

Revisiting marital health protection: Intraindividual health dynamics around transition to legal marriage

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Funding information

Deutsche Forschungsgemeinschaft, Grant/Award Numbers: AR811/2-1, WO 739/19-1

Abstract

Objective: This study analyzes the dynamics of health associated with the transition to first marriage and remaining in marriage up to 24 years in order to estimate the protective effect of heterosexual marriage (compared to being never married, including the unpartnered, partnered, and cohabiting) on physical, mental, and self-rated health.

Background: Past research produced inconclusive results on marital health protection. This study advances the debate by overcoming theoretical and methodological shortcomings of previous research. The authors use new statistical methods, which go beyond controlling for self-selection into marriage on health levels and also account for selection on health trajectories.

Method: The authors used German Socio-Economic Panel (SOEP) data (1992–2018, stratified random sample; N = 27,205 observations for physical and mental health, N = 110,440 observations for self-rated health). This study relied on fixed effects models with individual slopes, which controlled for individual premarital health trends, as well as fixed effects models with group slopes (FEGS), which modeled self-selection into marriage on premarital health trajectories.

Results: Compared to health trajectories of the never married, self-rated health and physical health declined temporarily upon the transition into marriage, but improved in the long run; however, the cumulative protective effect was statistically significant only among men and only for self-rated health. Mental health improved around the transition into first marriage, but the effect was short-lived. Men with more sustainable premarital health had a higher chance of marrying.

Conclusion: This study does not support the strong theoretical claims of marital protection and suggests that

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marriage exerts a mix of protective and adverse effects on health.

KEYWORDS

longitudinal research, marriage, mental health, physical health, transitions

The idea that marriage has a protective effect on health and longevity has a long tradition in the fields of family studies and medical sociology (Hank & Steinbach, 2018). Research on the topic is vast and growing, but the empirical evidence remains inconclusive. Although some studies demonstrated a protective effect of marriage on health (Guner et al., 2018; Kohn & Averett, 2014; Tumin, 2018), other research suggested that the protective effect is limited to mental health and is small and short-lived (Blekesaune, 2008; Kalmijn, 2017) or is explained by self-selection into marriage (Brockmann & Klein, 2004; Lillard & Panis, 1996).

The inconsistencies of research results may reflect theoretical and methodological shortcomings of the debate. First, previous research has not sufficiently considered the conceptual difference between the effect of marriage formation and dissolution. Whereas the negative effect of marital dissolution on health is well documented, the evidence of a positive effect of marriage formation and staying married remains controversial (Kalmijn, 2017). This study considers individuals who were never married at the beginning of the observation period, and who either got married or remained unmarried. We exclude from the sample any observations during and after marital dissolution, in order to focus on the effects of marriage formation and remaining in marriage on health.

Second, the theoretical models suggest that the protective effect might have different *dynamics* across various dimensions of health. Physical health, which tends to develop slowly over time, may benefit from marriage in the long run but may show no signs of improvement immediately upon entering marriage (Tumin, 2018). In contrast to that, mental health may respond to getting married even instantaneously (Hughes & Waite, 2009). The present study tests the hypothesis that the protective effects for physical health need several years to accumulate, whereas mental health may benefit from marriage both instantaneously and in the long run.

Third, so far only few studies used longitudinal data with several time points covering long observation periods (for exceptions, see the sections “Marital Health Protection” and “Can Marriage Harm Health?”). Analyses based on cross-sectional data are affected by self-selection into marriage, which limits conclusions on causal effects. Studies relying on only few waves of longitudinal data or short observation spans can hardly describe the long-term dynamics of the protective effect. Our study attempts to overcome these limitations by analyzing physical and mental health in marriages lasting up to 14 years, and self-rated health in marriages lasting up to 24 years.

Fourth, past studies did not account for selection on health *trajectories*. Models with individual fixed effects (FE), currently the standard in the literature, control for individual baseline *levels* of health. If not only the healthier individuals are more likely to marry but also those with more sustainable health, however, individual FE regressions still produce biased estimates. Our analysis relies on recently developed fixed effects regressions with individual slopes (FEIS) (Brüderl & Ludwig, 2015; Ludwig, 2015; Wooldridge, 2010), which control for individual premarital trajectories of health.

Overcoming the aforementioned shortcomings is indispensable for obtaining reliable estimates of the protective health effects of marriage. We define marriage as couples having obtained a marriage license, and we compare them not only to unpartnered, but also to partnered and cohabitators. By including cohabitators in the comparison rather than in the study sample, we focus the analysis on a homogenous group (cohabitations vary in the level of partners’

commitment more than marriages do, see Poortman & Mills, 2012) and a group for which we expect particularly strong protection (because marriages last longer on average, and because the process of legalizing one's marriage may provide additional economic and other intangible health-related benefits). Our theoretical objective is to elaborate on the framework of different dynamics around the transition to first marriage for physical, mental, and self-rated health. Our empirical contribution is to present the first estimates of the health effects of heterosexual marriage formation and remaining in marriage, while accounting for selection on premarital health trajectories and using long-span European data.

THEORETICAL APPROACHES AND PAST EMPIRICAL RESULTS

Marital health protection

Several mechanisms shape the protective effect of marriage on health; some of them are shared with cohabiting couples. For instance, married and cohabiting couples have an economic advantage over single-living individuals due to economies of scale and economic specialization (Becker, 1991). Married couples stand out with men's marital wage premium (Ludwig & Brüderl, 2018) and higher economic stability (Killewald, 2013). This protects health through better living conditions, lower stress levels, better access to health services, and higher quality of care. Risky and health-threatening behaviors, such as binge drinking, drug abuse, or reckless driving, become less prevalent after entering marriage (Averett et al., 2013; Umberson, 1992), and to a lesser degree after entering cohabitation (Duncan et al., 2006). Similarly, health-aware behaviors are more frequent among the married (Koball et al., 2010), with positive spillover to health. Finally, partnership typically gives people a sense of belonging, being important, loved, and valued (Musick & Bumpass, 2012), and provides them with instrumental help, information, and advice (Thoits, 2011). Social support may reduce stress directly and through buffering effects, positively affecting the cardiovascular, neuroendocrine, and immunological systems (Uchino, 2006).

In principle, these mechanisms apply to nonmarital relationships as well, but they should have stronger effects in marriages. Cohabitors who transition into marriage are a selected group: they invest more in their relationship (Poortman & Mills, 2012) and they enjoy greater economic premium (Barg & Beblo, 2009) than those cohabitors who remain unmarried. Therefore, health protection in marriage should be stronger than in unmarried cohabitation.

Additional protecting mechanisms may arise from the legal transition from unmarried cohabitation to marriage. Marriage may give an access to spousal health insurance, with positive spillovers for health (Anderson et al., 2012; Jovanovic et al., 2003). Similarly, the tax-related privileges (e.g., joint taxation) may further increase economic advantage of married couples.

Supporting the idea of marital protection, Kohn and Averett (2014, 18 waves of British Household Panel Study) showed that both marriage and nonmarital cohabitation (compared to being single, including the previously married) protects health (measured with an index reflecting both physical and mental health). Other studies suggested that marital protection takes place in long lasting marriages. Guner et al. (2018, 22 waves of the US Panel Study of Income Dynamics) estimated health trajectories of married and unmarried people (including never married and previously married), and found a health gap which increased with age. Dupre and Meadows (2007, five waves of the European Health and Retirement Survey) demonstrated that people in long marriages had a disproportionately low risk of an onset of chronic diseases. Similarly, Tumin (2018, 21 waves of the US Panel Study of Income Dynamics) found a protective effect of marriage on self-rated health, but only in the oldest cohort of women in marriages lasting at least 10 years.

Can marriage harm health?

Although research has focused on marital health protection, marriage may also harm health. First, after getting married people tend to reduce their physical activity (Eng et al., 2005; Nomaguchi & Bianchi, 2004) and gain weight (Averett et al., 2013; Teachman, 2016), both of which may negatively affect physical and mental health. Second, marriage is a privatizing (greedy) institution and the size of nonfamily social networks and socializing frequency tend to diminish after entering marriage (Pinquart, 2003). This may reduce marital health protection, even if it is partly compensated by increased family support. Third, marriage may undermine physical and mental health if spouses share health-threatening habits or behavior (Franks et al., 2002). Finally, whereas high quality marriage can be good for health, low quality marriage may have a devastating effect. Just as marital dissolution negatively affects health, marital conflict and low marital quality deteriorate mental and physical health of couples who remain married (Kiecolt-Glaser & Newton, 2001). Moreover, even the mere transition into marriage, although voluntary, may be a source of stress (Hobson et al., 1998) with negative spillovers for health (DeLongis et al., 1988; Holmes & Rahe, 1967).

