Couple relationships and health: the role of the individual's and the partner's education

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Abstract

A positive correlation between couple relationships and health is well established. However, recent studies indicate that the beneficial effects of couple relationships on health vary substantially according to the characteristics of the relationship and of the partners involved. The present paper examines to what extent partnership effects on physical and mental health differ based on the individual's education, the partner's education and educational homogamy between partners. Our database is the German Socio-Economic Panel for the period of 2002 to 2016. Based on fixed effects analysis, our results show that a highly educated partner is more beneficial for mental and physical health than a partner with low education. In contrast, the effects of partnerships on health do not depend on whether the partners have same or different educational levels. The results also indicate that partnership effects on health depend on mate choice and on the potential to find a highly educated partner. Education-specific partnership effects on mental health are more prevalent for women, and effects on physical health are more prevalent for men.

Key words: mental health, physical health, couple relationship, partnership, cohabitation, marriage, education, partner's education, homogamy, educational homogamy

Introduction

Previous research has shown a strong and robust positive correlation between health and education (Ross & Mirowsky 2013). A higher educational level is associated with better economic circumstances (Cutler/Lleras-Muney 2006), more social-psychological resources (Ross/Wu 1995), and healthier lifestyles (Rapp/Klein 2017) and therefore improves individuals' health. It is also well known that being in a couple relationship is, on average, positively associated with mental and physical health (Arránz Becker/Loter/ Becker 2017; Hank/Steinbach 2018; Rapp/Klein 2015). Both issues – health differences by education and by partnership status – are often examined separately. However, there are good reasons to assume that these two issues are mutually dependent on each other. For example, one explanation for why being in a partnership improves health is that the partner facilitates economic security and well-being (Bünnings/Kleibrink/Weßling 2017; Waite/Gallagher 2002), although this effect obviously depends on the partner's additional

economic resources. For this reason, the present study examines the question of how partnership effects on mental and physical health vary based on the individual's education, the partner's education and educational homogamy between partners.

Relatively few studies have examined whether the effects of being in a partnership on health differ based on individual characteristics. However, the major exception is gender differences because some but not all studies suggest that men have greater health benefits from a partnership than women (Kiecolt-Glaser/Newton 2001; Wood/Goesling/Avellar 2007). Previous research has also considered some characteristics of the spouse, with a focus mostly on obvious disadvantages, such as health impairment or unemployment. A large number of studies have consistently found that having an ill partner is negatively associated with individuals' mental and physical health (Bourassa/Memel/Woolverton/ Sbarra 2015; Hagedoorn/Sanderman/Bolks/Tuinstra/Coyne 2008; Polenick/Martire/ Hemphill/Stephens 2015; Westman/Keinan/Roziner/Benyamini 2008). In addition, there is some evidence that the spouse's job insecurity negatively affects the individual's health, particularly for women (Bubonya/Cobb-Clark/Wooden 2017; Bünnings et al. 2017; Mendolia 2014). Additionally, several studies have examined the effects of the partner's education on the individual's overall health status and mortality. Their results showed that the partner's level of education is positively associated with the individual's overall health, even after controlling for the individual's education (Brown/Hummer/Hayward 2014; Huijts/ Monden/Kraaykamp 2010; Li/Fu/Zhao/Luo/Kawachi 2013; Monden/van Lenthe/De Graaf/Kraaykamp 2003), and that it is also negatively associated with the individual's mortality (Egeland/Tverdal/Meyer/Selmer 2002; Jaffe/Eisenbach/Neumark/Manor 2006; Skalická/Kunst 2008).

The present study adds to this literature in two ways. First, we focus on mental and physical health separately. Couple relationships and partners' education may affect health through various pathways, some of which may be more important for physical health, whereas others may be more important for mental health. Therefore, a distinction between mental and physical health may help to better understand why the effects of couple relationships on health may vary by the individual's and partner's education and by educational homogamy. Second, it is difficult to determine whether the association between partnership status and health represents causation or health selection (Kalmijn 2017). The main reason for this difficulty is that people are not randomly allocated to various relationship statuses. People's selection of partners depends on various factors that may also affect health. In contrast to previous studies on the association between the couple relationship, the education of partners and health, we analyse longitudinal data with fixed effects (FE) regression models. Hence, we control for time-constant heterogeneity between people who did and did not start a couple relationship while being observed in the survey.

