marriages, coded as a count variable with three categories: one marriage, two marriages, and three or more marriages; (2) length of the current or most recent marriage, which increases with the length of the marriage as long as the respondent stays married. It stops counting after the marriage ends, and resets if the participant remarries; and three binary variables indicating (3) whether, during the duration of the study, the participant has been separated while married; (4) whether living apart prior to marital end; and (5) whether, for divorced and widowed participants, they remarried during the study.

Age/time in study

To better analyze between- and within-person differences, we adjusted for age using two variables: age at baseline and time in study for each wave (Hofer & Piccinin, 2010; Sliwinski et al., 2010). We calculated participants' age at baseline by subtracting the date of their first age-eligible interview from their birthdate. Time in the study was the difference between the interview date for the current wave and that for the baseline wave.

Sex/gender

The HRS asks participants for their sex/gender in their initial wave. There is a single-sex/gender question with only two possible responses, "Male" and "Female." Data about gender identity, including whether participants' or their spouses/partners are transgender, gender nonbinary, or otherwise gender minorities, is not available (Hanes & Clouston, 2021).

Education

Education, which has a strong association with cognitive health (Stern et al., 2020), was coded using a binary variable for those who completed an undergraduate degree or greater and those who did not.

Race and ethnicity

The HRS asks participants' about racial groups and Hispanic ethnicity in separate questions in a participant's initial interview. From this data, we created a binary variable: participants whose race is Black or Other, and those who gave their ethnicity as Hispanic, were coded as "Person of Color"; those who responded white and non-Hispanic were coded as such.

Wealth

Because this study uses data from a retirement survey, we opted to use household wealth (instead of wages or income) to account for the economic disadvantage. We rely on the HRS's total household wealth variable, natural-logarithmically transformed.

Statistical Analyses

Summary statistics were tabulated for the overall sample populations, and then separately to compare three subpopulations: participants who remained married for the duration of the study, participants who divorced at least once during the study, and participants who were widowed at least once during the study.

We performed two statistical analyses to test the relationship between cognitive trajectories and marital loss. To test the diversity of cognitive trajectories, we first conducted trajectory analysis to test the number of age-related cognitive-change trajectories within the sample population and then to test the relationship between those changes and marital loss. Second, to test the temporal effects of the end of marriage, we also conducted regression using a MLM.

Trajectory analysis does not assume uniform trajectories of temporal change across the population but instead tests for the existence of multiple directions and strengths of change for different latent groups of participants. Using the PROC TRAJ Stata extension developed by Jones and Nagin (2013) and following the procedure outlined by Andruff et al. (2009) and Nagin (2009), we tested for the number of groups as well as the pattern of change (i.e., linear, quadratic, or cubic). The outcome variable was the earlier-described 27-point cognitive-assessment score, and the time variable was age in years, centered on 51.

PROC TRAJ provides the intercepts and slopes for different groups' trajectories, as well as the postestimation probability of any individual participant's membership in each group, and

produces a categorical variable indicating the group number into which each participant has the greatest likelihood of fitting. To test the relationship between marital loss and overall cognitive trajectory, we performed a Pearson's χ^2 test for differences in the distribution of most-probable group membership across participants who were and were not divorced during their time in the study; we repeated this analysis for participants who were and were not widowed during their time in the study.

To test whether marital loss marked an inflection point in the rate of cognitive decline we used MLM regression, again using the above-described 27-point cognitive-assessment score as the dependent variable. We incorporated longitudinal information with the higher-level, random-effects term: the cross-wave participant identifier. By including a random-effects term for individuals across each wave of the study, MLM regression adjusts for the lack of independence between observations from any single participant. In the first MLM models, which we ran separately for widowhood and divorce (Models 1A and 2A, respectively), predictor variables were: baseline age, a time in the study, waves since widowhood/divorce (set to 0 if married or separated), a learning variable, and demographic variables (sex/gender, race/ethnicity, education, and wealth); the second MLM models for each form of marital loss (Models 1B and 2 B) added the above-named covariates for marital features.