Supporting the idea that marriage brings a mix of protective and harmful health consequences, some past studies did not find evidence of marital protection. Kalmijn (2017, 16 waves of Swiss Household Panel) showed that the transition into marriage temporarily improved life satisfaction and reduced depressive feelings, but general health worsened as people stayed married. Blekesaune (2008, 15 waves of the British Household Panel Study) showed that the first 2 years after transition into first marriage stood out with elevated mental distress. Lillard and Panis (1996, seven waves of the US Panel Study of Income Dynamics) did not find any evidence of a protective effect of marriage on self-rated health, and concluded that health differences between married and never married men were driven by selection. Averett et al. (2013, eight waves of the Canadian National Public Health Survey) showed that married people had better mental health and consumed less alcohol than the never married, but they also stood out with higher Body Mass Index (BMI) (among women), greater risk of overweight and obesity, and (among men) lower probability of regular exercise (Mata et al., 2018). Finally, a previous study on German Socio-Economic Panel (GSOEP) data (Brockmann & Klein, 2004, 15 waves) revealed a temporary increase in mortality during the first 2 years of marriage, which the authors explained by the stress associated with this life-changing transition.

Gender differences

The sex-role theory of mental illness suggests that the patriarchal nature of marriage may harm women's mental health (Gove & Tudor, 1973). Indeed, the "second shift" of combining employment, housework, and parenthood seems to erode self-rated health (Hewitt et al., 2006, based on two waves of Australian "Negotiating the Life Course" data). In addition, gendered social conventions, such as change of daily routines (Grunow et al., 2012) or taking husband's family name (Boxer & Gritsenko, 2005), may add to the negative marriage effects for women. However, previous studies found no evidence of a negative relationship between marriage and women's health, even in gender-unequal contexts (Lim & Raymo, 2016, based on four waves of the Japanese Panel Survey of Consumers).

Research suggested that the effects of marriage on health are qualitatively (rather than quantitatively) different for men and women. For instance, marriage correlates with fewer depressive symptoms among women, but among men it is associated with less frequent alcohol use (Simon, 2002, based on two waves of the US National Survey of Families and Households). This suggests that marriage may protect men's physical health more than women's, and bring more mental health benefits to women than to men. In line with this idea, past studies found

stronger marital protection among men than among women both in terms of physical health (Kiecolt-Glaser & Newton, 2001) and longevity (Brockmann & Klein, 2004; Gardner & Oswald, 2004, 11 waves of the British Household Panel Survey). However, other methodologically sophisticated studies found no gender difference in marriage protection (Guner et al., 2018; Kalmijn, 2017).

Based on these results, we expect that the protective effect of marriage for physical health is stronger among men than among women (Hypothesis 1). The results for gender differences in the protection of mental health are not conclusive, leaving open the possibilities that women's mental health benefits from marriage either more or less than men's health, or that it may even suffer from marriage.

Hypothesis 1. The protective effect of marriage for physical health is stronger among men than among women.

Selection

Controlling for selection is a major challenge for studying the relationship between marriage and health. Part of the literature tested whether premarital health affected people's propensity to marry (so called "selection or protection" question). Such selection may be positive (i.e., healthier individuals have a greater chance to marry because visible good health is attractive for potential spouses) or negative (i.e., less healthy people expect greater benefits from marriage and have a stronger incentive to marry). The evidence is mixed. Happier people tend to self-select into marriage (Mastekaasa, 1992; Stutzer & Frey, 2006), but not those with fewer depressive symptoms (Lamb et al., 2003). On the other hand, less healthy men were found to marry and remarry sooner than healthier men (Lillard & Panis, 1996).

In this analysis, we go beyond considering selection on time-invariant factors, and postulate that people self-select into marriage not only based on their general average health, but also based on health trajectories (Hypothesis 2). In other words, the (premarital) health *trajectories* may be associated with the propensity to marry. This may take the form of positive selection: people with more sustainable health may have a greater chance to marry if a healthy lifestyle is attractive to potential partners or if it correlates with visible good health. Supporting this argument, research showed that higher likelihood of marriage is associated with unobservable characteristics which promote good health (Lillard & Panis, 1996) and with health-relevant observables, such as alcohol and drugs use patterns (Fu & Goldman, 1996). However, the selection on trajectories may also be negative: people who expect a health decline in their future may be more determined to acquire the benefits of marriage, such as the care of a spouse (probably more likely among men) or shared income (which may be more likely among women in gender-unequal labor markets). No matter whether the selection is positive or negative, estimates of marital health protection will likely be biased unless they allow for different trajectories of premarital health among people who eventually marry and those who remain single.

Hypothesis 2. People self-select into marriage not only based on their general average health, but also based on health trajectories.

Cumulative, sustained, and short-lived effects: Physical versus mental health

In this study, we argue that the dynamics of health protection differs for physical and mental health. Three ideal types of dynamics are presented in Figure 1.

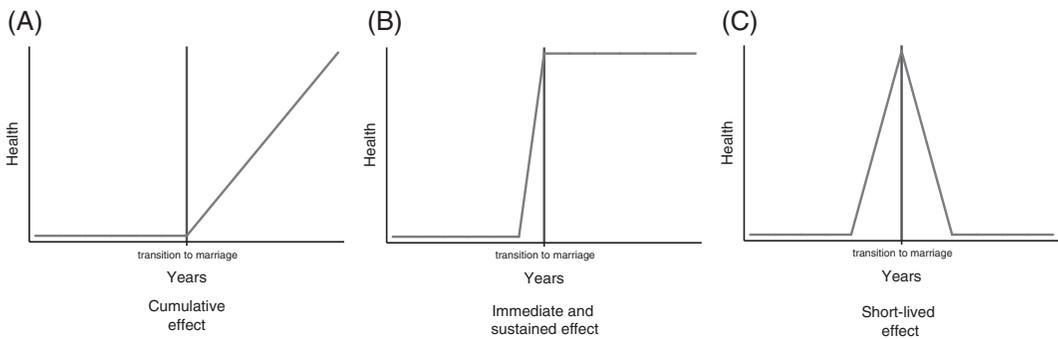


FIGURE 1 Three components of the protective effect of marriage on health

First there is a cumulative effect (Figure 1(A)), consistent with the notion that health protection is built up gradually through repeated exposure to the favorable environment of marriage (Hughes & Waite, 2009). This idea considers marriage as analog to a savings account: its beneficial effects need time to accumulate, and the protective effect increases with marital duration. Based on the cumulative nature of mechanisms of physical health protection, we expect that the protective effect of marriage is cumulative for physical health (Hypothesis 3). However, not all previous findings reflect this pattern: for example, Brockmann and Klein (2004) found a temporary increase of mortality in the 2 years directly following marriage formation.

Hypothesis 3. The protective effect of marriage is cumulative for physical health.

On the other hand, the protective effect of marriage on mental health is likely a combination of immediate and cumulative, short- and long-term effects (Hypothesis 4). An immediate long-term effect (Figure 1(B)) is typically modeled by including a marriage dummy in a FE model. It occurs if health improves immediately and persistently upon marriage formation. Theoretical mechanisms suggest that immediate sustained effects may occur for mental health but they are unlikely for physical health.

Hypothesis 4. The protective effect of marriage on mental health is a combination of immediate and cumulative, short- and long-term effects.

An immediate and short-term effect (Figure 1(C)) has been proposed by set-point theory in the well-being literature. It postulates that the positive effects of the transition into marriage are only short-lived because, although people's well-being increases or declines as a consequence of life events (Lucas, 2007), the process of adaptation brings it back to the person-specific baseline (as shown for mental health by Hughes & Waite, 2009).

Potential confounders

A test of marital protection needs to control for confounders, that is, factors which correlate with health but also with the probability or timing of marriage. An important confounder is parenthood, because parenthood transitions often coincide in time with marital transitions (Barban, 2013) and parenthood tends to affect mental (Ruppanner et al., 2019) and physical health (Mirowsky, 2002). Another confounder may be partnership status of unmarried respondents, because nonmarital partnerships may also affect health, and partnership formation

precedes marriage formation. Finally, socioeconomic status (as measured, e.g., by years of schooling) is also a potential confounder. Lower educated people tend to have less sustainable health (Cullati et al., 2014), and they differ from the more educated in their propensity to marry and in age at marriage. Thus, it is important to establish whether the estimated selection effects go beyond mere socioeconomic differences. However, a study of marital protection should not control for variables referring to mechanisms, that is, mediating the relationship between marriage and health (Elwert & Winship, 2014), such as income, employment, or social support.

Our study relies on a comparison of health trajectories of married people with the trajectories of the unmarried; therefore, it cannot control for some variables, primarily those characterizing the marriage (e.g., quality of marriage) or the spouse (e.g., health), because this information is missing for our reference group. Nonetheless, marriages differ in many ways. Low marital quality or a burden of caregiving for a sick spouse may challenge health instead of protecting it. Direct control for these confounders is not possible with our data; therefore, as a robustness check, we re-estimated our models excluding respondents in marriages of (presumably) low quality and respondents married to sick or disabled spouses (the results are shown in the Tables 9 and 10 in Supporting Information Appendix).

