CUMULATIVE DISADVANTAGE: THE ROLE OF CHILDHOOD HEALTH AND MARITAL QUALITY IN THE RELATIONSHIP BETWEEN MARRIAGE AND LATER LIFE HEALTH

Gwendolyn R. E. Zugarek

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Committee:

Susan L. Brown, Advisor

Kelly Stamper Balistreri

I-Fen Lin

ABSTRACT

Susan L. Brown, Advisor

Married older adults tend to fare better in terms of health and mortality than those who are not married, and this association is especially pronounced for those with high marital quality. At the same time, childhood health is related to later life health outcomes. The aim of this study is to determine how much of the relationship between marriage, marital quality, and later life health can be explained by the long arm of childhood health. From the cumulative disadvantage theory, childhood health is linked to marriage and marital quality as well as later life health. Using the 2008-2010 Health and Retirement Study (N=13,620), I examine whether marital status and quality are related to self-rated health and cardiovascular disease net of childhood health. Marital quality is associated with later life health, net of childhood health and other factors. High marital quality is associated with a decrease in risk of poor self-rated health and low-quality marriage is related to an increased risk of cardiovascular conditions compared to the unmarried. Poor childhood health is associated with an increased health risk, but the relationship between marriage and health remains robust after controlling for childhood factors, indicating it is not spurious. Finally, there is no significant difference in how marital status and quality function for men and women.

This thesis is dedicated to my grandparents, Jerry and Eleanor Eberhart, who taught me the importance of dedication, integrity, and compassion. May they rest in peace.

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TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

Research shows that married older adults fare better in terms of health and mortality than those who are not married (Carr and Springer 2010). Empirical studies document this positive association for physical, physiological, and emotional health. For example, those who are currently married tend to have fewer chronic conditions, mobility limitations, reported disabilities, and depressive symptoms, and higher self-rated health than those who are unmarried or have never been married (Hughes and Waite 2009; Lin and Brown 2012). Married individuals not only fare better in terms of health, on average, but also experience lower odds of mortality, with recent work suggesting the gap between marrieds and unmarrieds is increasing (Rendall, Weden, Favreault, and Waldron 2011). Marital quality also plays a role in health, with strain being associated with a decline in self-rated health, especially at older ages (Liu and Waite 2014; Umberson, Williams, Powers, Liu, and Needham 2006).

Research indicates childhood health is also related to a variety of later life health outcomes, including mortality (Elo and Preston 1992; Haas 2006; Haas 2008). However, prior research has not adequately examined the role childhood health might play in the relationship between marital status and quality on later life morbidity. In exploring the linkage between marital status and quality and health outcomes, it is important to consider whether these benefits persist or are partially explained by factors such as childhood health. The relationship between marital state (i.e., marital status and marital quality if married) and later life health may be spurious in that both marital state and later life health are influenced by childhood health.

Marital status appears to be associated with later life morbidity, as are marital quality and childhood health. The goal of this study is to parse out how much of the relationship between marriage, marital quality, and later life health can be explained by the long arm of childhood

health. Using the nationally representative Health and Retirement Study, I examine the relationship between marital status and later life self-rated and cardiovascular health. This allows me to examine general well-being, but also the potential influence on cardiovascular disease, which was the leading cause of death in the United States in 2013 (Kochanek, Murphy, Xu, and Arias 2014). These two outcomes also provide insight as to how marital state and childhood health are related to subjective versus objective health.

To more fully understand the linkage between childhood health and marital state, I also explore the possibility of childhood socioeconomic influences and gender differences in these relationships. Identifying what factors influence later health provides insight into the mechanisms that contribute to health outcomes among older adults. This paper seeks to ascertain whether marital status and quality and their association with well-being is a function of the state of the relationship itself, or whether there is a spurious relationship that ties back to childhood health, net of childhood socioeconomic conditions and other demographic factors.

BACKGROUND

There has been an increase in the number of unmarried older adults in recent years and studies indicate that those who are not married have higher risk of poor health (Carr and Springer 2010; Lin and Brown 2012). In addition, there is a growing proportion of married older adults who are in higher order marriages (Brown and Lin 2012), which have been linked to poorer health outcomes as compared to those of the continuously married (Hughes and Waite 2009). Overall, the older population appears to be at increasing health risk due to growing heterogeneity in the composition of older adults' marital statuses. If older adult marital biographies are becoming complex, risk for health complications may increase for these older adults. Widening the research scope of marital status and health to include both marital quality and childhood health assists in the understanding of how experiences in the life course might influence later life health.

Theoretical Framework

This research draws on cumulative disadvantage theory which suggests that people accrue events/experiences over the life course that benefit or hinder their health in later life and that both cohorts of advantage and disadvantage are formed through the life course (Ferraro and Kelley-Moore 2003; O'Rand 1996). Those who begin life with advantage are more likely to have access to resources and experiences that increase this advantage whereas those who experience disadvantage at early ages often continue to experience this disadvantage through lack of resources and exposure to negative life experiences. As disadvantaged individuals age, they increase their potential exposure to factors associated with negative health outcomes.

Cumulative disadvantage theory suggests older adults, who are already at an increased risk of poor health due to age, are more susceptible to health risks if they have accumulated a

profile of disadvantage (Liu and Waite 2014). The relationship between early and later life health could be because individuals with certain characteristics (e.g., poor childhood health) are more likely to have negative experiences and lack resources starting at early ages, or that having a negative experience in the beginning of the life course leads to a higher likelihood of future negative occurrences. Drawing on this theory, my research investigates the relationship between marital state and later life health while considering whether this is a spurious relationship that is explained by childhood profiles of disadvantage.

Marriage, Marital Quality, and Health in Later Life

Research consistently shows that those who are married are more likely to have lower morbidity and mortality in later life (Lillard and Panis 1996; Manzoli, Villari, Pirone, and Boccia 2007; Rendall et al. 2011). Some of the marriage advantage can be explained by the pooling of resources that occurs in marriage (Carr and Springer 2010; Waite 1995). For example, we know that better financial standing is linked to more positive health outcomes. Those who marry tend to have greater financial resources than those who remain single or who have experienced a divorce (Carr and Springer 2010). Married couples might also have increased access to larger social support systems and social networks. Marriage often provides a protective effect for both men and women against mortality (Liu 2012; Rendall et al. 2011). Spouses typically monitor each other's health behaviors, reducing riskier behavior participation among married individuals (Carr and Springer 2010; Waite 1995).

One area of health known to be related to stress is cardiovascular health. A study by Zhang and Hayward (2006) finds that those who are divorced, separated, or widowed have significantly higher rates of cardiovascular disease than marrieds, but they did not find a significant difference between marrieds and never-marrieds. This would point to the loss of a

relationship as a potential risk factor for overall health in later life, but not marriage as being a protective factor. Their study used the HRS, but does not consider the role of marital quality.

Several studies that factor in marital quality find that the health benefits of marriage only extend to those in high-quality marriages (Liu and Waite 2014; Williams 2003). In fact, those who are in poor quality marriages tend to fare worse than high-quality marrieds, never-marrieds, and those who have experienced marital dissolution (Ren 1997; Williams 2003). It is important to consider marital quality when examining marriage and well-being because those who are in low-quality marriages have greater exposure to stress due to marital strain, reducing the potential benefits that accrue from marriage. This additional health risk contributes to the possibility of accumulating a disadvantaged health profile.

The advantages related to marital status and quality have also been linked to physiological processes (Kiecolt-Glaser, Fisher, Ogrocki, Stout, Speicher, and Glaser 1987; Robles and Kiecolt-Glaser 2003). Married individuals have better immune responses than those who are not married, and those with better marital quality have higher functioning immune systems than those who are in poor-quality marriages (Kiecolt-Glaser et al. 1987). The strain of a poor-quality relationship appears to negatively mediate the positive health consequences that are associated with marriage. Social relationships play an important role in health according to Umberson and Montez (2010). Poorer relationship quality in all relationship types is tied to negative health outcomes.

The relationship between marital state and later life health might be an artifact of the relationship between childhood health and later life health. Research suggests that the link between marital quality and health is more important for women and people of older ages. Women appear to be more responsive to marital strain than men (Donoho, Crimmins, and

Seeman 2013). Those at older ages are also more vulnerable because they have had more time to accumulate the negative health effects of disadvantage (Liu and Waite 2014) and health declines with age in general. Marriage and higher marital quality could be directly influencing later life health, or they could be an artifact of those with poorer childhood health having accumulated health disadvantage and being less able to attain and maintain higher-quality marriages, or even marriage in general.

