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ABSTRACT

# Subjective Well-Being and Partnership Dynamics: Are Same-Sex Relationships Different?*

Partnered individuals are happier than singles. This can be because partnership leads to more satisfactory subjective well-being or because happier people are more likely to find a partner. We analyze Dutch panel data to investigate whether there is a causal effect of partnership on subjective well-being. Our data allow us to distinguish between marriage and cohabitation and between same-sex partnerships and opposite-sex ones. Our results support the short-term crisis model and adaptation theory. We find that marital partnership improves well-being and that these benefits are homogeneous to sexual orientation. The well-being gains of marriage are larger than those of cohabitation. Investigating partnership formation and disruption, we discover that the well-being effects are symmetric. Finally, we find that marriage improves well-being for both younger and older cohorts while cohabitation only benefits younger cohort.

**JEL Classification:** J12

**Keywords:** subjective well-being, happiness, marriage, cohabitation, sexual orientation

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# Introduction

In the past decades, a large number of studies in economics, sociology, and demography emerged on the relationship between partnership and well-being or happiness.[1] This literature predominantly asserts a positive association between marriage and well-being (Carr and Springer, 2010; Diener and Eunkook Suh, 1997; Gove and Shin, 1989; Kalmijn, 2017; Umberson and Karas Montez, 2010; Waite and Gallagher, 2000). Recently, a few studies examined whether such a positive relationship exists between cohabitation and well-being finding mixed results (Brown et al., 2005; Hansen et al., 2007; M, 2013; Kohn and Averett, 2014a; Musick and Bumpass, 2012; Soons and Kalmijn, 2009; Soons et al., 2009; Wright and Brown, 2017).

The positive association between partnership and well-being could originate from a causal effect of partnership on happiness. However, the positive association could also be due to selection, i.e. happier individuals are more likely to enter a partnership (Johnson and Wu, 2002; Kim and McKenry, 2002; Sandberg-Thoma and Kamp Dush, 2014; Stutzer and Frey, 2006; Waldron et al., 1996; Kalmijn, 2017; Wilson and Oswald, 2005).[2] For the causal effect there are four nonexclusive explanations. First, partnered individuals may gain from "production complementarities", i.e. specialization and division of labor (Becker, 1974, 1981; Stutzer and Frey, 2006). Second, there may be "consumption and investment complementarities" (Lundberg and Pollak, 2015; Stevenson and Wolfers, 2007). Couples may benefit from economics of scale by pooling resources, jointly consuming public goods and investing in children, and sharing leisure activities (Killewald, 2013; Waite and Gallagher, 2000). Third, a partnership may strengthen and expand social relationships. Partnered individuals do not only receive intimacy, commitment, and care from their partner, but also obtain material and emotional support from the family, relatives and friends of their partner (Dush and Amato, 2005; Ross, 1995). Last but not least, a partnership may introduce social control and mutual supervision salutary to the couple's well-being. The norms in a partnership and the daily supervision by the partner reduce possible risky behavior (Duncan et al., 2006; Fleming et al., 2010; Monden et al., 2003; Umberson, 1992).

We investigate the effects of partnership dynamics in the Netherlands where there have been notable demographic changes in the past decades. In terms of partnership formation,

[1] The literature regards subjective well-being as a substitute for happiness (Diener et al., 2009). We use the two terms interchangeably.

[2] There could be adverse selection too if individuals with inferior well-being more likely actively seek for the protection a partnership offers.

cohabitation has become more popular at the expense of marriage. For example, by age 30, 34% of women born in the 1950s had been or were still cohabiting and 78% had been or were still married. Among women born in the 1970s, by age 30 these percentages switched to 69% for cohabitation and 45% for marriage. In the year 1998, there were about 3.4 million married couples, 0.6 million cohabiting households and 2.2 million single households. In 2016 the number of married couples decreased to 3.3 million, while the numbers of cohabiting couples and single households increased to 1.0 and 2.9 million, respectively. Furthermore, fewer cohabiting couples make a transition into marriage. For instance, for cohabiting women aged 20-24, there is a clear drop in the probability to be married within three years after cohabitation started. For those starting to cohabit in the period 1970-1974, this probability was 58%, while for those in the period 1980-1984, it reduced to 37%, and for the 1990-1994 cohort, it further fell to 27%. In the meantime, the divorce rates have risen. In 1970 about 0.3% of all marriages dissolved, in 2014 this was about 1% (Statistics Netherlands).