The context of Germany

As in most European countries, in Germany marriage is common: in 2011, 54% of people aged 20 years old or older lived in marriage or a registered partnership, somewhat above the European Union (EU) average of 51% (OECD, 2019). The state offers benefits to married couples, including joint taxation (which is beneficial in case of large income differences between spouses) and access to health insurance for an economically inactive spouse. Nonetheless, Germans marry relatively late (in 2017 the average age at first marriage was 31 years among women and 34 years among men, see OECD, 2019). Singlehood is socially accepted in Germany (in 2008, 37% of respondents in Germany did not agree that long-term relationship is necessary to be happy, compared to 8% in Greece and 74% in the Netherlands; EVS, 2016). Nonmarital cohabitation is widely accepted (in 2008 about 80% of respondents in Germany agreed that it is alright to live together without getting married; EVS, 2016) and common (in 2008 over 50% of married people under the age of 50 lived with their spouse already before marriage; EVS, 2016), but it is typically a transitory arrangement preceding marriage rather than an alternative to it (in 2016, 50% of nonmarital cohabitations recorded by GSOEP data lasted 2 years or shorter, but the same applied to only 10% of marriages; GSOEP, 2018; own calculation).

In general, German policies are aligned with traditional gender roles in marriage. The taxation system offers an advantage to married couples with large earnings difference, which incentivizes part-time employment and homemaking among married women (Baizán et al., 2004). Low provision of childcare facilities for younger children and half-day school for older children have the same effect (Köppen, 2011). Indeed, in 2014 among households with children under the age of 15, only in 25% both partners worked full-time (for comparison, in the EU both partners worked full-time in 75% of such households, see OECD, 2019) whereas in 66% only one partner worked full-time (whereas the other partner worked part-time or was not employed).

Overall, the low prevalence of full-time employment among married women with children and the resulting low frequency of double burden of family and employment responsibilities suggest that in Germany the gender differences in marriage protection are small. Moreover, the acceptance of nonmarital cohabitation and singlehood, and relatively low legal incentives for marriage (due to, e.g., universal access to individual employment-based health insurance) suggest that in Germany the marital health protection is moderate rather than large. This, combined with unique data of the GSOEP, makes Germany a typical and interesting case to study

the protective effect of marriage on health from a European perspective in a society with rather traditional gender roles.

DATA AND METHODS

Data

We used data from the GSOEP (version 35), a large national panel study of private households in Germany, conducted yearly since 1984 (GSOEP, 2018; Wagner et al., 2007). The GSOEP data are collected nationwide; the sample contains yearly data from almost 11,000 households and from 30,000 individuals, is representative for residents of Germany, and contains subsamples of migrants, high-income households, and specific family types. Among the many topics covered by the GSOEP, the measures of physical and mental health (recorded biennially 2002–2018), self-rated health (recorded yearly 1992–2018), and marital histories of respondents were of main interest for our study.

We ran separate analyses for each dimension of health. We derived the measures of physical and mental health from the SF-12 scale, which is a widely used instrument for assessing self-reported health-related quality of life (Andersen et al., 2007; Ware et al., 1996). GSOEP data provide component summary scores of physical and mental health calculated under the assumption of a null correlation between the dimensions (criticized by Taft et al., 2001). We followed a different approach and derived the scores from confirmatory factor analysis, allowing for correlation between physical and mental health (wave-specific correlations varied between 0.76 and 0.80; strategy suggested by Tucker et al., 2010).

Additionally, and for comparability with previous studies, we also considered marriage effects on self-rated health. Self-rated health is frequently used in large-scale studies because it is highly predictive of mortality risks (Schnittker & Bacak, 2014), correlates with disease incidence (Wu et al., 2013) and domain-specific dimensions of health (such as functioning, diseases, and pain; Lazarevič, 2018, Lazarevič & Brandt, 2020). Qualitative research suggested that it reflects aspects of both physical and mental health (Simon et al., 2005). Self-rated health in GSOEP is recorded on a scale from 1 (*very good*) to 5 (*poor*) (we reversed the coding). Wave-specific correlations of self-rated health with physical health vary between 0.73 and 0.80, and the correlations with mental health vary between 0.51 and 0.58 (note that self-rated health is one of the components of SF-12 measures of physical and mental health; our results did not change considerably after excluding this component, see Table 4 in Supporting Information Appendix). We rescaled all dependent variables into the range 0–100 for easier interpretation of coefficients; higher values correspond to better health. Table 1 shows an overview of all variables used in the analysis.

To model the long-term, the cumulative, and the short-term marital protection, we used three sets of variables. First, to capture the long-term effect of the transition into first marriage, we defined a dichotomous variable taking the value of 1 for observations during the first marriage (after the adaptation period) and 0 otherwise. The coefficient should be interpreted as the average long-term shift in health associated with entering marriage. Second, to capture the cumulative protective effect of marriage (i.e., the effect of remaining in marriage), we defined a duration variable. It was expressed in years (rescaled into decades) and it took the value of 0 for never married people and during the period of adaptation (modeling the duration as quadratic or logarithmic did not improve model fit, see Table 8 in Supporting Information Appendix). Finally, to capture the short-term effect of transition into marriage, we defined two dummy variables. First, the anticipation variable marked the period of 2 years before the first marriage; it allowed us to capture health changes occurring in anticipation of marriage (i.e., the changes occurring before the transition in response to unobserved factors associated with the

TABLE 1 Descriptive statistics

	Mean		SD overall		SD between		SD within		Min.		Max.		Percent of person-years missing ^a
	SD overall	SD within	Min.	Max.	Mean	SD overall	SD between	SD within	Min.	Max.			
Analysis for physical and mental health													
Women													
Number of person-years: 13,524, number of persons: 2353													
Physical health composite score	69.79	17.11	13.62	10.76	0.00	100.00	72.89	16.22	13.09	9.89	0.00	93.24	1.6%
Mental health composite score	67.58	15.78	11.93	10.46	0.00	100.00	71.26	14.59	11.20	9.52	0.00	89.99	1.6%
In first marriage	0.11	0.32	0.18	0.24	0.00	1.00	0.10	0.30	0.17	0.23	0.00	1.00	1.7%
Duration of marriage (years)	0.63	2.03	1.13	1.54	0.00	14.09	0.54	1.89	1.07	1.43	0.00	14.09	1.7%
Anticipation: 1–2 years before first marriage	0.04	0.20	0.07	0.18	0.00	1.00	0.04	0.19	0.07	0.18	0.00	1.00	1.7%
Adaptation: 1–2 years after first marriage	0.04	0.20	0.07	0.19	0.00	1.00	0.04	0.19	0.07	0.18	0.00	1.00	1.7%
Never married, unpartnered	0.37	0.48	0.38	0.30	0.00	1.00	0.45	0.50	0.40	0.30	0.00	1.00	3.9%
Never married, non-cohabiting partner	0.23	0.42	0.28	0.32	0.00	1.00	0.18	0.39	0.26	0.30	0.00	1.00	3.3%
Never married, cohabiting partner	0.25	0.44	0.32	0.30	0.00	1.00	0.23	0.42	0.32	0.28	0.00	1.00	3.3%
Has child(ren) aged 0–1 years old	0.08	0.28	0.13	0.24	0.00	1.00	0.07	0.25	0.12	0.21	0.00	1.00	1.7%
Has any child(ren)	0.42	0.49	0.45	0.22	0.00	1.00	0.27	0.44	0.40	0.20	0.00	1.00	1.7%
Age	33.96	10.88	10.49	3.84	18.00	70.00	34.24	11.26	10.79	3.94	18.00	70.00	4.0%
Ever married	0.29	0.45	0.43	0.00	0.00	1.00	0.26	0.44	0.42	0.00	0.00	1.00	10.5%
Years of schooling	13.65	2.89	2.89	0.00	7.00	18.00	13.14	2.84	2.80	0.00	7.00	18.00	4.5%
Analysis for self-rated health													
Women													
Number of person-years: 53,660, number of persons: 5436													
Self-rated health	66.94	22.38	16.61	15.79	0.00	100.00	69.03	21.79	16.25	15.14	0.00	100.00	3.7%
In first marriage	0.17	0.37	0.21	0.27	0.00	1.00	0.15	0.35	0.20	0.25	0.00	1.00	1.3%
Duration of marriage (years)	1.21	3.28	1.71	2.31	0.00	24.09	1.09	3.17	1.65	2.23	0.00	23.69	1.3%
Anticipation: 1–2 years before first marriage	0.05	0.23	0.09	0.21	0.00	1.00	0.05	0.21	0.09	0.20	0.00	1.00	1.3%
Adaptation: 1–2 years after first marriage	0.06	0.23	0.10	0.21	0.00	1.00	0.05	0.21	0.09	0.20	0.00	1.00	1.3%

(Continues)

TABLE 1 (Continued)

	Analysis for self-rated health												
	Women					Men							
	Number of person-years: 53,660, number of persons: 5436					Number of person-years: 56,780, number of persons: 5662							
Never married, unpartnered	0.33	0.47	0.37	0.30	0.00	1.00	0.42	0.49	0.39	0.31	0.00	1.00	3.3%
Never married, non-cohabiting partner	0.22	0.42	0.29	0.32	0.00	1.00	0.19	0.39	0.26	0.31	0.00	1.00	2.8%
Never married, cohabiting partner	0.23	0.42	0.31	0.30	0.00	1.00	0.20	0.40	0.31	0.28	0.00	1.00	2.8%
Has child(ren) aged 0–1 years old	0.09	0.29	0.15	0.26	0.00	1.00	0.08	0.26	0.13	0.23	0.00	1.00	1.3%
Has any child(ren)	0.40	0.49	0.43	0.25	0.00	1.00	0.29	0.45	0.38	0.23	0.00	1.00	1.3%
Age	31.69	10.57	10.11	4.32	18.00	70.00	32.14	10.67	9.89	4.45	18.00	70.00	2.8%
Ever married	0.39	0.49	0.45	0.00	0.00	1.00	0.35	0.48	0.43	0.00	0.00	1.00	9.9%
Years of schooling	13.29	2.77	2.70	0.00	7.00	18.00	12.91	2.76	2.67	0.00	7.00	18.00	3.7%

^aIn the initial data set in waves when the dependent variable has been observed ($N = 233,074$ person-years in the analysis for physical and mental health, $N = 597,089$ in the analysis for self-rated health), men and women combined.