Background and hypotheses

Controversial mechanisms have been proposed to explain why having a partner is positively associated with mental and physical health. On the one hand, healthier people may be more likely to start a relationship because they are more attractive as partners and may have better meeting opportunities (Guner/Kulikova/Llull 2016; Rapp 2018; Rapp/Gruhler

2018). On the other hand, having a partner may improve health for various reasons. Partners take care of each other and provide emotional and instrumental support, which buffers stress (Cohen/Wills 1985) and partly replaces professional health care (Brockmann/Klein 2004). In addition, partners monitor one another's health-related behaviour (Horwitz/White/Howell-White 1996; Klein/Rapp/Schneider 2013; Umberson 1992), a partner provides a sense of identity (Berkman/Glass/Brissette/Seeman 2000; Durkheim 1897; Gove/Style/Hughes 1990), and living with a partner improves economic security and economic well-being by scale economies (Bünnings et al. 2017; Waite/Gallagher 2002).

Most explanations suggest that partner effects on health function similar to higher education effects: Both provide additional material and non-material resources that may help individuals to improve or maintain their mental and physical health. However, two conflicting theories have been suggested to explain why different resources and their effects on health do not simply add up but interfere with one another. On the one hand, *resource multiplication theory* (Ross/Mirowsky 2006) suggests that advantaged groups, such as those with higher educational levels, gain more from additional resources than disadvantaged groups, for example, because they receive higher returns to their human capital. On the other hand, *resource substitution theory* (Ross/Mirowsky 2010) assumes that different kinds of resources can substitute each other. In this view, people with lower educational levels are expected to benefit more than people with higher educational levels from additional resources that a partner may provide.

With respect to the economic gains through partnership, it is straightforward to assume that the benefit from a partner's additional income declines with increasing individual income. In economics, this assumption is called the law of diminishing marginal utility (Gossen 1983 [1854]). Similarly, one might expect that the worse the health behaviour of a person is, the more he or she may benefit from a partner who monitors his or her health behaviour. Therefore, resource substitution seems more plausible than resource multiplication. In addition, it has been shown that stressors are more prevalent among people with lower educational levels (Baum/Garofalo/Yali 1999). For this reason, those with lower educational levels should benefit more than those with higher educational levels from stress buffering by the partner. Finally, there may be ceiling effects for the highest educated: They are already healthier than those with low education and already engage in healthy behaviours (Byrnes/Miller/Schafer 1999; Laaksonen et al. 2007). Hence, people with the highest educational levels might benefit less from a couple relationship than those with lower educational levels. Some of these mechanisms, particularly those related to health behaviour, may be more relevant for physical health, whereas others, such as buffering of stress by the partner, may be more important for mental health. Nonetheless, overall, the mechanisms may affect both physical health and mental health in a similar way. Therefore, with respect to the individual's own education, based on the substitution model, we hypothesize the following:

H1:   *People with low education receive greater health benefits from a couple relationship than people with high education.*

However, due to assortative mating, partners tend to have same educational levels (Blossfeld/Timm 2003). Therefore, those with lower educational levels may actually ben-

efit less from the partner's resources than those with higher educational levels. In this context, a partner's education should affect an individual's health in a similar way as his or her own education by improving economic circumstances, psychosocial factors, and health behaviour (Monden et al. 2003). In addition, a partner with low education provides not only fewer resources than a highly educated partner but also additional stressors, such as the partner job insecurity, which has been shown to negatively affect individuals' mental and overall health (Baranowska-Rataj/Strandh 2017; Bubonya et al. 2017; Bünnings et al. 2017; Mendolia 2014). Therefore, with respect to the partner's education, we suppose the following:

H2a: A partner with low education is less beneficial for health than a partner with high education,

and because of assortative mating, it follows that

H2b: People with low education receive fewer health benefits from a couple relationship than people with high education,

which contradicts H1.

The arguments given so far suggest that the effects of couple relationships on health depend on both individuals' and partners' levels of education. However, the health effects of the partnership may also depend on whether the two partners have same or different educational levels. It has been shown that educational homogamy is, on average, associated with high relationship quality (Eeckhaut/Stanfors/van de Putte 2013), which itself is positively related to health (Hawkins/Booth 2005; Umberson/Williams/Powers/Liu/Needham 2006). For these reasons, we hypothesize the following:

H3: A partner with the same education to that of the individual is more beneficial for health than a partner with different education.