Results

Summary statistics are shown in Table 1. Widowed participants were older at baseline than participants who remained married, while divorced participants were younger. Women and people of color constituted greater proportions of widowed participants than those who divorced or remained married. Participants who remained married for the duration of the study were more likely to have college degrees and were wealthier at baseline than either those who would divorce or be widowed. Divorced participants' marriages were, on average, roughly half the length of widowed and remained-married participants; they were also more likely to have 2 or more marriages than either group.

Trajectory analysis, shown in Table 2, shows that HRS participants best fit into five trajectory groups. Groups are ordered by ascending baseline cognitive-assessment score; among those groups, steeper declines with age are associated with lower scores at baseline. Being divorced during the study is not associated with a statistically significant change in trajectory-group membership ($\chi^2 = 7.082$; $p = .132$). Statistically significant differences do emerge with widowed participants, who have increased risk of membership in groups 1 and 2 and reduced risk in groups 3 and 4; that is, widowed participants are more likely to have lower baseline scores and steeper cognitive declines with time ($\chi^2 = 293.206$; $p < .001$).

Multilevel model (MLM) results are shown in Table 3; Models 1A and 2A show the results for divorce and widowhood, respectively, without immediate marital-loss binary variable or marital features; Models 1B and 2B add the immediate loss and marital features variables to the analyses. In keeping with existing research, widowhood's effects on cognition are negative, and we find this is true in both the short and long terms. Widowhood produces a negative immediate effect on cognition in the first wave following spousal death ($\beta = -0.113$, $p = .028$), and it is also associated with a steeper rate of decline with time in both models (Model 2A: $\beta = -0.182$, $p < .001$; Model 2B: $\beta = -0.183$, $p < .001$). Yet—in contrast to extant literature—divorce does not have any immediate effect ($\beta = -0.066$, $p = .592$) and has a positive association with cognitive slope, meaning cognitive decline slows after divorce in a more durable way (Model 1A: $\beta = 0.080$, $p = .003$; Model 1B: $\beta = 0.136$, $p < .001$). Though in the opposite direction, the effect size for each form of marital loss is likewise of similar magnitude, and of similar magnitude to the rate of cognitive decline associated with time in study. Given this similar magnitude between the marital loss coefficients and those for time in study, divorce may significantly slow cognitive decline with time compared to undivorced participants, while widowhood may more than double the rate of decline compared to participants who are not widowed.

Turning to marital features, only a history of separation has a statistically significant effect on cognitive intercepts and is negative; this holds for both divorce ($\beta = -0.775$, $p < .001$) and widowhood ($\beta = -0.805$, $p < .001$). Finally, the demographic variables are in keeping with the existing literature: race/ethnicity and education have the largest effect sizes across all models. Having a university degree or more is the most cognitively beneficial while being a person of color is the most cognitively deleterious.

Discussion

In our analysis of the relationship between marital loss and cognitive trajectories, we found that widowed participants were more likely to be in lower-performing trajectory groups, and we confirmed the existing literature that widowhood exacerbated cognitive decline. Importantly, our study novelly shows that this effect occurs both immediately after spousal death and persists with the duration of widowhood. In contrast—and contrary to existing literature—divorce is not associated with a difference in the cognitive-trajectory group, but it does mitigate the rate of cognitive decline with time. Ours is the first study to use duration since divorce to uncover this longer-term, post-divorce change.

The results support the idea that not all marital losses are, indeed, losses. This is somewhat intuitive: many couples divorce because they are dissatisfied with their marriage or, often, in conflict with their spouse. Ending the marriage and thus eliminating the source of that dissatisfaction and conflict—and the stress that accompanies them—brings with it new stressors, such as financial stress and worries about loneliness; it is these factors that researchers in marital loss and cognition have tended to focus on. However, divorced people also report increased overall happiness, as well as a sense of liberation from their former spouses (Crowley, 2019). Moreover, while divorce has historically been stigmatized in the United States, attitudes have changed to become more permissive. This includes the attitudes of older people, among whom divorce is also becoming more common (Brown & Wright, 2019). Part of this de-institutionalization of marriage and relationships, then, may also contribute a period effect to divorce's cognitive benefits.