Abbreviation: GSOEP, German Socio-Economic Panel.

Source: GSOEP data, 2002–2018 for physical and mental health, 1992–2018 for self-rated health.

transition). Second, the adaptation variable marked the period of the two first years of marriage to capture “wearing off” of the transition effect.

The GSOEP data allow to observe changes of mental and physical health in marriages lasting up to 14 years, and changes of self-rated health in marriages lasting up to 24 years (our results were robust to selection of the observation period for self-rated health, see Table 5 in Supporting Information Appendix: the estimates for a shorter observation span for self-rated health showed stronger patterns among women). The observation periods covered by the data were longer than in most previous studies, with few exceptions (e.g., the work by Kalmijn, 2017 covered a period of up to 15 years).

Our initial sample included all observations in the waves when the dependent variables have been observed: 71,898 respondents (233,074 observations) in the analysis for SF-12 measures and 90,207 respondents (597,089 observations) in the analysis for self-rated health. We subsequently selected respondents who were never married or currently married: 185,516 observations for SF-12 measures and 481,478 observations for self-rated health (note that a similar selection of respondents in *first* cohabitation or who have never cohabited is not feasible due to lower quality of information on cohabitation histories). We removed observation-years before the age of 18 and after the age of 70 (retaining 163,603 observations for SF-12 measures and 432,020 observations for self-rated health), in order to exclude health changes occurring in very young and very old age. Furthermore, we removed all observation-years in the year preceding the first dissolution, so that health changes associated with the marital crisis would not affect our results, and we limited the analysis to heterosexual individuals by excluding respondents who ever declared living in a homosexual partnership (retaining 161,882 observations for SF-12 measures, and 427,094 observations for self-rated health). As we aimed for controlling for premarital health trajectories, we further constrained the sample to respondents who (after excluding missing data, see Table 1) were observed at least four times of which at least two times as never married, and among the ever married people we include only those who were observed at least two times as married, retaining 27,278 observations for physical and mental health, and 113,580 observations for self-rated health (we tested the robustness of this decision by estimating results for alternative criteria, see Table 6 in Supporting Information Appendix). This implies that we included in the analysis marriages which lasted at least 4 years (3 for self-rated health) before they dissolved. Finally, excluding missing data for the dependent variable, partnership and parenthood variables, or years of schooling left us with the final sample of 4673 respondents and 27,205 person-years for physical and mental health, and 11,098 respondents and 110,440 person-years for self-rated health (we tested robustness of the results to inclusion of special GSOEP subsamples in the analysis; the results for the general sample of German population are shown in Table 7 in Supporting Information Appendix, and are overall consistent with the main results).

Analytical approach

Studies of the protective effect of marriage on health attempt to estimate causal marriage effects by controlling for health-related selection into marriage with FE panel models (Brüderl & Ludwig, 2015). FE regression compares the same individuals' health prior to and after entering marriage, so that all observed and unobserved time-invariant variables, including general health differences among respondents (but also personality traits, education, etc.), are differenced out of the equation and thus cannot account for the remaining marriage effect (Wooldridge, 2010).

However, simple FE models do not control for systematic differences between ever married and never married people in health *trajectories*. Ludwig and Brüderl (2018) showed that such

selection on trends rather than levels implies a violation of the “parallel trends assumption” and thus leads to biased causal estimates in standard FE models. This assumption can be relaxed by including an interaction term “age \times ever married” that allows for different time (i.e., age) slopes across the two groups (never married vs. ever married). In our analysis, such a fixed effects model with group-specific slopes (FEGS) takes the form shown in Equation (1) (i : individual, t : time).

$$\begin{aligned} \text{Health}_{it} = & \beta_1 \text{MarTrans}_{it} + \beta_2 \text{MarDur}_{it} + \beta_3 \text{MarAntic}_{it} + \beta_4 \text{MarAdapt}_{it} + \beta_5 \text{Partnered}_{it} \\ & + \beta_6 \text{Cohabiting}_{it} + \beta_7 \text{HasChild } 0/1y_{it} + \beta_8 \text{HasChild}_{it} + \beta_9 \text{Age}_{it} \\ & + \beta_{10} \text{Age}_{it} \times \text{EverMarried}_i + \beta_{11} \text{Age}_{it} \times \text{Schooling}_i + u_i + \varepsilon_{it} \end{aligned} \quad (1)$$

In Equation (1), time-varying individual health (Health_{it}) was regressed on (1) the transition into marriage (MarTrans_{it}), which modeled the long-term effect of marital transition; (2) marriage duration (MarDur_{it}), to estimate the cumulative effect; and (3) anticipation and adaptation dummies (MarAntic_{it} and MarAdapt_{it}), which represented short-term fluctuations around the transition. Additionally, the model included partnership status of never married respondents (two dummies, one for being partnered and one for cohabitation) and parenthood status (having a child aged 0–1 year and having any child) as time-varying controls. The difference in average (premarital) health trajectories between the ever married and the never married was modeled with the interaction term $\text{Age}_{it} \times \text{EverMarried}_i$. We also controlled for the differences in premarital health trajectories associated with education ($\text{Age}_{it} \times \text{Schooling}_i$). The variables “ever married” and “schooling” were time-invariant; therefore, their effects were captured by individual-specific intercept and were not separately estimated. The term u_i corresponded to individual fixed effects, and ε_{it} was the time-varying residual.

If, however, individual health trajectories are correlated with the propensity (and hence, the timing) of marriage, individual variations in health trajectories should be explicitly taken into account in the analysis. In this case, the FEIS is superior to the FEGS model because it does not require the assumption of random variation of individual slopes around the common group-specific slopes (Brüderl & Ludwig, 2015). The FEIS model is therefore more flexible. Instead of de-meaning data by eliminating the person-specific means from the panel data, the data are de-trended by removing individual (linear) slopes from the data. As a result, any systematic differences in premarital health trajectories (e.g., associated with socioeconomic status) are accounted for by estimating individual slopes per respondent. The FEIS model used in our analysis is specified in Equation (2).

$$\begin{aligned} \text{Health}_{it} = & \beta_1 \text{MarTrans}_{it} + \beta_2 \text{MarDur}_{it} + \beta_3 \text{MarAntic}_{it} + \beta_4 \text{MarAdapt}_{it} + \beta_5 \text{Partnered}_{it} \\ & + \beta_6 \text{Cohabiting}_{it} + \beta_7 \text{HasChild } 0/1y_{it} + \beta_8 \text{HasChild}_{it} + \beta_9 \text{Age}_{it} + u_i + \varepsilon_{it} \end{aligned} \quad (2)$$

In Equation (2), the main difference from the FEGS model in Equation (1) is that health deterioration with age was controlled at the individual level, therefore β_9 was allowed to vary across individuals.

We run all analyses using STATA 14 software (StataCorp, 2015). We estimated FEIS models using the *feis.ado* module (Ludwig, 2015). Technically, the estimation consists of two steps. In the first step, the person-specific slopes (in our case: the individual effects of age) are estimated from individual time-series regressions. In the second step, a FE regression is estimated using the de-trended residuals from the first step.

We used both specifications, FEGS and FEIS, because they yielded different information. The FEGS models informed whether the premarital health trajectories differed between the ever married and never married respondents and thus whether people self-selected into marriage on premarital health trajectories. In contrast to this, the FEIS models removed any observed or

unobserved individual selection into marriage on both health levels and health trajectories. Thus, they provided more accurate estimates of the health consequences of the transition into marriage and remaining in marriage.

RESULTS

Table 2 shows the estimates for men and women separately. We first present evidence of selection on health trajectories into marriage (FEGS models), and then turn to potentially causal effects of marriage on physical and mental health, net of selection (FEIS models).

Selection into marriage on health trajectories

Hypothesis 2 postulated that individuals self-select into marriage based on health sustainability, that is, that already before the first marriage people who eventually marry differ in their health trajectories from people who remain never married. In our results, the age-related decline of self-rated health was slower among the ever-married men than among never-married men (see the negative age main effect and the positive interaction effect “Age × Ever married”). The fact that we controlled for marital duration, which had no effect itself among men, implied that the positive interaction effect “Age × Ever married” referred to the period before marriage. Hence, men with more sustainable self-rated health tend to self-select into marriage. This pattern was not explained by slower health deterioration of higher educated people (see the interaction term “Age × Years of schooling”). For physical and mental health among men, the respective coefficients were also positive and of approximately the same order but not statistically significant. Among women, selection effects for physical and self-rated health were smaller and nonsignificant, which suggests that no self-selection occurred among women. However, this gender difference was not statistically significant (Table 3 in Supporting Information Appendix).