Finally, we take into consideration that all arguments given so far may differ between mental and physical health and may also differ between men and women. On the one hand, mental and physical health may be affected by a couple relationship to different extents due to the different mechanisms underlying partnership effects on health. Whereas emotional support, stress buffering, and a sense of identity given by the partner should be more closely related to mental health, economic gains from the couple relationship should affect mental and physical health as well (Kahn/Wise/Kennedy/Kawachi 2000). On the other hand, the various mechanisms by which the couple relationship and the partner's education affect mental and physical health may function differently for men and women. Therefore, we analyse mental and physical health as well as women and men separately.

Data and methods

Data and sample

To analyse our hypotheses on how partnership effects on health depend on individuals'
and partners' education and on the educational homogamy or heterogamy of partners, we
conduct a panel analysis of the German Socio-Economic Panel (GSOEP) from 2002 to
2016. The GSOEP (Schupp et al. 2016) (doi:10.5684/soep.v32.1) is a representative lon-
gitudinal study of private households in Germany with annual observations. Every year,
up to 11,000 households and up to 30,000 persons are interviewed (Wagner/Frick/Schupp
2007).

Table 1. Restriction of the sample

	observed persons			biennial observations of persons during the panel		
	total	with a transition into couple relationship		total	in couple relationship	
	N	N	in %	N	N	in %
1: panel 2002-2016, restricted to observations of persons without a partner at their first observation in the panel	12 899	3 405	26.4	40 127	8 050	20.0
2: additonally restricted to only one episode of couple relationship per person[1]	12 899	3 083	23.9	35 345	6 185	17.5
3: additionally restricted to persons with more than one observation during the panel	8 253	3 083	37.4	30 699	6 185	20.2
4: additionally restricted to observations without item-nonresponse (excluding item-nonresponse on partner's education)	6 951	2 542	36.6	23 999	5 207	21.7
5: additionally restricted to observations with information on partner's education (only couples who cohabited at least at one observation)	6 495	527	8.1	20 709	1 917	9.3

[1] In some cases, the relationship with the first partner during the panel – as measured with retrospective
questions at the time of the interview – was too short to be measured at two consecutive time points. We cut
observations even after such "short-time" couple relationships. Therefore, the number of persons with a
transition into couple relationship (visible at the observed time points of the panel) is reduced in row 2.

Source: German Socioeconomic Panel, waves 2002, 2004, 2006, 2008, 2010, 2012, 2014 and 2016, au-
thor calculation.

The mental and physical health variables used are available for every second year since
2002. Therefore, we construct an eight-wave panel (2002, 2004, 2006, 2008, 2010, 2012,
2014, and 2016) of GSOEP participants who did not live with a partner at the time of their
first observations in the panel (see Table 1, row 1). We include all observations of these in-
dividuals until 2016 or until an individual who had started a new relationship had separated
from his or her new partner. This approach results in the sample being restricted to only one
partnership per person (row 2). In addition, we drop participants with only one remaining
observation in the panel (row 3), and we drop some biennial observations of participants
due to item non-response on individual characteristics (row 4). After this step, we have
23 999 observations from 6 951 individuals, among whom 2 542 started a new intimate re-
lationship during the panel study. To estimate the effects of partner education, we must re-

strict the sample to couples who shared a household during at least one time point because partner education data is available only for partners who lived together. This step considerably reduces the sample (row 5) to 20 709 observations from 6 495 couples, among whom 527 started a new intimate relationship during the observation window. Note that by restricting the sample in this way, we cannot include those couples who did not start living together during the observation window – either because the observations are right-censored or because the couple separated before moving in together. Hence, our analysis is restricted to those with relatively stable couple relationships.

Outcome variables

Since 2002, the GSOEP has provided the Mental Health Component Summary Scale (MCS) as an indicator for mental health and the Physical Health Component Summary Scale (PCS) as an indicator for physical health every second year. The indicators are based on the scores of twelve questions of the SF12v2, a short version of the internationally approved and reliable SF36v2 Index (Ware/Dewey/Kosinski 2001). The SF12v2 items reflect both mental and physical aspects of quality of life, such as bodily pain, physical and emotional restrictions to social role accomplishments, and vitality. The weights of the items on the mental and physical health scales are calculated by the GSOEP group using exploratory factor analysis (varimax rotation), and the indices are transformed into norm-based scores with a mean of 50 and a standard deviation of 10 in the year 2004 (see Andersen/Mühlbacher/Nübling/Schupp/Wagner 2007 for more details). In the restricted sample described above, the mental health scale has a mean of 49.8 and ranges between 0.6 (min) to 77.3 (max), whereas the physical health scale has a mean of 49.2 with a range from 10.7 (min) to 76.4 (max).