Our paper exploits panel data on partnerships and subjective well-being collected in the Netherlands over the period 2008-2013. Our data allow us to make a distinction between marriage and cohabitation and between opposite-sex and same-sex relationships. Couples may invest different levels of tangible and intangible capital (Michael, 2004) in marriage and cohabitation (Nock, 1995; Stanley et al., 2004). Thus, the subjective well-being derived from cohabitation and marriage may be different. There are three reasons why the sexual nature of a partnership can have different effects on well-being. First, same-sex couples may be less likely to obtain social connections and support for their partnership. Although same-sex marriages have been legalized since 2001 in the Netherlands, this type of partnerships may still not be completely accepted by these couples' family, relatives, neighbors, or even employers and fellow employees (Badgett, 1995; Clain and Leppel, 2001; Berg and Lien, 2002; Carpenter, 2007; Elmslie and Tebaldi, 2007; Patacchini et al., 2015). As soon as same-sex partners start cohabiting or get married, their sexual orientation is likely to be disclosed to the public including their employers and co-workers (Plug and Berkhout, 2004). Possible discrimination and unfriendly behavior will directly harm their well-being (Mays and Cochran, 2001; Meyer, 2003; Huebner et al., 2004; Hatzenbuehler et al., 2010; McCabe et al., 2010). Second, pressure from family and society may force sexual minorities to adjust their behavior, which in turn affects their well-being. For instance, they may refuse to openly enter a partnership, be less likely to adopt a child, shy away from prejudiced occupations (Plug et al., 2014), and bear a higher risk of partnership dissolution. According to Statistics Netherlands, in

2015 over 30% of the lesbian couples married in 2005 ended up with divorce. The corresponding percentages of gay men and opposite-sex couples are 15% and 18% respectively. Third, same-sex couples may be more likely to negatively affect each other's lifestyle. Some epidemiological studies find that gay men couples consume more alcohol than their straight counterparts, while lesbian couples are more likely to smoke than straight females (Gruskin et al., 2001). Due to the heterogeneity of their partnership formation and stability, the effect of marital partnership on well-being may differ between same-sex and opposite-sex couples. The issues of the well-being and marital partnership of same-sex couples are largely unexplored in the literature.

Previous studies have investigated differences in well-being effects from marriage and cohabitation but neglected potential heterogeneity of sexual orientation. To the best of our knowledge, we are the first to investigate whether same-sex partnerships have a different effect on subjective well-being than opposite-sex partnerships have. Being the first country that started implementing the same-sex marriage law, the Netherlands bears the longest duration and relatively mature evolution of same-sex marriages so that its relevant data are considerably appropriate for our specific research topic. Moreover, the Netherlands is a country with a highly tolerant attitude to lesbian, gay, bi-sexual and trans-gender (LGBT) individuals or sexual minorities. For example, in the Eurobarometer 2015, 91% of the Dutch respondents agreed on the statement that "same-sex marriages should be allowed throughout Europe", while the average across the 28 EU countries on this was 61% (European Commission, 2015).

We also study whether partnership effects on subjective well-being are age-cohort specific. Nowadays, older adults are more likely to be unmarried by remaining cohabiting or dating without making a formal commitment (Brown and Shinohara, 2013; Brown et al., 2006; Calasanti and Kiecolt, 2007; Cooney and Dunne, 2001; Sassler, 2010) and by increasingly divorcing (Brown and Lin, 2012; Kennedy and Ruggles, 2014). Later in life, cohabitation operates as a long-term alternative to marriage. Therefore, the positive well-being effects of cohabitation may be comparable to that of marriage for the older cohort (Brown et al., 2012; King and Scott, 2005; Vespa, 2012; Wright and Brown, 2017). However, it may also be that older adults prefer to protect the wealth they have accumulated over their lifetime rather than pool resources with their partner (Brown et al., 2012). Cohabitation allows them to retain financial and economic autonomy (Brown et al., 2016; Chevan, 1996; Hatch, 1995). Moreover, older adults may be less willing to provide care-giving at later stages of their life. Cohabitation does not explicitly enforce this kind of responsibility as marriage does (Talbott, 1998). Therefore, the positive well-

being effect of cohabitation could be smaller than that of marriage for older adults. Our study adds to the literature that debates whether for different age-cohorts the well-being impact of cohabitation is similar to that of marriage.

Finally, we analyze whether the well-being effects are symmetric for partnership formation and partnership dissolution. Symmetry implies that partnership formation and partnership dissolution have similar magnitudes but opposite signs. Intuitively, at the beginning of a partnership a couple is enjoying the intimacy and mutual trust (Michael, 2004) and thus partnership formation has a positive effect on well-being (Lucas et al., 2003; Lucas and Clark, 2006). However, as time goes by a partnership may be confronted with difficulties and face a breakup. Therefore, partnership dissolution may have a negative effect on the well-being of the individuals involved. Only a handful of studies examined the well-being gains of a partnership formation and the well-being loss of a partnership dissolution simultaneously. Usually, strong effects of partnership dissolution are found (Kalmijn, 2017; Simon, 2002; Strohschein et al., 2005; Williams and Umberson, 2004). However, these studies do not rigorously test whether partnership formation and dissolution have symmetric effects on well-being. Hence, our paper is one of the pioneers to systematically compare every pair of entry and exit among different partnership transitions examining whether the effects within every pair are symmetric.