Childhood Health and Health in Later Life

There appears to be a strong link between childhood health and health in later life (Blackwell, Hayward, and Crimmins 2001; Hayward and Gorman 2004; Smith 2009a). Several studies suggest that poor childhood health leads to negative health outcomes later in the life course (Haas 2007; Harris 2010; Hayward and Gorman 2004; Smith 2009a). Smith (2009b) concludes childhood health is not just related to midlife health, but also to income and marriage prospects net of parent health and educational attainment. Siblings with better reports of childhood health had higher adult incomes, suggesting that healthier children accrue advantage compared to those having poorer childhood health (Smith 2009b). Hayward and Gorman (2004) identify childhood health as being related to later life health, but this relationship disappears after controlling for socioeconomic conditions during childhood. Other studies, however, find this relationship to be robust (Haas 2007; Harris 2010; Smith 2009a).

Blackwell and colleagues (2001) analyze self-reports of older adults and find severe childhood health problems were associated with chronic morbidity. Haas (2007) similarly suggests that childhood health was a predictor of adult health outcomes. Reports seem to show a consistent link between childhood health and later life health. Harris (2010), in her Population Association of America Presidential Address, explains that health statuses at all stages of life are

important, but argues health and health behaviors during earlier life influence health trajectories that unfold later in life.

Childhood Health and the Life Course

Poor childhood health is linked to less education and lower social status attainment (Haas 2006). Thus, traits often characteristic of someone having good marriage prospects, like higher educational attainment and financial stability, are less common among those who were severely ill as children. Haas (2006) finds childhood health to be a causal factor in determining socioeconomic attainment. While he recognizes that childhood health can be a consequence of other factors, the relationship remains robust even controlling for the influence of family characteristics.

This would not mean those who were ill as children will not marry. Instead, they may be in poorer quality marriages. Some scholars suggest the number of health complaints at the beginning of a marriage is associated with an increased risk of a poor-quality marriage and marital dissolution (Joung, Van de Mheen, Stronks, Van Poppel, and Mackenbach 1998), but these researchers did not consider the role of childhood health in the presence of health complaints. However, since poorer childhood health has been linked to negative health outcomes (Haas 2007; Harris 2010; Smith 2009a; Smith 2009b), this suggests childhood health could play a role in marital quality and stability. Those with poorer childhood health who have accumulated health complaints could be at a disadvantage in forming and maintaining high-quality marriages. Having a strained marriage or going through the stress of a divorce would then add to this disadvantaged profile.

Gender and Marriage

The benefits of marriage and marital quality may differ by gender. Although both men and women benefit from marriage, it is unclear whether the benefits are the same for both groups (Carr and Springer 2010). Several scholars argue men gain more from marriage than women (Bernard 1972; Reczek and Umberson 2012; Umberson 1992). For example, some research finds marriage offers greater physical health benefits, at least in terms of mortality, for men compared to women (Gardner and Oswald 2004; Johnson, Backlund, Sorlie, and Loveless 2000). Taking on the caretaker role may play a part in observed gender differences because women are more likely to monitor or control their husbands' health behaviors than the reverse (Reczek and Umberson 2012; Umberson 1992). However, other studies suggest that men and women experience similar health advantages over time (Liu and Umberson 2008; Manzoli et al. 2007).

Research on marital quality has also yielded mixed findings for a variety of health outcomes, with some suggesting women are at a disadvantage and others finding no gender difference. Williams (2003) finds women and men experience similar negative psychological outcomes from a low-quality marriage. But, Liu and Waite (2014) identify women as having a higher risk of cardiovascular problems when exposed to low-quality marriages compared to men. These mixed findings may be at least partially explained by the time frame of the data sets that are being analyzed. While men's health benefits from marriage remained fairly stable from 1972 to 2003, women have actually experienced gains from marriage in recent years (Liu and Umberson 2008). This indicates a convergence in marital health benefits between the sexes, but does not factor in how marital quality may influence the gender gap. If women do experience less of a health advantage from marriage, or marriages of particular quality, then this would suggest that women are at a higher risk in terms of accumulating health disadvantage.

A Note on Selection

There is debate in the literature as to whether the health benefits associated with marriage are due to individuals with better health selecting into marriage and enjoying higher quality marriages. Alternatively, experiencing marriage and/or marriages of higher quality may cause a person to have better health outcomes. Research has also suggested childhood health influences an individual's likelihood of marrying and the quality of that relationship. A question to consider when examining these connections to health outcomes is whether the relationship between marriage and health is causal or spurious.

Research that finds married individuals benefit from spousal support and health behavior monitoring lends credence to a causal explanation in the relationship between marriage and health (Carr and Springer 2010; Umberson 1992; Waite 1995). The social support benefits can come from not only having a partner, but the increased social networks of friends and family that a spouse brings to the relationship (Waite 1995). On the other hand, there is research to suggest marriage may limit social networks and interactions because of the time and energy required in maintaining a relationship (Gerstel and Sarkisian 2006). Having a spouse to combine financial resources with could enable long-term investments. Assuming that spouses are pooling resources, the financial standing of a married household of comparable individual income would have more resources, as well as a safety net for unforeseen events (Waite 1995). Alternatively, the negative health implications of experiencing the stress of marital strain would indicate some marriages also could have a negative causal effect on health outcomes (Liu and Waite 2014; Williams 2003).

Selection in the context of marriage and health could be health prior to marriage influencing whether an individual enters into a marriage or the likelihood of selecting into a

poorer quality marriage. Another important factor is selection related to risky behavior. Those who select into marriage might exhibit less risky behavior, thus increasing the likelihood of marrieds having greater health. Behavioral selection is also supported by the fact that divorced men in poorer health were quicker to remarry (Lillard and Panis 1996), suggesting seeking health benefits might play a role in marriage selection as it relates to those pursuing better health stability at later ages. Lillard and Panis (1996) consider health, selection into marriage, and health outcomes in later life for men, finding that those who are healthier are more likely to marry and less likely to experience a divorce. While there is evidence in their study to support marriage as a mediator of earlier health and later health, it does not control for marital quality, specifically identify childhood health, nor does it examine whether marriage buffers the risk of later life morbidity.

There is evidence that supports both the causation and selection perspectives, and it is possible that both play a role in health outcomes. Waite (1995) argues marriage is both selective and protective. Waite considers selection into marriage, but not the role of childhood health. Development of behaviors starts at younger ages and it is important to understand how childhood health is associated with these selection processes and outcomes.

The goal of this study is to examine whether the relationship between marital state and later life health is robust or spurious due to childhood health. It also aims to identify whether childhood health buffers the relationship between marital state and later life morbidity. In other words, I identify whether childhood health and marital state have multiplicative effects on later life health. Finally, I examine whether being married, regardless of marital quality, is directly related to better later life health outcomes for both women and men, as compared to the

unmarried, and whether marital quality is less important for men than for women in determining health outcomes.

CURRENT STUDY

Although prior work has examined the relationship between marital state and health, it has not investigated the role of childhood health. Childhood health is the very beginning of a health trajectory, not including prenatal and conception factors. It is important to understand whether marital status and quality significantly influence later life health or if this well-documented relationship is largely an artifact of childhood health status. Identifying such a relationship increases understanding of how marriage influences health and if earlier life experiences are a key factor in the disadvantaged profiles in older adults.

Historically, men have enjoyed larger health benefits from marriage, but more recently this gender gap has been closing (Liu and Umberson 2008). However, there is contemporary empirical research suggesting low marital quality is more likely to be related to negative health outcomes among women than among men (Liu and Waite 2014). In this study, men and women are analyzed separately if significant interactions between gender and marital state are present in order to parse out any gender difference that may be present in how these health mechanisms function.

This study examines later life health outcomes and how they differ depending on marital state. *The first hypothesis is that those with low-quality marriages do not have a health advantage over the unmarried, while those in high-quality marriages do have an advantage*. The reason low-quality marriages might not have any benefit compared to those who are unmarried is that any benefit that comes from being married would be diminished by the presence of stress that a low-quality marriage produces. Alternatively, the experience of having a low-quality marriage might leave those individuals with greater health risk compared to those who are unmarried.

The second hypothesis of this study is that the association between marital state and later life health can be explained by the long arm of childhood health. If the relationship between marital state and later life health is not significant after adding childhood health to the model, this indicates a spurious relationship between marital state and later life health.

The third hypothesis is that individuals with poorer childhood health and lower marital quality (or being unmarried) have an especially high risk of health disadvantage compared to those with poor childhood health and high-quality marriages. In other words, hypothesis three posits that the accumulation of negative health indicators has a multiplicative health disadvantage and high-quality marriage can buffer poor childhood health.

Lastly, I postulate women derive less of a health advantage from marriage than men, with men benefiting more from being married regardless of quality and women having greater health risk when faced with lower marital quality. Since prior research yields mixed findings with regard to gender differences, this study contributes to the literature and helps to decipher whether gender differences exist in the relationship between marital status, marital quality, and later life health.