Key predictor variables

Relationship status is measured with three successive questions. First, respondents were asked about their marital status. Second, all unmarried respondents were additionally asked whether they were in a permanent relationship (in German, "feste Partnerschaft"). Third, individuals who were in permanent relationships were asked whether they shared a household with their partners. For the following analysis, we construct a variable that is zero for all points of observation in the panel where the respondent was not currently in a couple relationship and that is set to one if the respondent was in a non-cohabiting relationship, was sharing the same household with an unmarried partner, or was married (and not separated). Information about the start and end of periods of being single is taken from the given biographic dataset "biocouplem". The duration of the current couple relationship is measured in years (but calculated on a monthly basis).

We use a generated variable provided by GSOEP to measure the educational attainment of the original respondent and of his/her partner. Respondents with a lower secondary degree ("Hauptschulabschluss"), who dropped out or who never attended school for any reason are assigned a low educational level. Those who reported having an intermediate degree ("Realschulabschluss") constitute the intermediate level. Those

who had either a technical school degree ("Fachabitur") or an upper secondary degree ("Abitur") are assigned a high educational level. Respondents who were still in school, had "other" school degrees or had item-nonresponse were deleted from the sample. We do not divide the educational levels any further because the cultural (dis)similarities that might help to explain differences in mental and physical health advantages of a new partner by homogamy vs. heterogamy are sufficiently represented by the current categorization and because we cannot split our sample of only 527 new couple relationships into more subgroups without losing substantial statistical power.[1] To include the observations after establishing a new couple relationship, but before partners have moved in together, we impute the first valid information about partner's education (available after moving into the same household) to these earlier observations. Similarly, we impute missing information on partner education from the latest valid information in the GSOEP.

Method and modelling strategy

This study uses FE models to estimate the impact of a new couple relationship on physical and mental health. In an FE model, the intra-individual mean is subtracted from every measurement of all variables; hence, it focuses exclusively on the covariation of variables over time *within* individuals. Thus, we control for any time-constant confounders, such as personality or prior relationship status, even if they are unknown (Allison 2009; Brüderl/ Ludwig 2015).

In our models, the FE estimators for establishing a new couple relationship give the average treatment effect on the treated (ATET), which means that these estimators are estimated using the data only from those respondents who established a new couple relationship (the treated). As noted above, interpretation should take in account that our subsample of the treated is restricted to the couple relationships that transitioned to cohabitation.

Changes in mental or physical health might be due not only to finding a partner but also to ageing and period effects. Therefore, the following FE model controls for age and period.[2] For the same reason, we control for changes in parenthood status and changes in educational attainment. To estimate the effects of these time-varying covariates, the model uses the information of both those with and those without a new partner during the panel.

Consequently, the estimator for a new couple relationship provides information about the intra-individual health changes experienced by individuals who have started a couple relationship (compared with the situation before having a partner) *net the effect of ageing, net the period effects* and net all other covariates. Since the educational attainment of both

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1   The constellation with least biennial observations (N=160) was men with a partner of low educational level.

2   In particular physical health is known to deteriorate over the life-course. By specifying period effects, we control for potential effects of the various societal crises in the 21st century in particular on individuals' mental health (for instance the German economic crisis in the early 2000s, the financial crisis in the later 2000s and the refugee crisis of 2015). To avoid perfect collinearity of period and age measures, we grouped each two points of observation (2002/2004, 2006/2008, 2010/12, 2014/ 16). Empirical results show that mental health deteriorated in calendar time, in particular for women (Table 2). For physical health, we did not find significant period effects (Table 3).

partners may have different effects on men's and women's health, we conduct separate models for male and female respondents.[3]

Findings

Couple relationships, education of both partners, and mental health

Table 2 shows the effect of starting a couple relationship on mental health while controlling for age, period and other covariates. Note that we employ FE models. Hence, the estimator for a new couple relationship provides information about the intra-individual health *change* experienced by individuals who started a new couple relationship (compared with the situation before starting the relationship), net all observed and unobserved differences between individuals that are time-constant.[4] For men (Model 1a), mental health is 1.27 scale points better after having found a new partner than during the time without a partner. For women (Model 1b), the effect is slightly larger (+1.41). Therefore, we find a positive effect of starting a partnership on mental health for both women and men.