All in all, our contribution to the literature on marital partnership and well-being is threefold. First, we disentangle the causal effect of partnership on subjective well-being from correlation through selection. We also examine the role of reverse causality i.e. a sudden increase in one's well-being induces a jump of the probability that the individual enters a partnership. Second, our study is the first to investigate the potential heterogeneity of sexual orientation in the well-being effects of partnership formation and maintenance. Third, our paper systematically tests the symmetry of partnership formation and dissolution.

# Conceptual Background

There are two competing models explaining the mechanisms through which partnership formation and partnership dissolution affect well-being: the long-term resource accumulation model and the short-term crisis adaptation model.

The resource model argues that the well-being gains of partnership formation accumulate over time rather than manifest immediately. With the proceeding of a partnership, a couple keeps investing more resources in terms of shared tangible property (income, real

estate, combined families and mutual friends) and intangible capital (intimacy, trust, commitment and family responsibilities) (Kamp Dush and Amato, 2005; Rhoades et al., 2011; Rusbult, 1980). This implies that the partnership ties become stronger over time and the positive well-being effect increases with partnership duration (Kalmijn, 2017; Waite and Gallagher, 2000). Likewise, the well-being loss of a partnership disruption will materialize gradually. The lack of social support and social control from a protective partner may render the divorcees to develop and engage in a less healthy lifestyle and well-being risky behaviors, which will exacerbate their well-being as time passes (Hughes and Waite, 2009). Besides, the loss of the gradually accrued investment in the previous partnership makes it difficult to recover for the divorcees' well-being (Stanley et al., 2006). Simpson (1987) shows that after breaking up a longer partnership, people feel higher level of distress over a longer period of time than individuals who break up after a short partnership. The resource model has some variants such as investment model (Rusbult, 1980), role theory (Pearlin, 1999) and chronic strain theory (Amato, 2000), all of which share the similar idea of gradual well-being promotion and deterioration in the long run during partnership formation and dissolution, respectively.

The short-term crisis adaption model asserts that the stress around a partnership disruption is only temporary and the divorcees are able to recover or adjust quickly. Thus the initial negative well-being effect will fade with the passage of time (Acock and Demo, 1994; Booth and Amato, 1991; Pearlin, 2009; Stroebe et al., 2007). Moreover, Wheaton (1990) claims that a partnership disruption, as a stressful event, actually alleviates the stress of sustaining an unsuitable partnership with low quality, so the breakup distress is only short-term. Similarly, the positive well-being effect of a partnership formation is also only temporary. Partnered individuals increase merely short-term well-being and then adapt back to the original level of well-being of pre-partnership that is determined by stable internal characteristics like personality (Anusic et al., 2014; Lucas et al., 2003; Lucas and Clark, 2006; Musick and Bumpass, 2012; Soons et al., 2009). Other variants of the crisis model include adaptation theory (Diener et al., 2006; Lucas et al., 2003), stressful-event-as-stress-relief-model (Wheaton, 1990), and setpoint theory (Anusic et al., 2014).

Recently Finkel et al. (2014) put forward that in today's modern society, young people hold increasingly high expectations and standards of marriage, such as personal growth in the marital union. The newly marrieds will feel disappointed if the transition from cohabitation to marriage does not catch up with their high expectations and standards of marriage, hence their well-being may not change substantially or may even decline after

getting married.

# Methodology Review

The methodology to establish a relationship between partnership and well-being has evolved over time as researchers made efforts to conquer more challenging questions: going from association to causality and accounting for reverse causality. Three types of studies can be distinguished with increasing degree of complexity of the analysis. The first type of studies uses cross-sectional data focusing on correlation between partnership and well-being. Gove and Shin (1989), White (1992), Mastekaasa (1995), and Diener and Eunkook Suh (1997) conduct such an analysis for the US, Canada, Norway and multiple countries together, respectively. They confirm the positive association between subjective well-being and marriage across countries and cultures. Kurdek (1991) and Mastekaasa (1995) show that cohabitation is also positively correlated with subjective well-being in some countries. None of the studies of this category addresses the issue of causality, i.e., they do not distinguish selectivity from causality or consider possible reverse causality.

The second type of studies tries to remove the selection effect such that happier people are more likely to enter a partnership. The selection effect is due to individual-specific unobserved heterogeneity. One example of such an unobserved characteristic is personality: extroverted people may be happier and also more likely to find a partner. Ferrer-i Carbonell and Frijters (2004), Stutzer and Frey (2006), Musick and Bumpass (2012), and Averett et al. (2013) are the representatives of the static fixed effects studies where individual time-invariant unobserved heterogeneity is taken into consideration. Most studies find that partnership including marriage and cohabitation increases the well-being of the individuals that enter a partnership. However, this conclusion is not universal. For instance, Averett et al. (2013) show that marriage leads to a higher Body-Mass Index, to overweight and obesity as well as a less exercise. Meanwhile, these studies find evidence of a positive selection effect. Chapman and Guven (2016) employ data from the US, the UK and Germany and introduce the quality of marriage as additional explanatory variable. They discover that the positive effect of marriage on happiness is driven by happy marriages. For couples who are not happily married, marriage has a negative effect on happiness.