One of the assets of this study is the use of both subjective and objective health measures as the dependent variables. Self-rated health is used to capture general health status. This measure reflects the respondents' overall views of their current state of health. While a large selection of questions are available in the HRS to measure a multitude of health problems and physical and cognitive limitations, self-rated health helps in understanding which factors may influence overall morbidity in those age fifty and over. Relying on an overall health measure has been shown as an effective way of measuring respondent health status and is a predictor of mortality in older adults (Mossey and Shapiro 1982). The second dependent variable is

cardiovascular health, which has been linked to both marriage and marital quality (Liu and Umberson 2008; Liu and Waite 2014; Zhang and Hayward 2006). Cardiovascular health is an objective health measure that taps diagnoses from a medical professional and adds a second dimension to the health outcomes examined in this study. This is an important objective health measure because cardiovascular disease was also the leading cause of death in the United States in 2013 (Kochanek et al. 2014).

Considering marital status without examining marital quality would be leaving out an important predictor that has been tied to several health outcomes (see Liu and Waite 2014; Williams 2003). This study incorporates the quality of the relationships for those who are currently married, allowing for a comparison of those who are not married to those who are in higher-quality versus lower-quality marriages. Here, marital quality is tapped by multiple indicators of both positive and negative quality which together provide an overall gauge of marital quality. Marital quality reports are typically skewed with respondents often rating their relationships on the higher end of the scale. I conduct sensitivity analyses to assess the appropriate cut point for high versus low marital quality.

The other health measure used in this study is childhood health. Haas (2007) used a dichotomized version of self-rated childhood health, which represents overall health as a child. The reasoning behind dichotomizing, as he explains, is that it reduces error that can be associated with requiring higher levels of specification in retrospective reports of general health. In other words, good childhood health offers less ambiguity than having the respondent recall and choose between the good, very good, and excellent options in the five choices within the HRS questionnaire. This does not mean that a respondent cannot comprehend the difference between

the positive and negative categories, just that picking within the positive or negative categories leaves more room for fluidity of interpretation.

Childhood SES is also considered in this research. Previous work finds that experiencing poorer economic conditions in childhood is linked to worse health later in life (Blackwell et al. 2001; Haas 2007; Haas 2008; Hayward and Gorman 2004; Luo and Waite 2005). These findings are present for both subjective and objective health outcomes (Luo and Waite 2005; Haas 2008). It is important to note that while childhood SES has been linked to health in later life, the significant relationship between childhood health and later life health remains independent of these factors, suggesting socioeconomic factors in childhood are important, but not explanatory in regards to the relationship between childhood health and later life health outcomes (Blackwell et al. 2001; Haas 2008; Luo and Waite 2005).

There are several other factors that can also contribute to marital status and health outcomes. This study controls for race-ethnicity because they have been linked to health outcomes (Kington and Smith 1997) and there are mixed findings as to whether there are racial-ethnic differences in the benefits of marriage (Carr and Springer 2010). Black are also less likely to marry than Whites (Raley 1996) and are less likely to experience high marital quality (Bulanda and Brown 2007). Age is considered because research suggests that marital strain is increasingly detrimental with age (Liu and Waite 2014; Umberson et al. 2006) and health, in general, declines in later life. Another factor that can have a negative association with health is the loss of a marriage through death or divorce/separation (Carr and Springer 2010). Controlling for whether the respondent has been previously married will help to filter out any difference higher order marriages might have from first marriages, as well as any differences among the unmarried that these marital biographies could explain. Religiosity is used in this study as a

proxy for social support (Brown, Bulanda, and Lee 2005). Lastly, the socioeconomic indicators of total assets, health insurance, and educational attainment are considered. Married individuals are more likely to have higher levels of education and greater assets, to possess health insurance, and to be in better health (Carr and Springer 2010; Lin and Brown 2012).

While research has examined how marital status and quality are associated with later life health and how childhood health can shape health at older ages, there is a gap in the research as to whether these aspects of the life course work in conjunction with one another to create profiles of health advantage/disadvantage. This study seeks to examine whether marital status and quality are related to health net of childhood health. This work also investigates whether these two factor have a multiplicative effect on later life health. By investigating all of these relationships, making gender comparisons, and using both subjective and objective health outcome measures, the study offers a unique contribution to the literature.

DATA AND METHODS

Data

This study uses the nationally representative (1992-2010) Health and Retirement Study (HRS). The University of Michigan began this longitudinal panel study of adults over the age of 50 in 1992 and has added new waves of data biannually since 1996. The HRS focuses on key topics in aging research, such as economics, health, family ties, relationships, etc. It assigns a core survey to all participants, then gives different groups separate modules to cover a larger variety of research interests. Every two years when a new wave of data is being collected, half the sample is also given a supplemental psycho-social survey that includes marital quality questions and then the other half answers these additional questions the following wave. This is done to reduce the burden on the respondents.

For the purposes of this study, I am analyzing the 2008 and 2010 data, using only the half of the sample from each year that took the psycho-social supplemental survey in order to examine the marital quality variables found in this supplement (14,635 of the 24,218 cases). The childhood health and SES measures are pulled from the initial wave in which they are asked. All other variables are from the year in which the respondent took the psycho-social survey. List-wise deletion removes respondents under the age of 50 (409 cases), and those missing on either of the dependent variables (19 cases). Cases are also removed if the respondent is missing on marital status (1 case), at least 2 of the 7 marital quality questions if they are married (185 cases), or the childhood health measure (26 cases). Lastly, the analyses use complex weighting. Those cases missing on the weight variables (375 cases) are removed, giving a final sample of 13,620 respondents.

Dependent Variables

The dependent variables are self-rated and cardiovascular health. Self-rated health is collapsed into a dichotomized variable. Reports of fair or poor health are coded as '1' and good, very good, and excellent are coded as '0.' For the second dependent variable, respondents are asked if they have ever been diagnosed with coronary heart disease, congestive heart failure, angina, a heart attack, other heart problems, or a stroke. This study is modeling the cardiovascular variable on the example of Zhang and Hayward (2006) and codes the diagnosis of any of these conditions as a '1' and all others as '0.'

Independent Variable

Marital status and quality are divided into three mutually-exclusive categories: unmarrieds, low-quality marrieds, and high-quality marrieds. All those who are not currently married are coded as unmarried. Among those who are married, they are divided into low-quality marrieds and high-quality marrieds. The construction of the marital quality scale consists of marital quality measures from the 2008 or 2010 psycho-social questionnaire (see Smith, Fisher, Ryan, Clarke, House, and Weir 2013). These measures cover the following: does your spouse understand the way you feel about things; can you rely on them if you have a serious problem; can you be open to your spouse about your worries; and does your spouse place too many demands on you; criticize you; let you down; get on your nerves. The relationship quality questions have the response categories of 'a lot,' 'some,' 'a little,' and 'not at all.' Those with missing responses are coded to the mean of each question. The negative quality measures are reverse coded and then summed with the positive measures to create a scale (alpha=0.83), similar to Amato and colleagues (2003). This scale ranges from 7 to 28. Respondents who score within

the top quarter of married respondent on quality (26 to 28) are categorized as having a high-quality marriage and those below are considered low-quality.

Supplemental sensitivity analyses using the median (23) and the bottom fourth (21) as cut points are conducted to ensure measure robustness (marital quality scale and sensitivity analyses found in the appendix). In the final model, sensitivity analyses (Table 5 and Table 7, respectively) yielded findings that were nearly the same substantively as the results obtained using the top quarter cut point (Tables 2 and 3). The only exception is that for self-rated health when high-quality marrieds include the median and above on the quality scale, the low-quality marrieds are statistically more likely to report poor self-rated health than the high-quality marrieds. This difference may be related to greater statistical power from increasing the number of high-quality marrieds. The results for the sensitivity models that increases the number in the high-quality marrieds category to the top three quarters on quality find no significant relationship between marital state and older adult health (Table 6 and Table 8). These results suggest that the findings in the main models are not sensitive to the cut point because they hold when the cut point for high-quality is extended to the median but, as expected, this does not hold when only the bottom quarter of the marrieds are considered lower-quality because respondents are more likely to score their marital quality as higher on the quality scale (see Table 4).

Childhood Health

Childhood health is a single, retrospective measure of self-rated childhood health. This question is first asked of respondents who are in the HRS in 1998. For those who entered the study in subsequent years, the answer given in the initial interview is used. This measure is dichotomized, as done by Haas (2007), with poor and fair childhood health coded as a '1' and good, very good, and excellent is coded as '0.'