Widowhood, in contrast, is less likely to provide such benefits. Even following cases of caregiving for an ill spouse, the surviving spouse experiences poor health outcomes following widowhood. These outcomes are exacerbated in cases of extended illness, as in many cases of dementia, and are

Table 1. Summary Statistics for Health and Retirement Study Participants Married at Baseline (1998–2016)

Variable	Whole sample (N = 22,147; 100.00%)		Married throughout study (n = 12,018; 54.26%)		Divorced (n = 6,102; 27.55%)				Widowed (n = 5,105; 23.05%)			
	Mean or %	*SD*	Mean or %	*SD*	Mean or %	*SD*	Diff.[a]	*p* Value[b]	Mean or %	*SD*	Diff. [a]	*p* Value[b]
Cognitive score[c]	16.06	4.35	16.07	4.39	16.24	4.14	0.17*	.012	15.83	4.56	−0.24*	.002
Age (y)[c]	60.29	8.99	59.82	9.06	57.19	6.27	−2.64*	<.001	64.96	9.33	5.14*	<.001
Length of current marriage (y)[c]	30.33	14.84	34.63	11.45	17.03	11.18	−17.60*	<.001	33.44	17.32	−1.19*	<.001
												<.001
Women	50.22%		45.50%		48.17%		2.67%*	.001	67.26%		21.76%*	<.001
People of color	30.65%		31.80%		33.11%		1.75%*	.078	24.48%		−9.58%*	<.001
College+	22.68%		26.04%		20.58%		−5.45%*	<.001	15.30%		−10.70%*	<.001
Mean wealth (Ln)[c]	11.03	3.51	11.25	3.38	10.40	3.93	−15.15*	<.001	11.11	3.21	−2.66*	.008
Number of marriages												
1	68.62%		97.01%		7.61%		89.40%*	<.001	61.70%		35.31%*	<.001
2	23.59%		2.43%		66.85%		64.43%*	<.001	28.73%		26.31%*	<.001
3+	7.78%		0.56%		25.54%		24.98%*	<.001	9.56%		9.00%*	<.001
												<.001
Remarried during study	2.54%				6.23%				6.90%			
Ever separated	6.47%		3.53%		13.77%		10.24%*	<.001	5.88%		2.35%*	<.001
Ever partnered	2.76%		0.69%		6.74%		6.05%*	<.001	4.43%		3.74%*	<.001

Notes: [a]Difference from participants who remained married for the duration of their study participation.
[b]*p* Value for the difference between this group and participants who remained married for the duration of their study participation; calculated using a *t* test for continuous variables and Chi-squared test for categorical variables.[c]At baseline.
*Statistically significant at $p \leq .05$.

Table 2. Results of Trajectory Analysis of Cognitive Scores for Health and Retirement Study Participants Married at Baseline (1998–2016)

Group	Parameter	β	p Value	Divorced		Widowed	
				No	Yes	No	Yes
1 (Lowest)	Intercept	9.379*	<.001	893	325	834	384
	Linear	−0.097*	<.001	5.4%	5.22%	4.75%	7.39%
	Quadratic	−0.001*	.006				
	% of sample	7.01%*	<.001				
2	Intercept	13.258*	<.001	2,229	920	2,253	896
	Linear	−0.081*	<.001	13.47%	14.77%	12.82%	17.24%
	Quadratic	−0.002*	<.001				
	% of sample	17.42%*	<.001				
3	Intercept	16.366*	<.001	4,450	1,681	4,545	1,586
	Linear	−0.070*	<.001	26.9%	27.0%	25.87%	30.51%
	Quadratic	−0.002*	<.001				
	% of sample	32.11%*	<.001				
4	Intercept	18.760*	<.001	7,837	2,880	8,790	1,927
	Linear	−0.048*	<.001	47.38%	46.25%	50.03%	37.07%
	Quadratic	−0.002*	<.001				
	% of sample	33.33%*	<.001				
5 (Highest)	Intercept	21.38*	<.001	1,133	421	1,149	405
	Linear	−0.034*	.002	6.85%	6.76%	6.54%	7.79%
	Quadratic	−0.002*	<.001				
	% of sample	10.13%*	<.001				
				χ^2	7.0817		293.206*
				p Value	.132		<.001