The third type of studies focuses on addressing potential reverse causality, i.e., a shock to the well-being of an individual leads to a jump of the likelihood of entering a partnership for that individual. Lillard and Panis (1996) employ a simultaneous-equation

framework using proportional hazards for health and marital separations. The correlation of the errors of the two equations captures the selection effect. They attempt to deal with reverse causality by introducing instrumental variables in the health equation. Van den Berg and Gupta (2015) take a similar measure and claim that men generally enjoy a protection effect of marriage while women benefit from marriage only after the childbearing age. Ali and Ajilore (2011) apply propensity score matching to obtain a counterfactual outcome and correct for selection on observables. Their results show that marriage indeed reduces risky health behaviors and thus improves well-being. Kohn and Averett (2014a,b) both assume sequential reverse causality from current well-being to the partnership choice in the next period. Their first study uses a dynamic fixed effects model with internal instruments advocated by Blundell and Bond (1998) to account for reverse causality. Their second study exploits a random coefficient mixed logit model to estimate the unobserved heterogeneity associated with both health and relationship choice so that they are able to disentangle the reverse causality due to this unobserved heterogeneity. Both studies find that marriage and cohabitation benefit health similarly.

# Data and Statistical Model

## Data

Our research is based on data from the LISS (Longitudinal Internet Studies for the Social sciences) panel administered by CentERdata (see for details: www.lissdata.nl). The panel is a random sample of households drawn from the Dutch population consisting of more than 6500 households, over 10000 individuals and 93 monthly waves from November 2007 till July 2015.

With information of partnered household heads and their wedded or cohabiting partner, we identify the sexual orientation of each individual by comparing one's gender with that of his or her partner (see the Appendix A for details). In this way, individuals who were always single during the period of observation are not included in part of our analysis, i.e. where sexual orientation is included in the analysis.[3] First, we investigate the effect of any partnership on subjective well-being. Then, we study whether marriage

[3]If the reason for remaining single is accidental, this does not bias our results. However, if the singles did not enter a partnership because they would not benefit in terms of well-being, we will overestimate the well-being effects of partnership formation. Nevertheless, it is also possible that these singles have lower well-being levels than people who experienced at least one partnership during the sample period and could have benefited more than average from partnership formation. Then, the well-being effects of partnership will be underestimated in our study.

has a different effect on subjective well-being than cohabitation has. As the society becomes more and more tolerant and people more and more open minded on the forms of partnerships, cohabitation has been considerably popular and a soaring tendency in the partnership market especially in the Netherlands (Latten and Mulder, 2014). Due to the rapid expansion of cohabitation and its distinction from other marital statuses, it is reasonable to isolate it as a different category. For singles we make no distinction among never married, separated, divorced and widowed because the numbers of observations for them are rather small.

There are 27,779 observations in our sample where 425 concern individuals who entered a same-sex relationship.[4] The same-sex sample size is relatively small, but it matches the estimated share of gay individuals in the population (Sandfort et al., 2006; Bakker et al., 2009).

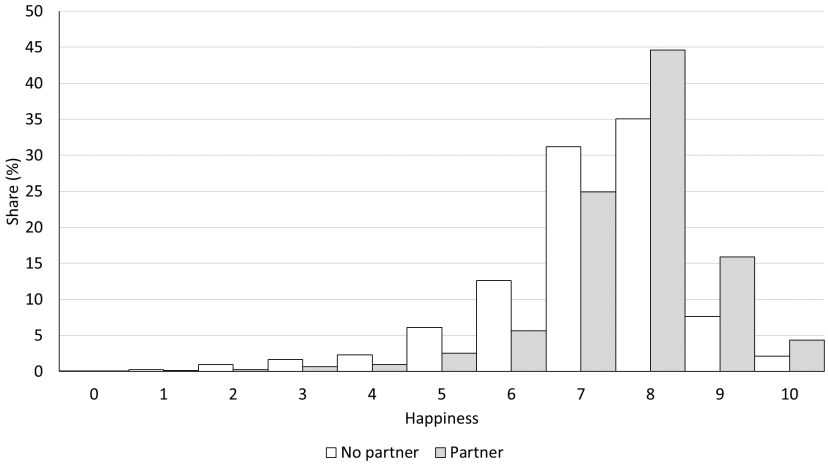
Our indicator of well-being is based on the question "On the whole, how happy would you say you are?" The answer is provided on an ordinal scale from zero to ten (from totally unhappy to totally happy). Panel a of Figure 1 illustrates the well-being distribution by partnership status. On the happiness scale from zero to ten hardly anyone reported below five. In the relatively lower score groups of five, six and seven, non-partnered individuals dominate partnered ones in percentage, while in the higher score groups of eight, nine and ten this is the contrary. Apparently, couples are happier than non-partnered individuals. Panel b of Figure 1 further distinguishes marriage from cohabitation in the partnership forms. Cohabitants account for higher proportions in the happiness score groups of five, six and seven but lower proportions in the groups of eight, nine and ten than the marrieds. So, generally speaking, partners are happier if they are married as compared to cohabiting. Nonetheless, the differences between the various types of individuals in Figure 1 are all unconditional and can only be suggestive of a causal effect of partnership on evaluative happiness.