Controls

The first set of controls, indicating childhood SES, are attained through five retrospective measures about the respondent's childhood using similar measures to Haas (2008): mother's education, father's education, perceived family as poor, moved in childhood due to financial difficulty, and father's unemployment. Respondents are asked how they perceived their families' financial situation in childhood and the answer categories are "pretty well off,' 'about average,' and 'poor.' This variable was dichotomized so that those who claimed to be poor are coded as '1' and all else (including missing) are coded as '0.' There are a few respondents who volunteered the response 'it varied' which are coded as '0' to be conservative. For whether they moved due to financial strain, respondents are coded as '1' if they responded 'yes.' Father's unemployment is a dichotomized variable with respondents whose father experienced a period of unemployment in childhood coded as '1' and all others (including missing) coded as '0.' Lastly, father's and mother's education are both into coded 'less than high school' if he/she has less than 12 years of schooling, 'high school' with 12 years (reference category), 'college' if more than 12 years of education, or 'missing' if respondent was missing on the question.

This study controls for age, gender, race, previous marriage, religiosity, and socioeconomic status (SES). The age measure is continuous and race is coded into White (reference category), Black, Hispanic, or other race dummies. Those missing on race and ethnicity are coded as White and those missing on Hispanicity and not race are coded to their racial category. Gender is coded as '1' for male and '0' for female. Previous marriage is coded as '1' if the respondent has been experienced at least one divorce or been widowed. Importance of religion is used as the religiosity indicator. The categories 'not too important,' 'somewhat

important,' and 'very important,' are coded from '1' to '3' with '3' being the most important. Missing cases are coded as '3.'

SES is assessed through health education, insurance, and total individual assets. Educational attainment is identified by the highest degree earned: less than high school, high school (reference category), some college, and a college degree or higher. Those missing on education are coded to the mode (high school). The insurance measure consists of four mutually-exclusive categories: private insurance (reference category), Medicare, other insurance, and no insurance (Brown, Lee, and Bulanda 2006). Individuals missing on the insurance measures are categorized as being privately insured (the modal category). Wealth is a comprehensive measure at the household level that accounts for all assets, income, debts, and second residences. This study divides total household assets by the square root of the number of individuals living in the household in order to account for the variation in household sizes. Total individual assets range from -540,477 to 27,800,000 dollars, with a right skewed distribution and a standard deviation of 734,308. For the purposes of this analysis, the total wealth variable is divided into five categories: debt, $0 to $50,000 (reference category), $50,001 to $100,000, $100,001 to $250,000, and those with greater than $250,000 (see Karraker and Latham 2015).

Analytic Strategy

I begin by examining the distribution of each variable in this study (shown in Table 1). Descriptive statistics are shown for the total sample, as well as by the three marital state categories. Then I use logistic regression to test the hypotheses for each of the dependent variables. The first set of analyses examines poor self-rated health and the second set investigates the cardiovascular health measure.

The initial model examines the association between marital state and later life morbidity, to test the first hypothesis that only the high-quality marrieds have a health advantage compared to the unmarried and that low-quality marrieds do not have a health advantage (alternatively, low-quality marrieds are disadvantaged compared to the unmarried). The second model is used to assess whether the relationship found between marital state and later life health is spurious by adding childhood health and SES to the model, which tests whether the relationship between marital state and later life health is spurious (hypothesis 2). Next, the controls are added to test whether these associations are robust or possibly reflect selection. An additional model tests interactive effects of marital state and childhood health, evaluating hypothesis 3 that suggests marital state buffers childhood health.

The last piece to this study is examining if any gender differences exist. Interactions between gender and marital state are used to identify whether there are significant differences between men and women. This tests the fourth hypothesis, that men benefit more from marriage more than women and lower quality marriages are associated with a larger health disadvantage for women.

RESULTS

Descriptive Results

Descriptive statistics are shown in Table 1 for the whole older adult population, as well as by marital status and quality. Self-rated health is reported as poor by 26.2% of older adults, with approximately the same proportion (25.9%) reporting a cardiovascular condition. Over half of adults 50 years and over are married (62.1%) and 17.2% of older adults are categorized as high-quality marrieds (at least 26 on the marital quality scale). Approximately 45% of older adults are classified as being in a low-quality marriage.

Only 5.9% of older adults experienced poor childhood health, while 27.7% perceived their families as being poor during their childhoods, and 17.3% and 18.7% reported having had to move as a child due to financial strain and had a father who experienced unemployment, respectively. On parental education, 45.8% of fathers were reported as having had less than a high school education and 24.2% as having just a high school education. For mothers, 43.1% had less than a high school education and 33.9% were reported as receiving a high school education. There were several missing cases on parental education, with 14.4% of fathers and 8.5% of mothers missing.

Turning now to the descriptive statistics by marital state (also in Table 1), those older adults who are not married have a larger proportion reporting poor self-rated health and cardiovascular conditions (33.8% and 28.8%, respectively) than those who are in high-quality marriages (19.1% and 23.5%, respectively) and those in low-quality marriages (22.5% and 24.3%, respectively). This suggests married individuals have a health advantage. Also, 7.2% of unmarrieds reported poor childhood health, as compared to 4.2% of high-quality marrieds and 5.2% of low-quality marrieds. Those who were married were less likely to perceive themselves

as being poor as children than those who are unmarried (30.6%), with high-quality marrieds (24.4%) having a slight advantage over low-quality marrieds (26.5%). Father's and mother's education is missing more frequently for the unmarried (18.5% and 11.1%, respectively), compared to the married categories (11-12% and 6.9%, respectively). Unmarried older adults report that 49% of mothers and fathers had less than a high school education while married respondents reported approximately 38-40% for mothers and 44% for fathers. Parental education composition is similar for both married categories. These results suggest older adults who are currently married were more likely to have experienced better childhood health and SES profiles of advantage compared to those who are not married.

The average age of individuals in this study is higher for those who are unmarried (68.1 years of age) compared to the married (64-65 years of age) and women compose 67.8% of the unmarried, compared to the 42.2% of high-quality marrieds and 48.9% of the low-quality marrieds. Over 80% of the married categories are White, while only 73.3% of the unmarried are White. Blacks represent only 4.2% of the high-quality marrieds and 6.4% of the low-quality marrieds, while accounting for 15.5% of the unmarried. Both Hispanics and 'other' racial/ethnic groups remain fairly evenly distributed among all three categories. Approximately a third of those who are married have been in a previous marriage and 82% of the unmarried have experienced a divorce and/or been widowed.

Older adults in high-quality marriages, on average, appear to have an economic advantage compared to those in low-quality marriages. Those in low-quality marriages, however, maintain an advantage over those who are not married. Those who are married have a higher proportion of individuals with a college degree or higher (29.9-32.9%) than the unmarried (19.8%). Unmarried older adults are also more likely to have less than a high school education

(22.7%) compared to those who are married (12.6-14.3%). High-quality and low-quality married older adults are more likely to have private insurance coverage (73.2% and 72%, respectively) than the unmarried (51.6), while the unmarried have more individuals covered under Medicare (33.4%) and without any form of insurance coverage (9.9%). The last economic advantage seen in these descriptive statistics is the higher proportion of unmarried older adults in debt (8.8%) compared to the married (3.6-4%) and the greater proportion of married in the higher asset categories. Approximately 47% of high-quality marrieds report having over $250,000 in assets. This is after factoring in any debts that may be present. This is a larger proportion than the 40.9% of low-quality married that report being in this asset bracket and much greater than the unmarried who have only 26.6% in this category. The most frequent asset bracket for the unmarried is $0 to $50,000 (35.9%), almost twice the proportion of high-quality marrieds in that category.

Multivariate Results

The logistic regression results for poor self-rated health are presented in Table 2. In the zero order model for poor self-rated health, those who are married are less likely to report poor self-rated health than those who are not married. Additionally, quality appears to play a role in this relationship with high-quality marrieds being significantly less likely to report poor self-rated health than those in low-quality marriages, as indicated by the ‘a’ superscript in the table. These findings support the first hypothesis in that high-quality marrieds have a health advantage over the unmarried, but does not support my expectation that low-quality marrieds are comparable to or disadvantaged relative to the unmarried.

In model 2 of Table 2, childhood characteristics are introduced. Those who are married remain significantly less likely to report poor self-rated health and those with higher-quality

marriages are less likely to rate their health as poor than those in lower-quality marriages, suggesting childhood health does not explain the relationship between marital state and later life health. This is contrary to the second hypothesis that postulates the relationship is spurious. Respondents who experienced poor childhood health have a greater likelihood of having poor self-rated health compared to those who did not experience poor childhood health. Being poor as a child, moving in childhood due to financial issues, and having a father or mother with less than a high school education is associated with an increase in the odds of respondents having poor self-rated health. Those missing on parental education are also more likely to have poor self-rated health. Having a father who went to college is related to a decrease in the odds of the respondent reporting poor self-rated health.