Effect of marriage on physical health

Once we controlled for selection into marriage on health levels and trajectories in the FEIS models, we observed results indicating possible causal effects. We expected the protective effect of marriage for physical health to be cumulative. In line with Hypothesis 3, the effects of “Marriage duration,” net of short-term shifts, were in general positive for physical health and self-rated health (Figure 2). However, the effect reached statistical significance only for self-rated health among men, with an effect size corresponding to an average net improvement in health of 4.6 points on a scale from 0 to 100 per 10 years of marriage. The gender difference was not statistically significant (Table 3 in Supporting Information Appendix), but the pattern was qualitatively in line with the hypothesis that marriage has a more salient protective effect on physical health among men than among women (Hypothesis 1).

We also found a negative effect of the marriage dummy on physical and self-rated health, which was statistically significant among women for self-rated health. In combination with the positive marital duration effect, this pattern suggests that physical health and self-rated health decline directly after the transition into marriage but then recover (for an illustration, see Figure 2). This implies that, net of self-selection and other events related to marriage, the cumulative marriage protection of physical and self-rated health only start to unfold after a small and temporary health decline.

TABLE 2 Changes of health associated with transition into marriage and staying in marriage—FEGS and FEIS models

	Physical health			Mental health			Self-rated health					
	Men		Women	Men		Women	Men		Women			
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>		
FEGS estimates												
In first marriage	-0.93	(1.18)	-1.40	(1.21)	1.06	(1.13)	0.70	(1.12)	-1.64*	(0.79)	-2.50**	(0.87)
Duration of marriage (per 10 years)	-0.84	(1.81)	2.68	(2.04)	-1.74	(1.66)	-0.01	(1.96)	-0.07	(1.09)	0.99	(1.28)
Anticipation: 1–2 years before first marriage	0.38	(0.69)	0.53	(0.79)	0.55	(0.64)	1.34+	(0.74)	-0.03	(0.53)	0.40	(0.56)
Adaptation: 1–2 years after first marriage	-0.26	(1.00)	0.38	(1.14)	1.92+	(1.01)	1.49	(1.07)	-0.97	(0.75)	-0.81	(0.81)
Never married, non-cohabiting partner (ref: unpartnered)	0.27	(0.35)	-0.39	(0.42)	0.86*	(0.36)	1.03*	(0.41)	0.18	(0.27)	-1.10***	(0.30)
Never married, cohabiting partner (ref: unpartnered)	0.18	(0.48)	-1.11*	(0.52)	1.25*	(0.51)	0.75	(0.53)	0.24	(0.41)	-1.14**	(0.42)
Has child(ren) aged 0–1 years old	1.40**	(0.51)	-0.75	(0.54)	0.87*	(0.44)	0.36	(0.48)	0.97**	(0.36)	1.80***	(0.38)
Has any child(ren)	-1.01	(0.70)	0.36	(0.72)	-0.69	(0.68)	1.70*	(0.71)	-0.95+	(0.56)	1.72**	(0.59)
Age (centered at 40, per 10 years)	-4.82***	(0.45)	-4.41***	(0.55)	-2.40***	(0.43)	-2.85***	(0.53)	-7.62***	(0.40)	-5.99***	(0.45)
Age × Ever married	1.71	(1.50)	-0.08	(1.71)	1.83	(1.39)	1.42	(1.68)	1.96*	(0.99)	-0.05	(1.15)
Age × Years of schooling	0.34**	(0.11)	0.32**	(0.12)	0.12	(0.11)	0.40***	(0.11)	0.32***	(0.09)	0.30**	(0.10)
Number of persons	2320		2353		2320		2353		5662		5436	
Number of person-years	13,681		13,524		13,681		13,524		56,780		53,660	
FEIS estimates												
In first marriage	-1.41	(1.32)	-1.40	(1.33)	1.52	(1.31)	1.60	(1.23)	-1.19	(0.92)	-2.59**	(0.93)
Duration of marriage (per 10 years)	1.97	(2.34)	2.47	(2.61)	-1.18	(2.32)	-0.58	(2.40)	4.60**	(1.64)	2.05	(1.68)
Anticipation: 1–2 years before first marriage	0.75	(0.70)	0.36	(0.81)	0.88	(0.72)	1.28+	(0.73)	0.61	(0.56)	0.15	(0.57)
Adaptation: 1–2 years after first marriage	0.00	(1.08)	0.26	(1.17)	2.46*	(1.19)	1.84+	(1.11)	0.30	(0.84)	-0.90	(0.85)
Never married, non-cohabiting partner (ref: unpartnered)	0.43	(0.40)	-0.37	(0.43)	1.40***	(0.41)	1.19**	(0.45)	0.28	(0.28)	-0.94**	(0.31)
Never married, cohabiting partner (ref: unpartnered)	0.06	(0.63)	-1.02+	(0.57)	1.35*	(0.60)	1.15+	(0.61)	0.01	(0.45)	-1.38**	(0.45)
Has child(ren) aged 0–1 years old	1.24*	(0.58)	-1.00+	(0.59)	0.40	(0.50)	0.24	(0.55)	1.12**	(0.38)	2.03***	(0.40)
Has any child(ren)	0.29	(0.90)	0.37	(0.90)	0.65	(0.86)	1.77+	(0.91)	-0.51	(0.66)	0.93	(0.71)
Number of persons	2320		2353		2320		2353		5662		5436	
Number of person-years	13,681		13,524		13,681		13,524		56,780		53,660	

Note: SEs clustered on individuals. The sample contains respondents before first marriage and in first marriage, who were observed at least four times, of which unmarried at least two times and (for those who ever married) married at least two times.
 Abbreviations: *B*, regression coefficient; FEIS, fixed effects models with individual slopes for age; FEIS, fixed effects models with individual slopes for age; GSOEP, German Socio-Economic Panel.
 + $p < .10$.
 * $p < .05$.
 ** $p < .01$. *** $p < .001$. *Source:* GSOEP data 2002–2018 for physical and mental health; 1992–2018 for self-rated health.

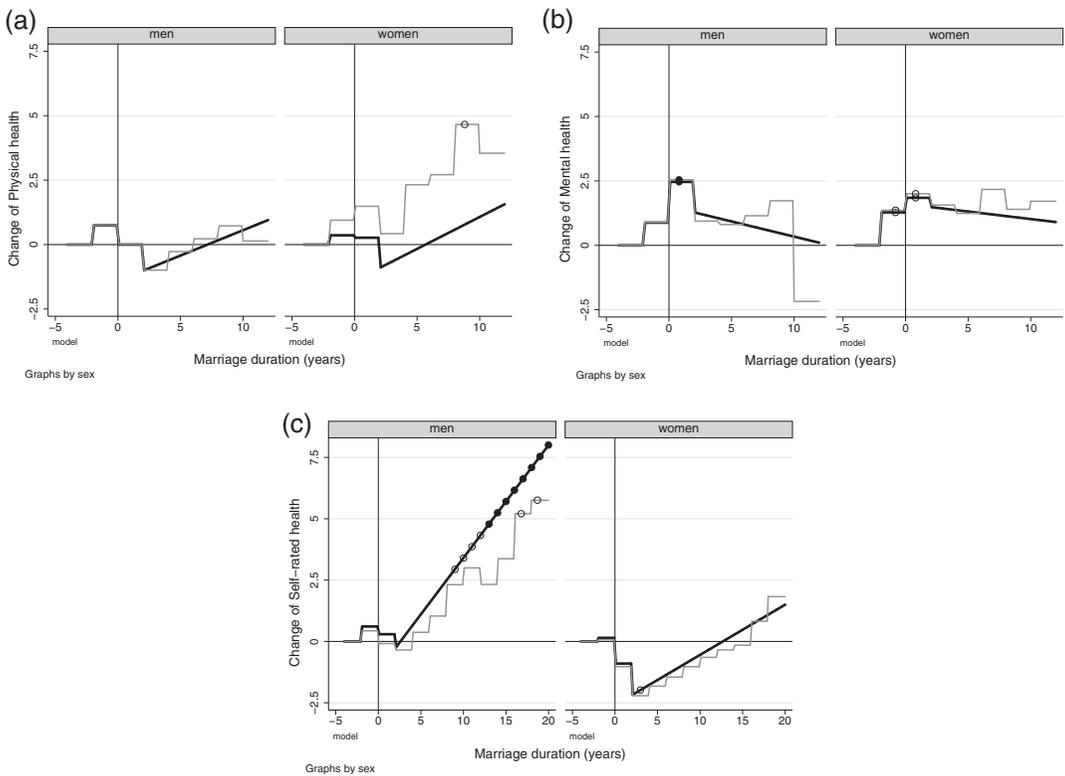


FIGURE 2 The net effect of marital transition and of remaining in marriage on health; predictions from FEIS models in Table 2 (black) and distributed fixed effects estimates (gray, not shown in the table). Full circles indicate health changes statistically significant at 95% level; empty circles signify health changes statistically significant at 90% level. FEIS, fixed effects models with individual slopes

Effect of marriage on mental health

Hypothesis 4 postulated that marital protection of mental health is a sum of cumulative and instantaneous, short- and long-term effects. Our results showed that the impact of marriage on mental health was less persistent than on physical health. Among men and women alike, marriage effects on mental health were limited to a short-term increase after the transition into marriage (i.e., for adaptation dummies), suggesting short-lived protective effects. The marriage dummy, which corresponded to the long-term protective effect, was also positive for men and women but not statistically significant.