In Models 2a and b, we test our contradicting hypotheses that partnership effects on mental health depend on an individual's education (H1 and H2b). Due to introducing interaction effects, the main effect of a new partner now shows the increase in mental health when individuals with high educational level find new partners. For men (Model 2a), this effect is very low (+0.24). The interaction effects show that men with intermediate educational levels benefit more from new partners (+1.98) than men with high educational levels; however, this effect is significant only at the 10% level. Men with low educational levels do not benefit significantly more or less from having new partners than men with high educational levels.[5] For women, Model 2b shows that only those with high educational levels benefit significantly from new partners (+2.35), but differences between women with high educational levels and those with low and intermediate educational levels are not significant. Hence, hypothesis H1 that people with low education receive greater health benefits from a couple relationship than people with high education finds no support. However, the contrasting hypothesis H2b that people with low education receive *fewer* health benefits from a couple relationship is supported for women's mental health.

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3   Please note that the (overall) R² displayed in Tables 2 and 3 refers to all explained intra- and inter-individual variance of the dependent health scores. Since inter-individual variance is large, the share of health variance that is explained as being inter-individual is large. As a measure of the share of intra-individual variance being explained, please refer to the within R² displayed in the tables.

4   This may lead to counter-intuitive effects. For example, we controlled for intra-individual educational mobility and found that men are mentally better off with an intermediate instead of an upper school degree. As we dropped all individuals who were still enrolled in school, the intra-individual change from an intermediate to an upper school degree is a very rare event, and the effect is based on a very selective group.

5   As shown by an additional test (not in Table 2), the difference in the benefits of finding a new partner between men with lower and intermediate degrees is not significant.

In Models 3a and b in Table 2, we test our hypothesis H2a that having a partner with low educational attainment is less beneficial for mental health than having a partner with higher educational attainment. Again, we use interaction effects to determine the difference between educational levels. Hence, now the main effect of a new partner gives the increase in mental health for a new partner with a high educational level, whereas the interaction effects represent the differences in mental health gains between new partners with intermediate and high educational levels and the differences between new partners with low and high educational levels. For men, we do not find significantly different effects for partners of various educational levels. For women, only a new partner with a high educational level improves mental health (+3.36). For women who have partners with low education, there is no effect at all (3.36-3.60= -0.24), and for partners with intermediate degrees, there is only a small positive effect (3.36-2.63=0.73). Hence, only for women do we find support for our hypothesis H2a that having a partner with lower educational attainment is less beneficial for mental health than having a partner with higher educational attainment.

In Models 4a and b, we analyse the effect of starting a homogamous or heterogamous partnership (Hypothesis H3). The main effect now represents the mental health benefit from finding a new partner who has different educational attainment than the focal individual (heterogamy), and the interaction effect gives the difference between finding a new partner with the same educational attainment (homogamy) vs. finding a partner with different educational attainment (heterogamy). The models show that homogamy does not result in a significantly larger increase in mental health, either for men (Model 4a) or for women (Model 4b).

In addition, we explore whether the health effect of homogamy depends on the joint educational level of both partners. In Models 5a and b, we split the new partner effect into one effect for finding a new partner with different educational attainment (heterogamy) and one effect for finding a new partner with the same educational attainment (homogamy). We then add interaction effects of the partner's joint educational level with the effect of finding a new homogamous partner. The main effect of a new partner with the same educational level now represents homogamy of a highly educated couple. For men, homogamy does not boost the mental health effect of finding a new partner, irrespective of the educational level. For women, a homogamous partner boosts mental health only when both partners are highly educated, i.e., when homogamy means finding a highly educated partner. Hence, we conclude that it is mainly the additional resources of a highly educated partner that improve women's mental health (hypothesis 2), particularly for women who have high educational levels themselves.