The third set of models consider demographic characteristics, social support, and economic factors. Model 3 of Table 2 shows that once the controls are introduced, low-quality marrieds are no longer significantly different than the unmarried in their likelihood of reporting poor self-rated health. High-quality married respondents are less likely to report poor self-rated health than the unmarried, but are not significantly different from the low-quality marrieds, supporting the first hypothesis (result not shown). The initial advantage seen for low-quality marrieds compared to the unmarried is explained by differences in age, educational attainment, insurance, and assets (results not shown). These economic variables and age also explain the initial advantage high-quality marrieds have over low-quality marrieds. Experiencing poor childhood health and poverty in childhood remain significant risk factors for poor self-rated health. Having moved in childhood is no longer significant. In regards to parental education, having a father with less than a high school education is the only significant factor and is positively related to poor self-rated health.

Older age is related to poorer self-rated health and Whites are significantly less likely to report poor self-rated health than all other races/ethnicities. There is no significant difference in self-rated health for men and women, net of other factors. Respondents with higher levels of religiosity are significantly less likely to report poor self-rated health, indicating social support is an important factor in this subjective health measure. Education is also associated with self-rated health, with those having less than a high school education more likely to report poor health than those who have a high school education, and those with more than a high school education being less likely to report poor health than those with high school as their highest level of educational attainment.

Respondents who have private health insurance are less likely to have poor self-rated health compared to those with Medicare or some other form of health coverage. There is no significant difference in self-rated health between those with private insurance and those who have no insurance. Individuals who are currently in debt are more likely to have poor self-rated health than those with individual assets that range from $0 to $50,000. Respondents with over $50,000 are less likely to rate their health as poor than those individuals with $50,000 or under and no debt. These findings suggest respondents with greater economic resources have better overall self-rated health.

Interactions between childhood health and marital state, as well as interactions between gender and marital state are not significant, which counter hypotheses 3 and 4, respectively. In other words, marital state does not act as a buffer in the relationship between childhood health and later life health. Nor does marital state offer different benefits for men than for women.

Now we turn to the second health indicator: cardiovascular health. Model 1 indicates those who are married are less likely to experience a cardiovascular condition, but that this

association does not differ by marital quality (Table 3). The initial model does not support the differing health advantage of those who are married by marital quality (hypothesis 1), although it does indicate a health advantage for the married over the unmarried.

In the second model for cardiovascular conditions, results are fairly similar to those of the second model for self-rated health. The initial finding that marriage is associated with a decrease in the odds of experiencing a cardiovascular condition holds, with marital quality remaining insignificant. This finding suggests hypothesis 1 that posits high-quality married have an advantage over the unmarried and low-quality marrieds do not have an advantage, or are actually disadvantaged, remains unsupported because the advantage accrues to all marrieds regardless of marital quality. Respondents who experience poor childhood health are significantly more likely to report having a cardiovascular condition. While having moved in childhood due to financial issues is associated with an increase in the likelihood of having poor self-rated health, this is not that case for cardiovascular health. However, having a father who experienced unemployment during the respondent's childhood is related to an increased risk of experiencing a cardiovascular condition where it was not a determinant of self-rated health. Individuals with parents that had less than a high school education have a higher risk of having a cardiovascular condition and respondents with a mother who had a college education have less risk. While missing on mother's education is related to greater odds of poor cardiovascular health, missing on father's education is not. This suggests, as did the models for self-rated health, that the relationship between marital state and later life health is not spurious, not supporting hypothesis 2.

Model 3 for cardiovascular health suggests that net of the control variables marital quality has a role in determining cardiovascular health. Respondents in high-quality marriages no longer have an advantage over those who are not married. However, those in poor-quality

marriages are more likely to experience a cardiovascular condition than those who are not married. These changes are explained by both the age and insurance variables (results not shown). The unmarried are older, on average, compared to the married. This places them at a health disadvantage. Insurance also plays a role in the advantage of the married. Only about half of the unmarried have private health insurance while over 70% of the married older adults have a private health plan. Controlling for health insurance, the high-quality married no longer have an advantage over the unmarried and low-quality married become significantly more disadvantages compared to the unmarried. Poor childhood health and poverty as a child remain positively associated with having a cardiovascular condition while father's unemployment and parental educational attainment is no longer significant.

Older age is associated with greater odds of having a cardiovascular condition. While gender was not a determinant of self-rated health, being male is significantly associated with the respondent having a cardiovascular condition. Additional models were estimated and no significant gender interactions are present (not shown). In regards to race/ethnicity, there is no significant difference in having cardiovascular conditions for Blacks and other non-Hispanic groups, compared to Whites, but Hispanics are less likely to experience cardiovascular conditions than Whites. Blacks in low-quality marriages, however, are less likely to report cardiovascular conditions than Whites in low-quality marriages (result not shown). Religiosity is not a significant indicator of cardiovascular health, unlike for self-rated health. This suggests social support may be more important in subjective health than objective health.

Education is a significant indicator of self-rated health, but is not significant for cardiovascular health. However, the economic indicators of health insurance and assets are significant. Individuals with private insurance are less likely to have a cardiovascular condition

than those with Medicare or another form of insurance. Those who have no health coverage are actually less likely to have a cardiovascular condition than those with private insurance. Similar to the results of model 3 of self-rated health, those who are in debt are more likely to have a cardiovascular condition than those who have $0 to $50,000 in individual assets and those with more than $50,000 in assets are significantly less likely to experience cardiovascular issues than those with fewer financial resources.

In results not shown, the interactions between childhood health and marital state are not significant and show no support for marital state acting as a buffer for childhood health (hypothesis 3). The gender and marital state interactions are also not significant, failing to support hypothesis 4 that posits men and women experience different advantages from marriage and marital quality. This indicates the mechanisms of marital state operates similarly in regards to health outcomes for men as it does for women.

Other analyses not shown compare all those who are married (not differentiating relationships by quality) to those who are not married and find married individuals are less likely to have reported poorer self-rated health. This pattern is similar to the relationship that is found between high-quality marrieds and the unmarried in the original analysis (shown in table 2). For cardiovascular health, the married group is similar to the low-quality group in the original models (shown in table 3). Married individuals are less likely to report a cardiovascular condition, even after controlling for childhood disadvantage. When socioeconomic and demographic characteristics are considered, however, married older adults are more likely to report cardiovascular issues. This may be explained by differences in the prevalence of obesity, which is not controlled for in this study. A report released by the Centers for Disease Control identified married older adults as having a high prevalence of obesity compared to their

unpartnered counterparts, putting them at greater risk of developing heart conditions (Schoenborn 2004). Lastly, the childhood health and gender interactions with marital state remain insignificant when marital quality is not considered. This supports the main finding that marital status functions the same regardless of gender and childhood health.

DISCUSSION

Previous work finds both marital state and childhood health are related to later life health outcomes. The purpose of this study is to bring these two subjects together to identify whether the relationship between marital state and health is spurious and can be explained by childhood factors. The HRS is a rich data set that is ideal for examining the current health and marital state of older adults in the U.S. It has several individual characteristics, including childhood, demographic, social support, and economic factors. Using these data allows for a nationally representative study that lends insight into older adult health outcomes in the general population.

These findings yield mixed evidence on how marital quality is associated with later life health. Older adults in high-quality marriages tend to report better self-rated health compared to the unmarried, but this advantage does not extend to cardiovascular health. In fact, those in low-quality relationships are more likely to report a cardiovascular condition than the unmarried, underscoring how poor marital quality can be particularly detrimental to older adult well-being. The role of marital quality may differ depending on the health outcome. High marital quality may be related to better self-rated health due to the subjective nature of both the marital quality measure and the health measure. Those who have a more positive outlook on their marriage may carry over that positive perspective when assessing their overall health. Cardiovascular health, on the other hand, is objective and requires a medical professional's diagnosis. While prior research suggests subjective and objective health is tightly linked (Mossey and Shapiro 1982; Pinquart 2001), this study is not the first to find differing associations between the two measures (Johnston, Propper, and Shields 2009). Johnston and colleagues (2009) find that income was not associated with self-reported health while there was a negative association when an objective measure of hypertension was examined. For both health outcomes, high-quality marrieds do not

have an advantage over the low-quality marrieds net of the controls. Thus, there is not strong evidence to support distinguishing among marrieds by marital quality.

Still, there is value when comparing marrieds to the unmarried. Those older adult who are married have better self-rated health than those who are not married. This relationship holds even after controlling for sociodemographic differences. On the other hand, married individuals are at greater risk of having a cardiovascular condition than the unmarried once sociodemographic characteristics are considered. These differences highlight the importance of looking at multiple measures of health outcomes and continuing to examine how marriage plays a role in later life health advantages and disadvantages.