Covariate effects

In order to disentangle genuine marriage effects and the effects of other events closely related to marriage, such as childbirth or cohabitation with a partner, we included the respective covariates in the FEIS models. Among men and women, we found the expected positive correlation between partnership and mental (but not physical) health. However, nonmarital partnership (cohabiting or not) correlated with poorer self-rated health among women. This result is counterintuitive but it was robust to model specification, and mirrored the negative effects of the marriage dummy. A similar effect for cohabitation, although statistically significant only at

the 10% level, showed up for physical health. This pattern suggests that in the short run partnership may affect women's health negatively.

Parenthood had a positive effect on self-rated health and on physical health. The literature showed strong cross-country variation in correlations between parenthood and happiness (Glass et al., 2016), suggesting that our result may reflect state's support for parenthood in Germany. Interestingly, these beneficial effects appear to be rather temporary, as the dummy for infants under 1 year of age was significant, whereas the effect of having children of any age was not.

DISCUSSION

For more than 150 years (Farr, 1859), scholars have studied the associations between marriage and health. Our research contributes to the debate by providing new empirical evidence on marital health protection as it accounts for selection on premarital health trajectories and uses long-spanning European data.

As our fixed effects with group-specific slopes (FEGLS) regression showed, men who eventually got married exhibited more sustainable self-rated health (e.g., slower declines over time) already before marriage. We did not find any significant selection effects for other dimensions of health, but a qualitative inspection of results suggested that similar selection among men is likely also for mental and physical health. It thus seems that not only men with better health but also those with more sustainable health are more likely to transition into marriage, similar to what has been reported for income (Ludwig & Brüderl, 2018). Health declines, particularly among men, may signal less longevity and dependability to their potential spouses who may, therefore, ultimately refrain from marrying them, an argument compatible with sociobiological approaches (Nielsen, 1994).

Using FEIS regressions, we eliminated selection on premarital health slopes from the causal marriage effect estimates. Consequently, we observed surprisingly few effects of marriage on health. The theoretically postulated cumulative effect of marriage on health occurred only for self-rated health; for physical health, the pattern was consistent with a cumulative effect, but was not statistically significant. These protective effects may stem from married people facing more favorable socioeconomic conditions, having more access to social support, or controlling each other's health damaging behavior (Carr & Springer, 2010). These mechanisms theoretically differentiate married from the unpartnered but also from other (i.e., unmarried) partnered people, among whom the ultimately marrying couples are a self-selected group (Poortman & Mills, 2012). Furthermore, also the legal act of marrying itself brings additional benefits, such as joint taxation or access to spouse's health insurance, which may additionally widen the gap between the married and the never married.

For self-rated and physical health alike, the long-term protection was accompanied by an initial health decline. This effect was statistically significant for women only, which may reflect the gendered aspects of the transition from cohabitation to marriage (such as the norm of taking husband's name, societal conventions of appropriate behaviors of married women, or changes of daily routines) which may act as additional stressors especially for women. However, the effect patterns among men and women were not significantly different in our analysis.

Existing theories do not help us understand why health (of men and women alike) declines temporarily upon transition into marriage; the stress associated with the transition seems to be the most plausible explanation. The pattern of initial decline is not at odds with results from past studies, which showed that entering marriage correlated with a temporary increase in mortality (Brockmann & Klein, 2004), decline in general health (Kalmijn, 2017), and worsening of mental health (Blekesaune, 2008). However, our study did not find a comparable pattern for mental health, which is typically highly responsive to stress. This suggests that entering

marriage may be associated with behaviors that uplift one's mood but have the unintended consequence of undermining physical health. Indeed, research showed that marriage correlates with lower physical activity (Rapp & Schneider, 2013) and body weight gain (Sobal et al., 2003) which may foster temporary declines in self-perceptions of physical health. Other research suggested gendered patterns: upon entering marriage, women tend to mimic the less healthy drinking patterns of their husbands rather than vice versa (Reczek et al., 2016). Consistently with this explanation, among women in our study marriage but also nonmarital partnerships were associated with a decline in self-rated health.

In the long run, however, self-rated health does seem to benefit from marriage as indicated by the positive effects of marital duration. The pattern of initial decline and long-term protection suggests that estimated effects of marriage on health may vary greatly with the observation window available in the data. In particular, the long-term protective effect may even go undetected unless the observation window includes a sufficient number of years after marriage.

Our second main result pertains to mental health. For this dimension, we found only temporary positive shifts around the transition into marriage, as postulated by set-point theory. Hence, beneficial mental health effects reported in the literature may in part capture short-term rather than sustainable protection. In our analysis, presence of a cohabiting partner seems to be just as important for mental health as marriage itself. This result raises the question of whether it is really the marriage event or rather transitions into cohabitation or parenthood that generate mental health benefits. In any case, when studying causal marriage effects it seems indispensable to control for these related transitions.

Our results regarding gender differences were mixed. Previous studies suggested that men benefit from marriage more strongly than women in terms of physical health, perhaps because marriage reduces their health-risk behavior, which in turn protects their physical health (Simon, 2002). Indeed in our analysis, the cumulative protective effect for self-rated health was statistically significant only among men. Our results suggest that selection of individuals with more sustainable health into marriage is stronger among men than among women. It is possible that these differences in selection are interpreted as stronger marital protection in studies, which do not account for selection on premarital health trajectories.

In contrast to findings from the United States, our analysis did not show salient marital protection for health. This is consistent with the idea that marital protection is more solid in the United States than in Europe (as suggested, e.g., by Kalmijn, 2017; Cherlin, 2009) and may reflect greater generosity of European welfare states (e.g., the universal access to health and unemployment insurance) but also cultural differences, such as the less central position of marriage in Europe (Thornton & Young-DeMarco, 2001). In such a context, marriage may yield only minor advantages over nonmarital unions. This may be especially true in countries like Germany, which offer only limited benefits to married couples. Therefore, further research, preferably using panel data from different countries, is needed to shed further light on conditions and mechanisms of marriage effects on health.

Nonetheless, our study suggests some policy implications. First, in some social contexts encouraging marriage may in itself have little effect for improving population health. In other words, our findings do not yield clear reasons for health policies to promote marriage above other living arrangements. This, of course, does not exclude other (e.g., normative or demographic) reasons to promote marriage. Second, our result on positive selection of men with sustainable health into marriage in combination with the potential benefits of marriage in other spheres of life suggests that marriage facilitates social inequalities among men through a cumulative advantage mechanism (DiPrete & Eirich, 2006). Unmarried men may be a group potentially affected by cumulative disadvantage mechanism, and policies addressing their health and well-being may be particularly useful to tackle social inequalities and improve population health.

Our focus on the temporal shape of marriage effects on health resulted in some limitations. First, we could not provide more detailed accounts of health-related selection into marriage. Specifically, we would expect particularly short-term health shifts to predict transitions into first marriage, which, however, would require a different analytical framework. Second, some mechanisms and moderators of the effects remained unclear. For instance, the quality of the marriage certainly plays an important role in determining health effects, especially in the long run. Unfortunately, the GSOEP data do not contain any indicators of marital quality. A next step could be to study the mechanisms, for example, social support or economic resources, directly and try to empirically assess their relative importance. Third, it would be insightful to replicate our analyses with medical indicators of health, such as medical diagnoses or biomarkers. Fourth, in the present study we were not able to provide a detailed analysis of cohabitation effects; in particular, we did not consider its duration. Our models tested the difference in health between the married and the never married unpartnered people, and we only implicitly considered the difference between the married and the unmarried cohabiters. Fifth, our study only analyzed the effects of heterosexual marriages, and our conclusions cannot be extended to same-sex marriages whose consequences may be quantitatively and qualitatively different. Finally, our analysis covered a relatively narrow range of marriage cohorts (2004–2016 for SF-12 measures, 1993–2017 for self-rated health) which does not allow addressing the question how the institution of marriage and the role of women in marriage changed in the post-war period.

A central finding from our study is that the protective effect of marriage on health, despite strong theoretical underpinnings, is rather weak, at least in the studied social context. In line with our theoretical considerations, for self-rated and physical health we found a pattern of a long-term protection, whereas for mental health the positive effects of first marriage were rather short-lived. This suggests that future research should consider different health aspects both theoretically and empirically. However, some of our results remain below conventional significance levels, suggesting tendencies rather than providing solid evidence. A methodological conclusion from our study is that selection may play an important role in shaping marital health trajectories, and controlling for it may be necessary for obtaining unbiased estimates of marital protection. Despite an increased use of sophisticated methodology such as FE panel regression in more recent studies, the existing body of research may still contain selection bias in terms of individuals' premarital health trends, potentially overestimating the protective marriage effect.