Notes: PROC TRAJ provides the intercepts and slopes for different groups' trajectories, as well as the postestimation probability of any individual participant's membership in each group and produces a categorical variable indicating the group number into which each participant has the greatest likelihood of fitting. Participants are grouped by most-probable trajectory group and the distribution of group membership is then calculated for divorced, undivorced, widowed, and unwidowed participants.
*Statistically significant at $p \leq .05$.

due to depression, anxiety, exhaustion and sleep disturbance, neglect of their own health needs, and social isolation that often accompany caring for an ill spouse (Saunders & Groh, 2020; Schulz et al., 2006). Despite the end of the source of these risk factors (i.e., the ill spouse), these effects can persist long after spousal death, for example, sleep disturbances were common for 10 years into widowhood (Corey & McCurry, 2018). Although "learning to live again" is a central part of the widowed experience, such recovery is lengthy, and dependent on personality traits, coping practices, social-network support, and other factors, like education and sex/gender (Bennett et al., 2005; Corey & McCurry, 2018; Klaus, 2021; Streeter, 2020). Conversely, the shock of a spouse's sudden death may also lead to immediate cognitive declines due to both grief and the need to quickly adjust to partnerlessness.

Marital separation, the only relationship feature with a statistically significant relationship to cognitive health, is more challenging to interpret. This is in part because of the paucity of research on separation, distinct from divorce. Although much research treats separation as "a linear transition that inevitably leads to divorce"—indeed, collapsing the two into "separation/divorce" is the most common way that divorce is operationalized in marital loss literature—not all separations end in divorce. Research has shown that this uncertainty and ambiguity are central to separated spouses' experiences of separation, along with feelings of isolation and unsustainability (Crabtree & Harris, 2020). The motivations for separation are similar to those for divorce: unhappiness, lack of love, and abuse, and the short-term effects of separation include decreases in mental and, for men, physical health (Hewitt & Turrell, 2011). We coded separation as a single, cross-wave variable to indicate whether respondents had been separated for any duration of their HRS participation. The negative association between ever having been separated and cognitive health, then, is likely a result of the unhappiness, uncertainty, and isolation that come with separation. This would resolve if that separation led to divorce, giving way to more certainty and an ability to "move on," and to improved cognitive health.

Limitations

Although this study provides evidence for post-divorce cognitive improvement and the acceleration of cognitive decline in widowhood, later-life relationship patterns are highly complex and variable. Most notably, to capture the effects of marital loss, we could only include those participants who were married for at least part of the study period, and then underwent divorce or widowhood. This requirement for later-life marital loss excludes those who had those experiences earlier in life, and thus the cognitive effects of younger marital loss and of longer-term divorce and widowhood require additional study.

Second, while we included certain relationship and life-history traits, the interactions of these factors with

Table 3. Results of Multilevel Models for Cognitive Performance of Health and Retirement Study Participants Married at Baseline (1998–2016)