This study bridges the gap between marriage and childhood health research using cumulative disadvantage theory as its framework. The findings suggest that while childhood health does not explain the relationship between marital state and health in older adults, those who have experienced profiles of disadvantage in childhood are also more likely to experience disadvantaged profiles in later life. In other words, the relationship between marital state and later life health is not spurious, but factors from childhood are important independent predictors of later life health. While there is no multiplicative effect present, these findings support the cumulative disadvantage perspective.

This research also extends prior work on the role of gender in marital status and health. The health advantages men have traditionally enjoyed from marriage are not found here, suggesting the greater health advantage men have experienced in the past from marriage is dissipating, consistent with other work (Liu and Umberson 2008).

Despite the many strengths of this study, there are some limitations. For instance, it is cross-sectional. This means that it is not able to establish causation. An example of this

limitation is that poor marital quality could be causing poorer health, but the opposite may be true, with poorer health creating a poorer quality relationship. Another limitation is the use of retrospective measures. While studies have shown that retrospective childhood health measures are fairly accurate (Smith 2009a), there is still a possibility of recollection errors. Lastly, studies have shown that marital quality has both positive and negative dimensions. While this work has combined them into one measurement of overall quality for an initial investigation of the role of childhood health in the relationship of marital state and later life health, future research should investigate whether childhood factors influence the relationship between marital quality and later life health differently when the dimensions are examined separately. Future research should also examine how other health outcomes are related to marital state and childhood factors.

This study contributes to marriage and childhood health research. Both marital status and quality matter for later life health. It appears that the relationship may operate differently depending on the health outcome being examined and thus an important avenue for future research is to examine additional indicators of later life health. At the same time, we find that the negative health outcomes related to poor childhood health are not buffered by marital status (or quality) and that those who have poor childhood health are more likely to have poorer later life health. Both marital state and childhood health are linked to older adult health. Thus, future research on older adult health should take a life course approach that not only focuses on current factors, but earlier life conditions, too.

REFERENCES

Amato, Paul R., David R. Johnson, Alan Booth, and Stacy J. Rogers. 2003. "Continuity and Change in Marital Quality Between 1980 and 2000." Journal of Marriage and Family 65(1): 1-22.

Bernard, Jesse. 1972. *The Future of Marriage*. New Haven, CT: Yale University Press.

Blackwell, Debra L., Mark D. Hayward, and Eileen M. Crimmins. 2001. "Does Childhood Health affect Chronic Morbidity in Later Life?" *Social Science and Medicine* 52:1269-1284.

Brown, Susan L., Jennifer Roebuck Bulanda, and Gary R. Lee. 2005. "The Significance of Nonmarital Cohabitation: Marital Status and Mental Health Benefits among Middle-Aged and Older Adults." *Journal of Gerontology*: *Social Sciences* 60B(1): S21-S29.

Brown, Susan L. and I-Fen Lin. 2012. "The Gray Divorce Revolution: Rising Divorce among Middle-Aged and Older Adults, 1990–2010." *The Journals of Gerontology* 67(6): 731-741.

Brown, Susan L., Gary R. Lee, and Jennifer Roebuck Bulanda. 2006. "Cohabitation among Older Adults: A National Portrait." *Journal of Gerontology*: *Social Sciences* 61B(2): S71-S79.

Bulanda, Jennifer Roebuck and Susan L. Brown. 2007. "Race-Ethnic Differences in Marital Quality and Divorce." *Social Science Research* 36(3): 945-967.

Carr, Deborah and Kristen W. Springer. 2010. "Advances in Families and Health Research in the 21st Century." *Journal of Marriage and Family* 72:743-761.

Donoho, Carrie J., Eileen M. Crimmins, and Teresa E. Seeman. 2013. "Marital Quality, Gender, and Markers of Inflammation in the MIDUS Cohort." *Journal of Marriage and Family* 75(1): 127-141.

Elo, Irma T. and Samuel H. Preston. 1992. "Effects of Early-Life Conditions on Adult Mortality: A Review.' *Population Index* 58(2): 186-212.

Ferraro, Kenneth F. and Jessica A. Kelley-Moore. 2003. "Cumulative Disadvantage and Health: Long-Term Consequences of Obesity?" *American Sociological Review* 68(5): 707-729.

Gardner, Johnathan and Andrew Oswald. 2004. "How is Mortality Affected by Money, Marriage, and Stress?" *Journal of Health Economics* 23 (6): 1181-1207.

Gerstel, Naomi, and Natalia Sarkisian. 2006. "Marriage: The Good, the Bad, and the Greedy." *Contexts* 5(4): 16-21.

Haas, Steven A. 2006. "Health Selection and the Process of Social Stratification: The Effect of Childhood Health on Socioeconomic Attainment." *Journal of Health and Social Behavior* 47: 339-354.

Haas, Steven A. 2007. "The Long-Term Effects of Poor Childhood Health: An Assessment and Application of Retrospective Reports." *Demography* 44(1): 113-135.

Haas, Steven A. 2008. "Trajectories of Functional Health: The 'Long Arm' of Childhood Health and Socioeconomic Factors." *Social Science and Medicine* 66(4): 849-861.

Harris, Kathleen Mullan. 2010. "An Integrative Approach to Health." *Demography* 47(1):1-22.

Hayward, Mark D. and Bridget K. Gorman. 2004. "The Long Arm of Childhood: The Influence of Early-Life Social Conditions on Men's Mortality." *Demography* 41(1) 87-107.

Hughes, Mary Elizabeth, and Linda J. Waite. 2009. "Marital Biography and Health at Mid-Life." *Journal of Health and Social Behavior* 50(3):344-358.

Johnson, Norman J., Eric Backlund, Paul D. Sorlie, and Catherine A. Loveless. 2000. "Marital Status and Mortality: The National Longitudinal Mortality Study." *Annals of Epidemiology* 10(4):224-238.

Johnston, David, Carol Propper, and Michael A. Shields. 2009. "Comparing Subjective and Objective Measures of Health: Evidence from Hypertension for the Income/Health Gradient." *Journal of Health Economics* 28(3): 540-552.

Joung, Inez M. A., H. Dike Van De Mheen, Karien Stronks, Frans W. A. Van Poppel, and Johan P. Mackenbach. 1998. "A Longitudinal Study of Health Selection in Marital Transitions." *Social Science and Medicine* 46(3): 425-435.

Karraker, Amelia, and Kenzie Latham. 2015. "In Sickness and in Health? Physical Illness as a Risk Factor for Marital Dissolution in Later Life." *Journal of Health and Social Behavior* 56(1): 59-73.

Kiecolt-Glaser, Janice K., Laura D. Fisher, Paula Ogrocki, Julie C. Stout, Carl E. Speicher, and Ronald Glaser. 1987. "Marital Quality, Marital Disruption, and Immune Function." *Psychosomatic Medicine* 49(1): 13-34.

Kington, Raynard S. and James P. Smith. 1997. "Socioeconomic Status and Racial and Ethnic Differences in Functional Status Associated with Chronic Disease. " *American Journal of Public Health* 87(5): 805-810.

Kochanek, Kenneth D., Sherry L. Murphy, Jiaquan Xu, Elizabeth Arias. 2014. "Mortality in the United States, 2013." NCHS data brief, National Center for Health Statistics, 178.

Lillard, Lee A., and Constantijn W. A. Panis. 1996. "Marital Status and Mortality: The Role of Health." *Demography* 33(3): 313-327.

Lin, I-Fen and Susan L. Brown. 2012. "Unmarried Boomers Confront Old Age: A National Portrait." *The Gerontologist* 52(2):153-165.

Liu, Hui. 2012. "Marital Dissolution and Self-Rated Health: Age Trajectories and Birth Cohort Variations." *Social Science and Medicine* 74:1107-1116.

Liu, Hui and Debra J. Umberson. 2008. "The Times They are a Changin': Marital Status and Health Differentials from 1972 to 2003." *Journal of Health and Social Behavior* 49: 239-253.

Liu, Hui and Linda Waite. 2014. "Bad Marriage, Broken Heart? Age and Gender Differences in the Link between Marital Quality and Cardiovascular Risks among Older Adults." *The Journal of Health and Social Behavior* 55(4): 403-423.

Luo, Ye and Linda Waite. 2005. "The Impact of Childhood and Adult SES on Physical, Mental, and Cognitive Well-Being in Later Life." *Journal of Gerontology* 60B(2): S93-S101.

Manzoli, Lamberto, Paolo Villari, Giovanni M. Pirone, and Antonio Boccia. 2007. "Marital Status and Mortality in the Elderly: A Systematic Review and Meta-Analysis." *Social Science and Medicine* 64: 77-94.