Table 1 gives an overview of average well-being distinguished by marital status and sexual orientation. The last column in the table confirms the findings in Figure 1. On the scale from zero to ten, non-partnered individuals on average score 7.12 while partnered individuals have an average score of 7.71. Married couples obtain 7.76 averagely while cohabitants on average have 7.56. Comparing the first two columns of Table 1, it is obvious that irrespective of the marital status, on average individuals in same-sex relationships are happier than the ones in opposite-sex relationships although the difference is only

[4]The definitions and descriptives of the relevant variables in the main models are provided in Tables 7 and 8 in the Appendix A2.

Figure 1: Well-being and Partnership

a. Partnership




b. Marriage and Cohabitation

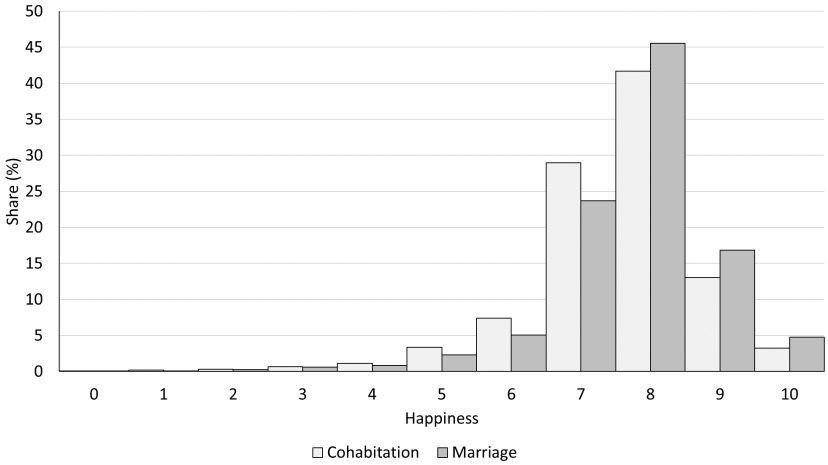



Table 1: Subjective Well-being by Marital Status and Sexual Orientation; Averages (Number of Observations)

| | Opposite-sex | | Same-sex | | Unknown | | Average | |
|---|---|---|---|---|---|---|---|---|
| a. Partnership | | | | | | | | |
| No partner | 6.98 | (801) | 7.65 | (34) | 7.14 | (5,224) | 7.12 | (6,059) |
| Partner | 7.73 | (19,104) | 7.76 | (391) | 7.55 | (2,225) | 7.71 | (21,720) |
| b. Marriage and Cohabitation | | | | | | | | |
| Marriage | 7.76 | (16,043) | 7.83 | (220) | 7.81 | (369) | 7.76 | (16,632) |
| Cohabitation | 7.58 | (3,061) | 7.68 | (171) | 7.50 | (1,856) | 7.56 | (5,088) |

The category "unknown" exists because these individuals have always been single, or their partners did not participate in the survey if they have been ever partnered, therefore their sexual orientation cannot be identified; see Appendix A for details.

Table 2: Partnership Transitions

| | Married | Cohabiting | Single | Total |
|---|---|---|---|---|
| Married | – | 72 | 61 | 133 |
| Cohabiting | 159 | – | 180 | 339 |
| Single | 44 | 98 | – | 142 |
| Total | 203 | 170 | 241 | 614 |

Based on 27,779 observations of 6,702 individuals over five years.

substantial for non-partnered individuals.

The partnership transitions are displayed in Table 2. As shown in the table, there is a persistent stability in partnership status. Over a period of five years, among the 6,702 individuals in our sample only 614 partnership transitions happened. Transitions from cohabitation account for the largest fraction, more than twice the transitions from the other two marital statuses. Most of the cohabitants broke up rather than entering a marriage. Over twice the number of single individuals switched to cohabitation than to marriage. Given the numbers of observations of these marital statuses in the sample, marriage is considerably more stable compared to cohabitation.