Variable		Divorced		Widowed	
		Model 1A	Model 1B	Model 2A	Model 2B
Fixed effects					
Baseline age (y)	β	−0.136*	−0.138*	−0.142*	−0.144*
	Standard error	0.003	0.003	0.003	0.003
	p Value	<.001	<.001	<.001	<.001
Time in study (y)	β	−0.174*	−0.174*	−0.176*	−0.177*
	Standard error	0.002	0.003	0.002	0.003
	p Value	<.001	<.001	<.001	<.001
First cognitive test	β	−0.588*	−0.584*	−0.611*	−0.598*
	Standard error	0.037	0.037	0.037	0.037
	p Value	<.001	<.001	<.001	<.001
Female sex/gender	β	0.747*	0.761*	0.756*	0.769*
	Standard error	0.045	0.046	0.045	0.046
	p Value	<.001	<.001	<.001	<.001
Person of color	β	−2.500*	−2.409*	−2.504*	−2.415*
	Standard error	0.051	0.052	0.051	0.052
	p Value	<.001	<.001	<.001	<.001
University degree+	β	2.188*	2.169*	2.189*	2.166*
	Standard error	0.053	0.054	0.053	0.054
	p Value	<.001	<.001	<.001	<.001
Wealth (Ln)	β	0.096*	0.089*	0.099*	0.092*
	Standard error	0.004	0.005	0.004	0.004
	p Value	<.001	<.001	<.001	<.001
Waves since divorce/widowhood	β	0.080*	0.136*	−0.182*	−0.183*
	Standard error	0.027	0.033	0.011	0.012
	p Value	.003	<.001	<.001	<.001
Newly divorced/widowed	β		−0.066		−0.113*
	Standard error		0.122		0.051
	p Value		.592		.028
Number of marriages					
2	β		0.024		0.033
	Standard error		0.067		0.067
	p Value		.719		.625
3+	β		−0.119		−0.093
	Standard error		0.102		0.102
	p Value		.243		.362
Length of most recent marriage (y)	β		0.001		0.002
	Standard error		0.002		0.002
	p Value		.819		.416
Ever separated	β		−0.775*		−0.805*
	Standard error		0.098		0.099
	p Value		<.001		<.001
Remarried during study	β		0.087		0.192
	Standard error		0.137		0.138
	p Value		.529		.163
Constant	β	23.405*	23.652*	23.733*	23.958*
	Standard error	0.179	0.184	0.177	0.182
	p Value	<.001	<.001	<.001	<.001
Random effects					
Intercept variance		6.748	6.682	6.866	6.778
Standard error		0.093	0.093	0.093	0.093
Statistics					
χ^2		16,000	16,000	21,000	20,000
Observations		96,741	94,724	106,877	104,121

Note:
*Statistically significant at $p \leq .05$.

experiences of divorce or widowhood are more difficult to analyze statistically. For example, for the purposes of parsimony, we did not model the variables to address separation and remarriage as time-varying factors; thus, whether remarriage ameliorates the adverse effects of widowhood, or divorce mitigates those of separation, remains to be seen.

Some factors important to separation and divorce, such as spousal abuse or infidelity, are not explicitly gathered in the HRS and thus were not possible to include in this study. Similarly, other marital characteristics, such as the role of sexuality and gender-identity were not gathered or were not sampled in large enough numbers for inclusion (Hanes & Clouston, 2021, 2023).

Future Directions

Although we included some marital features in this analysis, existing literature has shown that marital satisfaction, financial stability, social support, and feelings of isolation are important for their impacts on divorced and widowed persons' health (Umberson & Thomeer, 2020). This includes their mental health, most notably depression, which is itself a risk factor for cognitive decline and dementia (Kuo et al., 2020). Additional research is necessary to analyze the role of marital quality, like marital satisfaction and household division of labor, as well as post-loss stressors, such as financial instability, as intervening factors in the relationship between marital loss and cognitive health.

Marital benefits and the changes due to divorce and widowhood are likely differentiated by sex/gender and other factors, including education, wealth, the presence and relationship with children, and race/ethnicity. This is partly because marriage itself, including the costs and benefits of marriage, domestic labor, and experiences of abuse, are unequally distributed according to sex/gender. So, too, do certain post-marriage stressors fall unequally: men, for example, are more likely to experience isolation (Wright et al., 2019), while women are more likely to experience financial insecurity. Post-marriage life courses are also different: men are more likely to remarry than women, while women are likely to rely on friends and family for social support (Wright et al., 2019). These differences are ripe for additional analysis to see whether marriage, divorce, and widowhood affect men's and women's cognitive health differently, and if so, how intersecting identities like race and ethnicity shape those differences.

Finally, the relationship between marital loss and cognitive health is likely to change as the role of marriage changes for subsequent cohorts of older people. In particular, as marriage becomes less common and "grey divorce" and unmarried cohabitation, more common (Brown & Wright, 2017), the effects of marital loss and how we study relationship changes are likely to alter. More research is necessary to link the relationship between cognitive health, marital status (including changes to it), and cultures and attitudes toward marriage, divorce, and unmarried cohabitation.

Conclusion

Existing research has argued that married individuals tend to fare better as they age, including in terms of cognitive performance, and our results regarding widowhood support these findings. However, this paper challenges the view that marriage is universally beneficial by showing that divorce mitigates cognitive decline. These results are important for understanding the complexities of marriage and the necessity of, in some cases, ending those relationships for aging individuals' health.

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Conflict of Interest

None.

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