Mossey, Jana M. and Evelyn Shapiro. 1982. "Self-Rated Health: A Predictor of Mortality among the Elderly." *The American Journal of Public Health* 72(8): 800-808.

O'Rand, Angela M. 1996. "The Precious and the Precocious: Understanding Cumulative Disadvantage and Cumulative Advantage over the Life Course." *The Gerontologist* 36(2):230-238.

Pinquart, Martin. 2001. "Correlates of Subjective Health in Older Adults: a Meta-Analysis." *Psychology and Aging* 16(3):414-426.

Raley, R. Kelly. 1996. "A Shortage of Marriageable Men? A Note on the Role of Cohabitation in the Black-White Differences in Marriage Rates." *American Sociological Review* 61(6): 973-983.

Reczek, Corinne and Debra Umberson. 2012. "Gender, Health Behavior, and Intimate Relationships: Lesbian, Gay, and Straight Contexts." *Social Science and Medicine* 74:1783-1790.

Ren, Xinhua Steve. 1997. "Marital Status and Quality of Relationships: The Impact on Health Perception." *Social Science and Medicine* 44(2): 241-249.

Rendall, Michael S., Margaret M. Weden, Melissa M. Favreault, and Hilary Waldron. 2011. "The Protective Effects of Marriage for Survival: A Review and Update." *Demography* 48:481-506.

Robles, Theodore F. and Janice K. Kiecolt-Glaser. 2003. "The Physiology of Marriage: Pathways to Health." *Physiology and Behavior* 79: 409-416.

Schoenborn, Charlotte A. 2004. "Marital Status and Health: United States, 1999-2002." Advanced Data from Vital and Health Statistics, Center for Desease Control, 351.

Smith, James P. 2009a. "Reconstructing Childhood Health Histories." *Demography* 46(2): 387-403.

Smith, James P. 2009b. "The Impact of Childhood Health on Adult Labor Market Outcomes." *The Review of Economics and Statistics* 91(3):478-489.

Smith, Jacqui, Gwenith Fisher, Lindsay Ryan, Philippa Clarke, Jim House and David R. Weir. 2013. "Psychosocial and Lifestyle Questionnaire 2006 - 2010: Documentation Report." Retrieved 3/15/15 http://hrsonline.isr.umich.edu/index.php?p=userg.

Umberson, Debra. 1992. "Gender, Marital Status and the Social Control of Health Behavior." *Social Science and Medicine* 34(8): 907-917.

Umberson, Debra and Jennifer Karas Montez. 2010. "Social Relationships and Health: A Flashpoint for Health Policy." *Journal of Health and Social Behavior* 51: S54-S66.

Umberson, Debra, Kristi Williams, Daniel A. Powers, Hui Liu, and Belinda Needham. 2006. "You Make Me Sick: Marital Quality and Health over the Life Course." *Journal of Health and Social Behavior* 47:1-16.

Waite, Linda J. 1995. "Does Marriage Matter?" *Demography* 32(4): 483-507.

Williams, Kristi. 2003. "Has the Future of Marriage Arrived? A Contemporary Examination of Gender, Marriage, and Psychological Well-Being." *Journal of Health and Social Behavior* 44(4):470-487.

Zhang, Zhenmei and Mark D. Hayward. 2006. "Gender, the Marital Life Course, and Cardiovascular Disease in Later Midlife." *Journal of Marriage and Family* 68(3):639-657.

TABLES

Table 1. Percentage/Mean (SE) of Study Variables for the Full Sample and by Marital State

	Full Sample	High-Quality Married	Low-Quality Married	Unmarried
Dependent variables				
Poor self-rated health	26.2	19.1	22.5	33.8
Cardiovascular condition	25.9	23.5	24.3	28.8
Marital state				
High-quality married	17.2			
Low-quality married	44.9			
Unmarried	38.0			
Poor childhood health	5.9	4.2	5.2	7.5
Childhood SES				
Perceived as poor	27.7	24.4	26.5	30.6
Moved due to finances	17.3	15.4	17.1	18.5
Father unemployed	18.7	18.4	17.9	19.9
Father's education				
< High school	45.8	44.1	43.8	49.0
High school	24.2	27.0	26.5	20.3
College	15.6	17.8	17.6	12.3
Missing	14.4	11.1	12.2	18.5
Mother's education				
< High school	43.1	38.1	40.0	49.0
High school	33.9	37.3	37.1	28.6
College	14.6	17.7	16.1	11.4
Missing	8.5	6.9	6.9	11.1
Demographic characteristics				
Age (50 – 101 years)	65.7 (0.22)	64.8 (0.31)	64.1 (0.23)	68.1 (0.30)
Gender				
Women	54.9	42.2	48.9	67.8
Men	45.1	57.8	51.1	32.2
Race/Ethnicity				
White, non-Hispanic	79.8	86.5	82.7	73.3
Black, non-Hispanic	9.8	4.2	6.4	15.5
Hispanic	8.0	7.1	7.9	8.6
Other, non-Hispanic	2.8	2.2	3.0	2.7
Previous marriage(s)	51.2	33.9	31.7	82.0
Social support				
Religiosity (scale 1-3)	2.5 (0.01)	2.5 (0.02)	2.4 (0.02)	2.5 (0.02)

(continued on next page)

Table 1. Percentage/Mean (SE) of Study Variables for the Full Sample and by Marital State (continued)

	Full Sample	High-Quality Married	Low-Quality Married	Unmarried
Economic factors				
Respondent's education				
< High school	17.2	12.6	14.3	22.7
High school	32.8	31.1	32.0	34.5
Some college	23.5	23.4	23.9	23.0
Degree or higher	26.6	32.9	29.9	19.8
Health insurance				
Private	64.5	73.2	72.0	51.6
Medicare	25.1	19.7	20.0	33.4
Other	3.4	2.0	2.5	5.0
None	7.1	5.1	5.5	9.9
Individual assets				
In debt	5.7	3.6	4.0	8.8
$0-50,000	24.7	16.8	18.3	35.9
$50,001-100,000	12.1	10.4	13.4	11.4
$100,001-250,000	20.9	22.1	23.3	17.4
>$250,000	36.5	47.2	40.9	26.6
N=	*13,620*	*2,303*	*5,926*	*5,391*

Note: These statistics use complex weights

Table 2. Logistic Regression Models Predicting Poor Self-Rated Health (N = 13,620)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Marital state			
High-quality married	0.46***	0.54***	0.78*
Low-quality married	0.57*** [a]	0.64*** [a]	0.90
Unmarried (ref.)			
Poor childhood health		2.37***	2.07***
Childhood SES			
Perceived as poor		1.40***	1.26***
Moved		1.19**	1.10
Father unemployed		1.02	1.03
Father's education			
< High school		1.38***	1.15*
High school (ref.)			
College		0.80*	0.93
Missing		1.72***	1.20
Mother's education			
< High school		1.38***	1.03
High school (ref.)			
College		0.87	1.07
Missing		1.83***	1.18
Demographic characteristics			
Age			1.01***
Male			1.07
Race/Ethnicity			
White (ref.)			
Black			1.28**
Hispanic			1.76***
Other			1.66**
Previous marriage(s)			1.00
Social support			
Religiosity			0.88**
Economic factors			
Education			
< High school			1.53***
High school (ref.)			
Some college			0.86**
Degree or higher			0.53***

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Table 2. Logistic Regression Models Predicting Poor Self-Rated Health (continued)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Economic factors (continued)			
Health insurance			
Private (ref.)			
Medicare			1.53***
Other			1.98***
None			1.13
Assets			
In debt			1.37**
$0-50,000 (ref.)			
$50,001-100,000			0.65***
$100,001-250,000			0.46***
>$250,000			0.36***
Constant	0.51***	0.26***	0.21***

*<.05, **<.01, ***<.001

[a] indicates significantly different from high-quality marrieds

Note: This regression uses complex weights

Table 3. Logistic Regression Models Predicting a Cardiovascular Condition (N = 13,620)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Marital state			
High-quality married	0.76***	0.85**	1.08
Low-quality married	0.80***	0.87**	1.18*
Unmarried (ref.)			
Poor childhood health		1.33**	1.36**
Childhood SES			
Perceived as poor		1.22**	1.19**
Moved		0.98	1.00
Father unemployed		1.16*	1.13
Father's education			
< High school		1.37***	1.10
High school (ref.)			
College		1.01	1.05
Missing		1.19	1.09
Mother's education			
< High school		1.39***	1.07
High school (ref.)			
College		0.82*	0.86
Missing		1.49**	1.08
Demographic characteristics			
Age			1.06***
Male			1.47***
Race/Ethnicity			
White (ref.)			
Black			0.93
Hispanic			0.57***
Other			0.86
Previous marriage(s)			1.06
Social support			
Religiosity			0.98
Economic factors			
Education			
< High school			1.12
High school (ref.)			
Some college			1.04
Degree or higher			0.90