## Statistical Model

Subjective well-being is measured on an ordinal scale from zero to ten. To account for time-invariant unobserved personal characteristics, we use a linear fixed effects model even though in such a model the dependent variable is supposed to be cardinal. As indicated by Ferrer-i Carbonell and Frijters (2004) and Stutzer and Frey (2006) when analyzing happiness and life satisfaction, the linear fixed effects model performs as well as the fixed effects ordered logit model.[5] Our model is specified as:

$$h_{it} = p'_{it}\beta_p + x'_{it}\beta_x + \alpha_i + \epsilon_{it} \tag{1}$$

where $i$ $(i = 1, 2, ..., n)$ refers to individual, $t$ $(t = 1, 2, ..., T)$ stands for *year* and $p$ is either the *partnership dummy*, or a dummy vector of different marital statuses including *married* and *cohabiting* with *single* as the reference. Furthermore, $h$ denotes *well-being* measured on a scale from zero to ten and $x$ represents the vector of covariates that may be correlated to both *partnership* and *well-being* such as *drinking* and *smoking behavior* (Clark and Etilé, 2006), *Body Mass Index* (Clark and Etilé, 2011) and *physical problems*

[5]This is also the case in our analysis. By way of sensitivity analysis, we estimated a fixed effects ordered logit model finding very similar results.

(Graham et al., 2011; Kohn and Averett, 2014b), as well as demographic and socioeconomic variables like *the number of children living at home*, whether the respondent is a *home owner*, *log of personal net monthly income in Euros*, whether the respondent holds a *college diploma*, and *age-cohort dummies*. Finally, the $\alpha_i$ represent individual-specific time-invariant effects. The error terms $\epsilon_{it}$ are assumed to have zero mean and to be independent of $p_i' = (p_{i1}', ..., p_{iT}')$ and $x_i' = (x_{i1}', ..., x_{iT}')$. Time-invariant unobserved heterogeneity that may affect both *partnership* and *well-being*, such as *personality*, can be removed by demeaning Eq. (1).

# Parameter Estimates Subjective Well-being

## Baseline Estimates

The relevant parameter estimates of our fixed effects model are displayed in Table 3. The two columns show the partnership effect on happiness for males and females separately. To indicate the importance of considering individual fixed effects, we present OLS parameter estimates in panel a.[6] There, the partnership elevates the subjective well-being by 0.60 for men and 0.45 for women, about half a point on an 11-point scale. With the fixed effects setting in panel b, partnership also has a positive effect on happiness where the difference between males and females is small. Comparing estimates of panels a and b, it is obvious that the OLS estimates are partly driven by the positive selection such that happier individuals are more likely to have a partner. Nevertheless, after removing this selection effect with the fixed effects model, there is still a significant increase in well-being related to partnership. This effect of partnership on subjective well-being and the selection effect explains around 50% of the positive association between partnership and well-being, respectively.

In panel c of Table 3 we explore whether partnership effects are different for same-sex and opposite-sex couples. For males, the effect of having a same-sex partner is about the same as having an opposite-sex partner. For females, the well-being effect of having a same-sex partner is much higher than having an opposite-sex partner, but also for females, like in the case of males, we cannot reject that partnership exerts identical influences on happiness for same-sex and opposite-sex couples.

[6]We also run the OLS models on the subset of people who changed partnership status during the survey period as a robustness check since these individuals identify the fixed effects estimates. The results are similar to those in panel a of Table 3.

Table 3: Parameter Estimates Effects of Partnership on Subjective Well-being; OLS and Individual Fixed Effects

| | Males | | Females | |
|---|---|---|---|---|
| OLS | | | | |
| a. Partner | 0.60 | (0.06)** | 0.45 | (0.05)** |
| Individual Fixed Effects | | | | |
| b. Partner | 0.26 | (0.07)** | 0.27 | (0.07)** |
| c. Opposite-sex partner ($\beta_{osp}$) | 0.27 | (0.08)** | 0.27 | (0.08)** |
| Same-sex partner ($\beta_{ssp}$) | 0.25 | (0.31) | 0.71 | (0.42)$^{\dagger}$ |
| p-value ($\beta_{osp}$=$\beta_{ssp}$) | 0.940 | | 0.303 | |
| d. Marriage ($\beta_m$) | 0.33 | (0.08)** | 0.39 | (0.08)** |
| Cohabitation ($\beta_c$) | 0.21 | (0.07)** | 0.21 | (0.07)** |
| p-value ($\beta_m$=$\beta_c$) | 0.086$^{\dagger}$ | | 0.004** | |
| e. Opposite-sex marriage ($\beta_{osm}$) | 0.32 | (0.09)** | 0.44 | (0.09)** |
| Opposite-sex cohabitation ($\beta_{osc}$) | 0.25 | (0.08)** | 0.17 | (0.08)* |
| p-value ($\beta_{osm}$=$\beta_{osc}$) | 0.351 | | 0.000** | |
| Same-sex marriage ($\beta_{ssm}$) | 0.69 | (0.41)$^{\dagger}$ | 0.15 | (0.51) |
| Same-sex cohabitation ($\beta_{ssc}$) | 0.18 | (0.32) | 0.85 | (0.42)$^{\dagger}$ |
| p-value ($\beta_{ssm}$=$\beta_{ssc}$) | 0.094$^{\dagger}$ | | 0.058$^{\dagger}$ | |