Table 2: Effects of Finding a New Partner, Education of Respondent and Partner and Other Covariates on Mental Health (MCS, Fixed effects Models)

	Model 1 (a) men b	se	Model 1 (b) women b	se	Model 2 (a) men b	se	Model 2 (b) women b	se	Model 3 (a) men b	se	Model 3 (b) women b	se	Model 4 (a) men b	se	Model 4 (b) women b	se	Model 5 (a) men b	se	Model 5 (b) women b	se
new partner	1.27*	0.51	1.41*	0.59	0.24	0.78	2.35*	0.93	1.43+	0.75	3.36***	0.94	2.00**	0.72	0.25	0.92				
*new partner * own education*																				
(reference: high eductional level)																				
new partner * intermediate educational level					1.98+	1.05	-1.55	1.26												
new partner * low educational level					1.19	1.18	-1.42	1.53												
*new partner * partner's education*																				
(reference: new partner with high educational level)																				
new partner * with intermediate educational level									0.14	1.01	-2.63+	1.35								
new partner * with low educational level									-1.18	1.31	-3.60**	1.38								
*new partner * homogamy vs heterogamy*																				
new partner * with same educational level as ego													-1.29	0.92	1.88	1.15				
new partner with other educational level than ego																	2.00**	0.72	0.27	
new partner with same educational level as ego																	0.22	0.93	3.91***	
intermediate educational level * new partner with same educational level																	1.73	1.38	-2.95+	
low educational level * new partner with same educational level																	-0.64	1.69	-3.22+	1.81
intermediate educational level[1]	2.57**	0.94	-1.32	1.40	2.50**	0.94	-1.07	1.41	2.57**	0.94	-1.04	1.41	2.57**	0.94	-1.31	1.40	2.56**	0.94	-0.99	1.41
low educational level[1]	1.36	1.93	0.64	2.27	1.30	1.93	0.81	2.27	1.34	1.93	0.84	2.27	1.32	1.93	0.68	2.27	1.32	1.93	0.89	2.27
age-18	0.12	0.08	0.16*	0.08	0.12	0.08	0.16*	0.08	0.12	0.08	0.16*	0.08	0.12	0.08	0.16*	0.08	0.12	0.08	0.16*	0.08
lives with a child <16 in the household	-0.30	0.50	0.18	0.47	-0.27	0.50	0.15	0.47	-0.29	0.50	0.13	0.47	-0.31	0.50	0.17	0.47	-0.29	0.50	0.11	0.47
period 2006-2008	-0.52	0.40	-0.69+	0.37	-0.51	0.40	-0.69+	0.37	-0.52	0.40	-0.68+	0.37	-0.52	0.40	-0.68+	0.37	-0.53	0.40	-0.68+	0.37
period 2010-2012	-1.23*	0.71	-1.86**	0.65	-1.21+	0.71	-1.86**	0.65	-1.24+	0.71	-1.87**	0.65	-1.23+	0.71	-1.85**	0.65	-1.23+	0.71	-1.87**	0.65
period 2010-2016 (reference: 2002-2004)	-1.28	1.01	-1.78+	0.91	-1.26	1.01	-1.78+	0.91	-1.29	1.01	-1.80*	0.91	-1.27	1.01	-1.78+	0.91	-1.27	1.01	-1.79*	0.91
N	8616		12093		8616		12093		8616		12093		8616		12093		8616		12093	
overall R²	0.64		0.65		0.64		0.65		0.64		0.65		0.64		0.65		0.64		0.65	
within R²	0.001		0.001		0.001		0.001		0.001		0.001		0.001		0.001		0.001		0.001	

+ p<=0.1, * p<=0.05, ** p<=0.01, *** p<=0.001. 1) reference: high educational level.
Source: German Socioeconomic Panel, waves 2002, 2004, 2006, 2008, 2010, 2012, 2014 and 2016, author calculation.

Couple Relationships, Education of Both Partners, and Physical Health

Table 3 presents the corresponding results for physical health. As Model 1a (for men) and 1b (for women) reveal, a new partner has, on average, no significant effect on physical health. However, Models 2a and 2b show that men with high educational levels gain in physical health after finding new partners (+1.32), whereas men with intermediate educational levels (1.32-2.26=-0.80) and men with low educational levels (1.32-3.53=-2.21) experience deteriorations in health. For women, partnership effects on health do not significantly vary with their education. Hence, we do not find support for hypothesis H1 that individuals with low education receive greater health benefits from a couple relationship than individuals with high education; instead, we find support for the contradicting hypothesis in men (H2b) that those with low education receive fewer health benefits from couple relationships because they mostly find partners with low education. Models 3a and b examine the effect of the partner's education on the individual's health. For men, the results show that only having a partner with a high educational level boosts physical health (+1.13), whereas having a partner with intermediate education (1.13-2.26=-1.13) or low education (1.13-3.10=-1.97) even deteriorates health compared with the situation before having a partner. For women, health effects of having a partner do not consistently vary with the partner's education. Hence, hypothesis H2a is supported in particular for men: A partner with low education is less beneficial for physical health than a partner with high education.