(continued on next page)

Table 3. Logistic Regression Models Predicting a Cardiovascular Condition (continued)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Economic factors (continued)			
Health insurance			
Private (ref.)			
Medicare			1.18**
Other			2.13***
None			0.75*
Assets			
In debt			1.43**
$0-50,000 (ref.)			
$50,001-100,000			0.83*
$100,001-250,000			0.69***
>$250,000			0.61***
Constant	0.40***	0.24***	0.01***

*<.05, **<.01, ***<.001

Note: [1] There are no significant differences between the high-quality married and the low-quality married in any of the models

[2] This regression uses complex weights

APPENDIX A

Appendix. Table 1. Marital Quality Scale Distribution (N = 8,229)

	%	Cumulative %
7	0.2	0.2
8	0.2	0.4
9	0.3	0.7
10	0.3	1.0
11	0.4	1.4
12	0.7	2.1
13	1.1	3.2
14	1.4	4.6
15	1.7	6.3
16	1.8	8.1
17	2.9	11.0
18	3.4	14.4
19	4.6	19.0
20	5.5	24.5
21	7.0	31.5
22	8.7	40.2
23	9.4	49.6
24	10.6	60.2
25	12.1	72.3
26	11.3	83.6
27	8.9	92.5
28	7.5	100.0

Note: [1] This is the weighted sample
[2] High-quality in main models is 26-28, and is 23-28 and 21-28 in sensitivity models

Appendix. Table 2. Logistic Regression Models Predicting Poor Self-Rated Health (High-Quality at Median) (N = 13,620)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Marital state			
High-quality married	0.46***	0.54***	0.78**
Low-quality married	0.67*** [a]	0.73*** [a]	0.99 [a]
Unmarried (ref.)			
Poor childhood health		2.37***	2.07***
Childhood SES			
Perceived as poor		1.40***	1.26***
Moved		1.19**	1.10
Father unemployed		1.02	1.03
Father's education			
< High school		1.38***	1.15*
High school (ref.)			
College		0.81*	0.93
Missing		1.71***	1.19
Mother's education			
< High school		1.38***	1.03
High school (ref.)			
College		0.87	1.07
Missing		1.83***	1.18
Demographic characteristics			
Age			1.01***
Male			1.08
Race/Ethnicity			
White (ref.)			
Black			1.27**
Hispanic			1.76***
Other			1.64**
Previous marriage(s)			1.00
Social support			
Religiosity			0.89**
Economic factors			
Education			
< High school			1.53***
High school (ref.)			
Some college			0.86**
Degree or higher			0.53***

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Appendix. Table 2. Logistic Regression Models Predicting Poor Self-Rated Health (High-Quality at Median) (continued)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Economic factors (continued)			
Health insurance			
Private (ref.)			
Medicare			1.53***
Other			1.98***
None			1.13
Assets			
In debt			1.37**
$0-50,000 (ref.)			
$50,001-100,000			0.65***
$100,001-250,000			0.46***
>$250,000			0.36***
Constant	0.51***	0.26***	0.20***

*<.05, **<.01, ***<.001

[a] indicates significantly difference from high-quality marrieds

Note: [1] This regression uses complex weights

[2] Marital quality is divided with the median and higher equaling high-quality

Appendix. Table 3. Logistic Regression Models Predicting Poor Self-Rated Health (High-Quality at Three-Fourths) (N = 13,620)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Marital state			
High-quality married	0.78***	0.88**	1.14
Low-quality married	0.80**	0.83**	1.18
Unmarried (ref.)			
Poor childhood health		1.34**	1.36**
Childhood SES			
Perceived as poor		1.23***	1.20**
Moved		0.98	1.10
Father unemployed		1.16*	1.00
Father's education			
< High school		1.37***	1.10*
High school (ref.)			
College		1.01*	1.05
Missing		1.19	1.09
Mother's education			
< High school		1.39***	1.07
High school (ref.)			
College		0.82*	0.86
Missing		1.49**	1.08
Demographic characteristics			
Age			1.06***
Male			1.47***
Race/Ethnicity			
White (ref.)			
Black			0.93
Hispanic			0.57***
Other			0.86
Previous marriage(s)			1.06
Social support			
Religiosity			0.98
Economic factors			
Education			
< High school			1.12***
High school (ref.)			
Some college			1.04
Degree or higher			0.90

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Appendix. Table 3. Logistic Regression Models Predicting Poor Self-Rated Health (High-Quality at Three-Fourths) (continued)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Economic factors (continued)			
Health insurance			
Private (ref.)			
Medicare			1.18**
Other			2.13***
None			0.74*
Assets			
In debt			1.43**
$0-50,000 (ref.)			
$50,001-100,000			0.83*
$100,001-250,000			0.69***
>$250,000			0.61***
Constant	0.40***	0.24***	0.01***

*<.05, **<.01, ***<.001

[a] indicates significantly difference from high-quality marrieds

Note: [1] This regression uses complex weights

[2] Marital quality is divided with the bottom fourth equaling low-quality

Appendix. Table 4. Logistic Regression Models Predicting a Cardiovascular Condition (High-Quality at Median) (N = 13,620)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Marital state			
High-quality married	0.77***	0.86**	1.11
Low-quality married	0.82***	0.87**	1.21*
Unmarried (ref.)			
Poor childhood health		1.33**	1.36**
Childhood SES			
Perceived as poor		1.23***	1.19**
Moved		0.98	1.00
Father unemployed		1.16*	1.13
Father's education			
< High school		1.37***	1.10
High school (ref.)			
College		1.01	1.06
Missing		1.19	1.09
Mother's education			
< High school		1.39***	1.07
High school (ref.)			
College		0.82*	0.86
Missing		1.49**	1.08
Demographic characteristics			
Age			1.06***
Male			1.48***
Race/Ethnicity			
White (ref.)			
Black			0.93
Hispanic			0.57***
Other			0.85
Previous marriage(s)			1.06
Social support			
Religiosity			0.98
Economic factors			
Education			
< High school			1.12
High school (ref.)			
Some college			1.04
Degree or higher			0.90

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Appendix. Table 4. Logistic Regression Models Predicting a Cardiovascular Condition (High-Quality at Median) (continued)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Economic factors (continued)			
Health insurance			
Private (ref.)			
Medicare			1.18**
Other			2.13***
None			0.74*
Assets			
In debt			1.43**
$0-50,000 (ref.)			
$50,001-100,000			0.83*
$100,001-250,000			0.69***
>$250,000			0.61***
Constant	0.40***	0.24***	0.01***

*<.05, **<.01, ***<.001

Note: [1] There are no significant differences between the high-quality married and the low-quality married in any of the models

[2] This regression uses complex weights

[3] Marital quality is divided with the median and higher equaling high-quality

Appendix. Table 5. Logistic Regression Models Predicting a Cardiovascular Condition (High-Quality at Three-Fourths) (N = 13,620)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Marital state			
High-quality married	0.78***	0.88**	1.14
Low-quality married	0.80***	0.83**	1.18
Unmarried (ref.)			
Poor childhood health		1.34**	1.36**
Childhood SES			
Perceived as poor		1.23***	1.20**
Moved		0.98	1.00
Father unemployed		1.16*	1.12
Father's education			
< High school		1.37***	1.10
High school (ref.)			
College		1.01	1.05
Missing		1.19	1.09
Mother's education			
< High school		1.39***	1.07
High school (ref.)			
College		0.82*	0.86
Missing		1.49**	1.08
Demographic characteristics			
Age			1.06***
Male			1.47***
Race/Ethnicity			
White (ref.)			
Black			0.93
Hispanic			0.57***
Other			0.86
Previous marriage(s)			1.06
Social support			
Religiosity			0.98
Economic factors			
Education			
< High school			1.12
High school (ref.)			
Some college			1.04
Degree or higher			0.90

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Appendix. Table 5. Logistic Regression Models Predicting a Cardiovascular Condition (High-Quality at Three-Fourths) (continued)

	Model 1 (Odds Ratio)	Model 2 (Odds Ratio)	Model 3 (Odds Ratio)
Economic factors (continued)			
Health insurance			
Private (ref.)			
Medicare			1.18**
Other			2.13***
None			0.74*
Assets			
In debt			1.43**
$0-50,000 (ref.)			
$50,001-100,000			0.83*
$100,001-250,000			0.69***
>$250,000			0.61***
Constant	0.40***	0.24***	0.01***

*<.05, **<.01, ***<.001

Note: [1] There are no significant differences between the high-quality married and the low-quality married in any of the models

[2] This regression uses complex weights

[3] Marital quality is divided with the bottom fourth equaling low-quality