Panels a, b and d 27,779 observations of 3,088 males and 3,617 females; panels c and e 20,330 observations of 2,275 males and 2,526 females; standard errors in parentheses; $^{\dagger}$ p < 0.10; * p < 0.05; ** p < 0.01

Panel d shows that marriage makes couples happier than cohabitation does.[7] Here we ignore the influence of the transition from cohabitation to marriage. We compare the effects of marriage and cohabitation to that of being single. Later on, we systematically analyze the dynamics or transitions among different partnership statuses. The positive effect of marriage on well-being is stronger for women than for men. The well-being effect of cohabitation is the same for both genders.

In panel e we distinguish opposite-sex and same-sex marriage and cohabitation. For opposite-sex partnerships the effects of marriage and cohabitation are similar to those presented in panel d. For same-sex male partnerships, the well-being effects of marriage are substantially bigger than those of cohabitation. For same-sex female partnerships, this is the opposite, i.e. the well-being effects of cohabitation are substantially larger than those of marriage.

All in all, we conclude that partnership has a positive effect on subjective well-being and that this positive effect is statistically identical for same-sex and opposite-sex couples. Given the significant effect of marital partnership during the short survey period of five years, our results support the idea that the well-being benefits manifest in the short term

[7]We consider panel d in Table 3 as our baseline estimates. Appendix B presents the parameter estimates of the full baseline model.

Table 4: Parameter Estimates Effects of Subjective Well-being on Partnership; Individual Fixed Effects

| | Partnered$_t$ | | | |
|---|---|---|---|---|
| | Males | | Females | |
| a. Happiness$_{t-1}$ | -0.002 | (0.005) | -0.000 | (0.003) |
| b. Happiness$_{t-2}$ | -0.003 | (0.006) | 0.002 | (0.004) |
| c. Happiness$_{t-3}$ | 0.004 | (0.007) | -0.010 | (0.004)* |
| d. Happiness$_{t-4}$ | 0.004 | (0.009) | -0.007 | (0.006) |

Standard errors in parentheses; * $p < 0.05$; covariates and constant are included in every model but not shown for parsimony.

as in the crisis model (Booth and Amato, 1991; Pearlin, 2009) and adaptation theory (Diener et al., 2006; Lucas et al., 2003).

## Reverse Causality

In the analysis of the effects of partnership dynamics on well-being, there is a possibility of selectivity or reverse causality, or both. With the linear fixed effects model, we remove selectivity due to individual-specific unobserved heterogeneity related to both partnership and happiness. However, the linear fixed effects model does not account for possible reverse causality, i.e., the phenomenon that an individual whose happiness increases is more likely to find a partner. A person who becomes happier and more satisfied with his or her life may appear more confident and be more willing to socialize, so he or she is more attractive and approachable in the partnership market. Similarly, for a person who enters depression it is difficult to find a partner (Sandberg-Thoma and Kamp Dush, 2014).

To investigate whether or not reverse causality is an issue, we study whether single people are more likely to be partnered later on, as their happiness changes over time because of some shock. We estimate a fixed effects model in which the dependent variable is whether or not an individual is *partnered* and the independent variables are the *happiness* in an earlier period and the same covariates as before. If reverse causality existed, we would expect that a higher level of happiness makes partnership formation later on more likely. We use different lags for happiness to allow for effects that materialize quickly or more slowly. Table 4 displays the relevant parameter estimates of lagged happiness. Row a shows that a positive shock to happiness of an individual who was single does not improve his or her probability to enter a partnership in one year later. Rows b to d show that also after two, three or four years there is no effect. None of the

Table 5: Parameter Estimates Effects of Partnership on Subjective Well-being; Asymmetry of Partnership Formation and Dissolution