Models 4a and b reveal that educational homogamy does not significantly boost physical health for men and deteriorate physical health for women, which is in contrast to hypothesis H3, stating that same educational levels of partners in a couple is more beneficial than different educational levels.

Finally, in Models 5a and b, we again explore whether the impact of homogamy on physical health depends on the joint educational level of the partners. Homogamy is beneficial for physical health only for highly educated men, when homogamy is equivalent with finding a highly educated partner (Model 5a). For women, this effect is more or less zero (0.20, nonsignificant). Homogamy between partners with intermediate and low educational levels is even detrimental to physical health for both sexes.

Table 3: Effects of Finding a New Partner, Education of Respondent and Partner and Other Covariates on Mental Health (PCS, Fixed effects Models)

	Model 1				Model 2				Model 3				Model 4				Model 5			
	(a) men		(b) women		(a) men		(b) women		(a) men		(b) women		(a) men		(b) women		(a) men		(b) women	
	b	se	b	se	b	se	b	se	b	se	b	se	b	se	b	se	b	se	b	se
new partner	-0.35	0.38	-0.46	0.46	1.32*	0.58	0.40	0.73	1.13*	0.56	0.71	0.73								
*new partner * own education*																				
(reference: high eductional level)																				
new partner * intermediate educational level					-2.12**	0.79	-1.21	0.98												
new partner * low educational level					-3.53***	0.88	-1.70	1.20												
new partner's education																				
(reference: new partner with high educational level)																				
new partner * with intermediate educational level									-2.26**	0.75	-2.46*	1.05								
new partner * with low educational level									-3.10**	0.98	-1.21	1.08								
*new partner * homogamy vs heterogamy*																				
new partner * with same educational level as ego													0.64	0.69	-2.17*	0.89				
new partner with other educational level than ego																	-0.70	0.54	0.88	0.72
new partner with same educational level as ego																	1.51*	0.70	0.20	0.88
intermediate educational level * new partner with same educational level																	-2.42*	1.03	-3.14*	1.30
low educational level * new partner with same educational level																	-3.81**	1.26	-1.81	1.41
intermediate educational level[1]	-1.80*	0.70	-1.91+	1.09	-1.72*	0.70	-1.69	1.10	-1.83**	0.70	-1.79	1.10	-1.80*	0.70	-1.92*	1.09	-1.81*	0.70	-1.63	1.10
low educational level[1]	-4.69**	1.45	0.44	1.76	-4.56**	1.45	0.60	1.77	-4.68**	1.45	0.49	1.77	-4.68**	1.45	0.40	1.76	-4.68**	1.45	0.56	1.77
age -18	-0.40**	0.06	-0.46**	0.06	-0.40***	0.06	-0.46***	0.06	-0.40***	0.06	-0.46***	0.06	-0.40***	0.06	-0.46**	0.06	-0.40***	0.06	-0.46***	0.06
lives with a child <16 in the household	0.78*	0.38	0.09	0.36	0.78*	0.38	0.06	0.36	0.76*	0.38	0.06	0.36	0.79*	0.38	0.11	0.36	0.76*	0.38	0.07	0.36
period 2006-2008	0.01	0.30	-0.20	0.28	0.01	0.30	-0.19	0.28	0.01	0.30	-0.19	0.28	0.01	0.30	-0.20	0.28	0.01	0.30	-0.20	0.28
period 2010-2012	-0.10	0.53	0.06	0.51	-0.12	0.53	0.05	0.51	-0.12	0.53	0.05	0.51	-0.10	0.53	0.05	0.51	-0.12	0.53	0.04	0.50
period 2014-2016 (reference: 2002-2004)	0.58	0.75	0.25	0.71	0.54	0.75	0.25	0.71	0.55	0.75	0.24	0.71	0.58	0.75	0.25	0.71	0.55	0.75	0.24	0.71
N	8616		12093		8616		12093		8616		12093		8616		12093		8616		12093	
Overall R²	0.79		0.80		0.79		0.80		0.79		0.80		0.79		0.80		0.79		0.80	
Within R²	0.013		0.015		0.014		0.015		0.013		0.015		0.013		0.015		0.013		0.015	

+ p<=0.1, * p<=0.05, ** p<=0.01, *** p<=0.001. 1) reference: high educational level.