ACKNOWLEDGMENT

This research was funded by Deutsche Forschungsgemeinschaft (grant numbers AR811/2-1 and WO 739/19-1).

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REFERENCES

- Andersen, H. H., Mühlbacher, A., Nübling, M., Schupp, J., & Wagner, G. G. (2007). Computation of standard values for physical and mental health scale scores using the SOEP version of SF-12v2. *Schmollers Jahrbuch*, 127(1), 171–182.
- Anderson, M., Dobkin, C., & Gross, T. (2012). The effect of health insurance coverage on the use of medical services. *American Economic Journal: Economic Policy*, 4(1), 1–27. <https://doi.org/10.3386/w15823>
- Averett, S. L., Argys, L. M., & Sorkin, J. (2013). In sickness and in health: An examination of relationship status and health using data from the Canadian National Public Health Survey. *Review of Economics of the Household*, 11(4), 599–633. <https://doi.org/10.1007/s11150-012-9143-z>

- Baizán, P., Aassve, A., & Billari, F. C. (2004). The interrelations between cohabitation, marriage and first birth in Germany and Sweden. *Population and Environment*, 25(6), 531–561. <https://doi.org/10.1023/b:poen.0000039064.65655.3b>
- Barban, N. (2013). Family trajectories and health: A life course perspective. *European Journal of Population*, 29(4), 357–385. <https://doi.org/10.1007/s10680-013-9296-3>
- Barg, K., & Beblo, M. (2009). Does marriage pay more than cohabitation? *Journal of Economic Studies*, 36(6), 552–570. <https://doi.org/10.1108/01443580911001724>
- Becker, G. S. (1991). *A treatise on the family* (Enlarged edition). Harvard University Press.
- Blekesaune, M. (2008). Partnership transitions and mental distress: Investigating temporal order. *Journal of Marriage and Family*, 70(4), 879–890. <https://doi.org/10.1111/j.1741-3737.2008.00533.x>
- Boxer, D., & Gritsenko, E. (2005). Women and surnames across cultures: Reconstituting identity in marriage. *Women and Language*, 28(2), 1.
- Brockmann, H., & Klein, T. (2004). Love and death in Germany: The marital biography and its effect on mortality. *Journal of Marriage and Family*, 66(3), 567–581. <https://doi.org/10.1111/j.0022-2445.2004.00038.x>
- Brüderl, J., & Ludwig, V. (2015). Fixed-effects panel regression. In H. Best & C. Wolf (Eds.), *The Sage handbook of regression analysis and causal inference* (pp. 327–357). Sage.
- Carr, D., & Springer, K. W. (2010). Advances in families and health research in the 21st century. *Journal of Marriage and Family*, 72(3), 743–761. <https://doi.org/10.1111/j.1741-3737.2010.00728.x>
- Cherlin, A. (2009). *Marriage, divorce, and remarriage*. Harvard University Press.
- Cullati, S., Rousseaux, E., Gabadinho, A., Courvoisier, D. S., & Burton-Jeangros, C. (2014). Factors of change and cumulative factors in self-rated health trajectories: A systematic review. *Advances in Life Course Research*, 19, 14–27. <https://doi.org/10.1016/j.alcr.2013.11.002>
- DeLongis, A., Folkman, S., & Lazarus, R. S. (1988). The impact of daily stress on health and mood: Psychological and social resources as mediators. *Journal of Personality and Social Psychology*, 54(3), 486–495. <https://doi.org/10.1037/0022-3514.54.3.486>
- DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology*, 32, 271–297. <https://doi.org/10.1146/annurev.soc.32.061604.123127>
- Duncan, G. J., Wilkerson, B., & England, P. (2006). Cleaning up their act: The effects of marriage and cohabitation on licit and illicit drug use. *Demography*, 43(4), 691–710. <https://doi.org/10.1353/dem.2006.0032>
- Dupre, M. E., & Meadows, S. O. (2007). Disaggregating the effects of marital trajectories on health. *Journal of Family Issues*, 28(5), 623–652. <https://doi.org/10.1177/0192513x06296296>
- Elwert, F., & Winship, C. (2014). Endogenous selection bias: The problem of conditioning on a collider variable. *Annual Review of Sociology*, 40, 31–53. <https://doi.org/10.1146/annurev-soc-071913-043455>
- Eng, P. M., Kawachi, I., Fitzmaurice, G., & Rimm, E. B. (2005). Effects of marital transitions on changes in dietary and other health behaviours in US male health professionals. *Journal of Epidemiology & Community Health*, 59(1), 56–62. <https://doi.org/10.1136/jech.2004.020073>
- EVS. (2016). *European Values Study 2008: Integrated dataset (EVS 2008)*. GESIS Data Archive, Cologne. ZA4800 Data file version 4.0.0. <https://doi.org/10.4232/1.112458>
- Farr, W. (1859). *Influence of marriage on the mortality of the French people*. Savill & Edwards.
- Franks, M. M., Pienta, A. M., & Wray, L. A. (2002). It takes two: Marriage and smoking cessation in the middle years. *Journal of Aging and Health*, 14(3), 336–354. <https://doi.org/10.1177/08964302014003002>
- Fu, H., & Goldman, N. (1996). Incorporating health into models of marriage choice: Demographic and sociological perspectives. *Journal of Marriage and the Family*, 58(3), 740–758. <https://doi.org/10.2307/353733>
- Gardner, J., & Oswald, A. (2004). How is mortality affected by money, marriage, and stress? *Journal of Health Economics*, 23(6), 1181–1207. <https://doi.org/10.1016/j.jhealeco.2004.03.002>
- Glass, J., Simon, R. W., & Andersson, M. A. (2016). Parenthood and happiness: Effects of work-family reconciliation policies in 22 OECD countries. *American Journal of Sociology*, 122(3), 886–929. <https://doi.org/10.1086/688892>
- Gove, W. R., & Tudor, J. F. (1973). Adult sex roles and mental illness. *American Journal of Sociology*, 78(4), 812–835. <https://doi.org/10.1086/225404>
- Grunow, D., Schulz, F., & Blossfeld, H. P. (2012). What determines change in the division of housework over the course of marriage? *International Sociology*, 27(3), 289–307. <https://doi.org/10.1177/0268580911423056>
- GSOEP. (2018). *German Socio-Economic Panel, data for years 1984-2018*. version 35.
- Guner, N., Kulikova, Y., & Llull, J. (2018). Marriage and health: Selection, protection, and assortative mating. *European Economic Review*, 109, 162–190. <https://doi.org/10.1016/j.euroecorev.2018.02.005>
- Hank, K., & Steinbach, A. (2018). Families and health: A review. In: G. Doblhammer & J. Gumà (eds.), *A demographic perspective on gender, family and health in Europe* (pp. 23–39). Springer.
- Hewitt, B., Baxter, J., & Western, M. (2006). Family, work and health: The impact of marriage, parenthood and employment on self-reported health of Australian men and women. *Journal of Sociology*, 42(1), 61–78. <https://doi.org/10.1177/1440783306061353>