Source: German Socioeconomic Panel, waves 2002, 2004, 2006, 2008, 2010, 2012, 2014 and 2016, author calculation.

Discussion

The general idea of this paper is that the mental and physical health benefits of a couple relationship might depend on one's own education, on one's partner's education, and on educational homogamy or heterogamy between partners. Based on FE models and the GSOEP, our results showed that starting a couple relationship is, *on average*, associated with increasing mental health for both men and women. In contrast, starting a relationship is, *on average*, not accompanied by significant changes in physical health.

Regarding one's own education, whether those with high or low educational levels should benefit more from couple relationships is theoretically ambiguous. On the one hand, we have argued that those with low education may have greater gains from a couple relationship than those with high education because the partner's additional resources may substitute for the individual's poor economic and social-psychological resources. On the other hand, due to assortative mating, those with low education usually have partners with low education. Therefore, those with lower educational levels receive fewer additional resources through a partnership and may have fewer health gains from being in a relationship than those with higher educational levels. Our results provide some support for the second argument. Highly educated men reported having better physical health after starting a couple relationship than they had when they were single, whereas men with intermediate educational levels and particularly those with low educational levels reported worse physical health after starting relationships. However, for women's physical health and for women's and men's mental health, the effects of partnerships did not vary significantly with the individual's education.

Regarding partner education, we expected that having a partner with high education is more beneficial for mental and physical health than having a partner with low education because a highly educated partner gives access to more and better resources, such as health-relevant knowledge, economic resources or social status, and because previous studies have found that a partner's level of education is positively associated with one's own overall health status (Brown et al. 2014; Huijts et al. 2010; Li et al. 2013; Monden et al. 2003). We found support for this hypothesis for women's and men's physical health and for women's mental health but not for men's mental health. These gender differences for mental health may be driven by the traditional gender role model, in which a partner with high socio-economic resources is less important for men than for women.

The results further shed some light on the relevance of the various mechanisms on how a partner with high socio-economic resources affects mental and physical health. We found that a new partner with a high educational attainment improves mental health only in women. Hence, mechanisms linked mainly to mental health outcomes like emotional support and a sense of identity given by a partner with high socio-economic resources seem to be more important for women. In contrast, the finding that a new partner with a high educational attainment significantly boosts physical health mainly in men – and the absence of such effects for men's mental health – points at the importance of monitoring of health-related behaviours by a highly educated partner for men's physical health (Horwitz/White/Howell-White 1996; Klein/Rapp/Schneider 2013; Umberson 1992). One possible explanation may be that highly educated men engage more in health-related behaviours when they have a highly educated partner, whereas highly educated women do so even when they are single.

We further expected that educational homogamy would be more beneficial for health than educational heterogamy because homogamy may increase relationship quality. However, the results for both women and men and for both physical and mental health did not support this assumption. The results for women's and men's physical health and for women's mental health indicate that homogamy is advantageous only for those with high educational levels, i.e., when homogamy means having a highly educated partner. Therefore, partner education, but not homogamy or heterogamy, seems to be decisive for the health effects of couple relationships. Even the moderating effects of an individual's education on the association of health and couple relationships can be explained via assortative mating and, hence, again, their partner's education.

The interpretation of our findings is restricted due to some limitations. Although we applied FE analysis to remove time-constant heterogeneity, we cannot completely rule out time variant heterogeneity and reverse causation. It is still possible that mental and physical health improved in the same time period as the couple formation took place, but shortly before the partner was found, which might imply reverse causation. For reasons of data availability, our findings are additionally restricted to the health benefits of the more stable couple relationships that shared households at least once during the observation window, and which are possibly more advantageous for health than less stable relationships. Finally, the results do not represent relationships that lasted longer than 14 years.

In sum, our results indicate that the intra-individual effects of a couple relationship on mental and physical health vary considerably by the educational levels of the partners. The results also indicate that partnership effects on health depend on mate choice and on the potential to find a partner that is highly educated and hence has valuable health-relevant resources. Further research is necessary to further examine and explain the gender differences we found.

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