- Hobson, C. J., Kamen, J., Szostek, J., Nethercut, C. M., Tiedmann, J. W., & Wojnarowicz, S. (1998). Stressful life events: A revision and update of the social readjustment rating scale. *International Journal of Stress Management*, 5(1), 1–23.
- Holmes, T. H., & Rahe, R. H. (1967). The social readjustment rating scale. *Journal of Psychosomatic Research*, 11(2), 213–218. [https://doi.org/10.1016/0022-3999\(67\)90010-4](https://doi.org/10.1016/0022-3999(67)90010-4)
- Hughes, M. E., & Waite, L. J. (2009). Marital biography and health at mid-life. *Journal of Health and Social Behavior*, 50(3), 344–358. <https://doi.org/10.1177/002214650905000307>
- Jovanovic, Z., Lin, C. J., & Chang, C. C. H. (2003). Uninsured vs. insured population: Variations among nonelderly Americans. *Journal of Health & Social Policy*, 17(3), 71–85. https://doi.org/10.1300/j045v17n03_05
- Kalmijn, M. (2017). The ambiguous link between marriage and health: A dynamic reanalysis of loss and gain effects. *Social Forces*, 95(4), 1607–1636. <https://doi.org/10.1093/sf/sox015>
- Kiecolt-Glaser, J. K., & Newton, T. L. (2001). Marriage and health: His and hers. *Psychological Bulletin*, 127(4), 472–503. <https://doi.org/10.1037/0033-2909.127.4.472>
- Killewald, A. (2013). A reconsideration of the fatherhood premium: Marriage, coresidence, biology, and fathers' wages. *American Sociological Review*, 78(1), 96–116. <https://doi.org/10.1177/0003122412469204>
- Koball, H. L., Moiduddin, E., Henderson, J., Goesling, B., & Besculides, M. (2010). What do we know about the link between marriage and health? *Journal of Family Issues*, 31(8), 1019–1040. <https://doi.org/10.1177/0192513x10365834>
- Kohn, J. L., & Averett, S. L. (2014). Can't we just live together? New evidence on the effect of relationship status on health. *Journal of Family and Economic Issues*, 35(3), 295–312. <https://doi.org/10.1007/s10834-013-9371-2>
- Köppen, K. (2011). *Marriage and cohabitation in Western Germany and France*. University of Rostock.
- Lamb, K. A., Lee, G. R., & DeMaris, A. (2003). Union formation and depression: Selection and relationship effects. *Journal of Marriage and Family*, 65(4), 953–962. <https://doi.org/10.1111/j.1741-3737.2003.00953.x>
- Lazarevič, P. (2018). Changes in health but not in the general evaluation? The sensitivity of self-rated health to changes. *Revue d'Epidémiologie et de Santé Publique*, 66, S434. <https://doi.org/10.1016/j.respe.2018.05.543>
- Lazarevič, P., & Brandt, M. (2020). Diverging ideas of health? Comparing the basis of health ratings across gender, age, and country. *Social Science & Medicine*, 267, 112913. <https://doi.org/10.1016/j.socscimed.2020.112913>
- Lillard, L. A., & Panis, C. W. (1996). Marital status and mortality: The role of health. *Demography*, 33(3), 313–327. <https://doi.org/10.2307/2061764>
- Lim, S., & Raymo, J. M. (2016). Marriage and women's health in Japan. *Journal of Marriage and Family*, 78(3), 780–796. <https://doi.org/10.1111/jomf.12298>
- Lucas, R. E. (2007). Adaptation and the set-point model of subjective well-being: Does happiness change after major life events? *Current Directions in Psychological Science*, 16(2), 75–79. <https://doi.org/10.1111/j.1467-8721.2007.00479.x>
- Ludwig, V. (2015). *XTFEIS: Stata module to estimate linear fixed-effects model with individual-specific slopes (FEIS)*. Statistical Software Components S458045, Boston College Department of Economics, revised 21 Apr 2019. <https://econpapers.repec.org/software/bocbocode/s458045.htm>
- Ludwig, V., & Brüderl, J. (2018). Is there a male marital wage premium? New evidence from the United States. *American Sociological Review*, 83(4), 744–770. <https://doi.org/10.1177/0003122418784909>
- Mastekaasa, A. (1992). Marriage and psychological well-being: Some evidence on selection into marriage. *Journal of Marriage and the Family*, 54(4), 901–911. <https://doi.org/10.2307/353171>
- Mata, J., Richter, D., Schneider, T., & Hertwig, R. (2018). How cohabitation, marriage, separation, and divorce influence BMI. A prospective panel study. *Health Psychology*, 37(10), 948–958. <https://doi.org/10.1037/hea0000654>
- Mirowsky, J. (2002). Parenthood and health: The pivotal and optimal age at first birth. *Social Forces*, 81(1), 315–349. <https://doi.org/10.1353/sof.2002.0055>
- Musick, K., & Bumpass, L. (2012). Reexamining the case for marriage: Union formation and changes in well-being. *Journal of Marriage and Family*, 74(1), 1–18. <https://doi.org/10.1111/j.1741-3737.2011.00873.x>
- Nielsen, F. (1994). Sociobiology and sociology. *Annual Review of Sociology*, 20(1), 267–303. <https://doi.org/10.1146/annurev.so.20.080194.001411>
- Nomaguchi, K. M., & Bianchi, S. M. (2004). Exercise time: Gender differences in the effects of marriage, parenthood, and employment. *Journal of Marriage and Family*, 66(2), 413–430. <https://doi.org/10.1111/j.1741-3737.2004.00029.x>
- OECD. (2019). *Family database*. Available at: <https://www.oecd.org/els/family/database.htm>. Accessed on Nov 13, 2019.
- Pinquart, M. (2003). Loneliness in married, widowed, divorced, and never-married older adults. *Journal of Social and Personal Relationships*, 20(1), 31–53. <https://doi.org/10.1177/0265407503020001186>
- Poortman, A. R., & Mills, M. (2012). Joint investments in marriage and cohabitation: The role of legal and symbolic factors. *Journal of Marriage and Family*, 74(2), 357–376. <https://doi.org/10.1111/j.1741-3737.2011.00954.x>
- Rapp, L., & Schneider, B. (2013). The impacts of marriage, cohabitation and dating relationships on weekly self-reported physical activity in Germany: A 19-year longitudinal study. *Social Science and Medicine*, 98, 197–203. <https://doi.org/10.1016/j.socscimed.2013.09.024>

- Reczek, C., Pudrovska, T., Carr, D., Thomeer, M. B., & Umberson, D. (2016). Marital histories and heavy alcohol use among older adults. *Journal of Health and Social Behavior, 57*(1), 77–96. <https://doi.org/10.1177/0022146515628028>
- Ruppner, L., Perales, F., & Baxter, J. (2019). Harried and unhealthy? Parenthood, time pressure, and mental health. *Journal of Marriage and Family, 81*(2), 308–326. <https://doi.org/10.1111/jomf.12531>
- Schnittker, J., & Bacak, V. (2014). The increasing predictive validity of self-rated health. *PLoS One, 9*(1), e84933. <https://doi.org/10.1371/journal.pone.0084933>
- Simon, J. G., De Boer, J. B., Joung, I. M. A., Bosma, H., & Mackenbach, J. P. (2005). How is your health in general? A qualitative study on self-assessed health. *The European Journal of Public Health, 15*(2), 200–208. <https://doi.org/10.1093/eurpub/cki102>
- Simon, R. W. (2002). Revisiting the relationships among gender, marital status, and mental health. *American Journal of Sociology, 107*(4), 1065–1096. <https://doi.org/10.1086/339225>
- Sobal, J., Rauschenbach, B., & Frongillo, E. A. (2003). Marital status changes and body weight changes: A US longitudinal analysis. *Social Science & Medicine, 56*(7), 1543–1555. [https://doi.org/10.1016/s0277-9536\(02\)00155-7](https://doi.org/10.1016/s0277-9536(02)00155-7)
- StataCorp. (2015). *Stata statistical software: Release 14*. StataCorp.
- Stutzer, A., & Frey, B. S. (2006). Does marriage make people happy, or do happy people get married? *The Journal of Socio-Economics, 35*(2), 326–347. <https://doi.org/10.1016/j.socec.2005.11.043>
- Taft, C., Karlsson, J., & Sullivan, M. (2001). Do SF-36 summary component scores accurately summarize subscale scores? *Quality of Life Research, 10*(5), 395–404.
- Teachman, J. (2016). Body weight, marital status, and changes in marital status. *Journal of Family Issues, 37*(1), 74–96. <https://doi.org/10.1177/0192513x13508404>
- Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior, 52*(2), 145–161. <https://doi.org/10.1177/0022146510395592>
- Thornton, A., & Young-DeMarco, L. (2001). Four decades of trends in attitudes toward family issues in the United States: The 1960s through the 1990s. *Journal of Marriage and Family, 63*(4), 1009–1037. <https://doi.org/10.1111/j.1741-3737.2001.01009.x>
- Tucker, G., Adams, R., & Wilson, D. (2010). New Australian population scoring coefficients for the old version of the SF-36 and SF-12 health status questionnaires. *Quality of Life Research, 19*(7), 1069–1076. <https://doi.org/10.1007/s11136-010-9658-9>
- Tumin, D. (2018). Does marriage protect health? A birth cohort comparison. *Social Science Quarterly, 99*(2), 626–643. <https://doi.org/10.1111/ssqu.12425>
- Uchino, B. N. (2006). Social support and health: A review of physiological processes potentially underlying links to disease outcomes. *Journal of Behavioral Medicine, 29*(4), 377–387. <https://doi.org/10.1007/s10865-006-9056-5>
- Umberson, D. (1992). Gender, marital status and the social control of health behavior. *Social Science and Medicine, 34* (8), 907–917. [https://doi.org/10.1016/0277-9536\(92\)90259-s](https://doi.org/10.1016/0277-9536(92)90259-s)
- Wagner, G. G., Frick, J. R., & Schupp, J. (2007). The German Socio-Economic Panel Study (SOEP) - Scope, evolution and enhancements. *Schmollers Jahrbuch, 127*(1), 139–169.
- Ware, J. E., Kosinski, M., & Keller, S. D. (1996). A 12-item short-form health survey: Construction of scales and preliminary tests of reliability and validity. *Medical Care, 34*(3), 220–233. <https://doi.org/10.1097/00005650-199603000-00003>
- Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. MIT Press.
- Wu, S., Wang, R., Zhao, Y., Ma, X., Wu, M., Yan, X., & He, J. (2013). The relationship between self-rated health and objective health status: A population-based study. *BMC Public Health, 13*(1), 320. <https://doi.org/10.1186/1471-2458-13-320>

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How to cite this article: Mikucka, M., Arránz Becker, O., & Wolf, C. (2021). Revisiting marital health protection: Intraindividual health dynamics around transition to legal marriage. *Journal of Marriage and Family, 1–21*. <https://doi.org/10.1111/jomf.12784>