| | Males | | Females | |
|---|---|---|---|---|
| a. Single to partnered ($\beta_{sp}$) | 0.18 | (0.09)$^{\dagger}$ | 0.17 | (0.10) |
| Partnered to single ($\beta_{ps}$) | -0.30 | (0.09)** | -0.29 | (0.08)** |
| p-value ($\beta_{ps}$=$-\beta_{sp}$) | 0.339 | | 0.351 | |
| b. Single to married ($\beta_{sm}$) | 0.17 | (0.16) | 0.28 | (0.20) |
| Married to single ($\beta_{ms}$) | 0.25 | (0.15) | -0.00 | (0.13) |
| p-value ($\beta_{sm}$=$\beta_{ms}$) | 0.722 | | 0.249 | |
| Single to cohabiting ($\beta_{sc}$) | 0.06 | (0.11) | 0.05 | (0.12) |
| Cohabiting to single ($\beta_{cs}$) | -0.18 | (0.10)$^{\dagger}$ | -0.14 | (0.09) |
| p-value ($\beta_{cs}$=$-\beta_{cs}$) | 0.418 | | 0.561 | |
| Cohabiting to married ($\beta_{cm}$) | 0.06 | (0.10) | 0.08 | (0.09) |
| Married to cohabiting ($\beta_{mc}$) | -0.31 | (0.15)* | -0.02 | (0.11) |
| p-value ($\beta_{cm}$=$-\beta_{mc}$) | 0.152 | | 0.660 | |
| p-value ($\beta_{sm}$-$\beta_{ms}$=$\beta_{sc}$+$\beta_{cs}$=$\beta_{cm}$+$\beta_{mc}$=0) | 0.429 | | 0.599 | |

Column 1 contains 12,955 observations of 3,088 men;
column 2 14,824 observations of 3,617 women.
Standard errors in parentheses; $^{\dagger}$ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.

results are sizable or significant except the coefficient in row c for women. Although it is significant at 5% significance level, the magnitude of 1% is still negligible. From this we conclude that reverse causality from happiness to future partnership dynamics is not an issue.

## Symmetry

Partnership formation and partnership disruption may have different effects on subjective well-being both in sign and magnitude. Therefore, it is interesting to distinguish between entering a partnership and quitting it and test whether their effects are symmetric. We introduce a "single to partnered" dummy variable with value one in case of partnership formation and value zero otherwise. Likewise, the "partnered to single" dummy values one in case of partnership dissolution and values zero otherwise.

Panel a of Table 5 presents seemingly asymmetric effects during partnership formation and during partnership dissolution. The first term of single to partnered refers to the effect when a partnership forms and the second stands for the effect when a partnership dissolves. In both columns, partnership formation and disruption have opposite effects on the subjective well-being of both men and women. For example, males who make a transition from singleness to partnership experience on average an increase in well-being of 0.18. If they break up and become single, they face a decrease in well-being of 0.30. In order to formally check whether the effects are identical in magnitude during partnership

formation and disruption, we conduct the pair symmetry test with the null hypothesis such that the absolute values of the coefficients of the two transition variables are equal. The p-value of the test indicates that we cannot reject that the effects are symmetric.

Partnership is heterogeneous in the sense that it includes informal cohabitation and formal marriage. The subjective well-being derived from cohabitation and marriage is likely to be different. That is why we further investigate the symmetries of transitions among marriage, cohabitation and singleness. Panel b displays the effects on subjective well-being of several types of partnership dynamics. Now, we find substantial differences between males and females. Going from singleness to marriage increases happiness of males by 0.17 but making a transition from marriage back to singleness also increases happiness by 0.25. Nevertheless, neither of these parameter estimates differs from zero at conventional levels of significance. Females experience an (insignificant) increase in happiness if they get married after having been single but their happiness does not change after a divorce. With respect to the transitions between singleness and cohabitation, males are similar to females in point estimates. From singleness to cohabitation it does not significantly affect happiness, but from cohabitation to singleness it yields a significant negative effect on happiness, -0.18, for males and insignificant -0.14 for females. Entering marriage does not seem to raise the subjective well-being for cohabiting couples but canceling the wedlock and going back to cohabitation significantly hurts men's happiness while it does not hurt women's happiness. As in panel a, we test the symmetry of every pair of partnership dynamics individually in panel b. At a 5% significance level, we cannot reject that every individual pair of partnership dynamics is symmetric in size for both males and females. Furthermore, we take a joint symmetry test with the null hypothesis such that all pairs of partnership dynamics are symmetric in size together. Again, we cannot reject such a symmetry.

Therefore, there are symmetric and opposite effects on the subjective well-being between partnership formation and dissolution for both men (significantly) and women (partially significantly). However, as for more elaborate dynamics among singleness, cohabitation and marriage, though the symmetries still hold, most of the estimates are insignificant. This may be due to the small number of observations in each transition (see Table 2). The estimation of the partnership dynamics also provides evidence to the short-term crisis model or adjustment theory. At partnership formation, subjective well-being improves quickly; at partnership dissolution, subjective well-being is harmed immediately as well.

Table 6: Parameter Estimates Effects of Partnership on Subjective Well-being by Age Cohort

| | Males | | Females | |
|---|---|---|---|---|
| a. Born before 1962 | | | | |
| 1. Partner | 0.28 | (0.12)* | 0.17 | (0.15) |
| 2. Marriage ($\beta_m$) | 0.36 | (0.12)** | 0.31 | (0.16)* |
| Cohabitation ($\beta_c$) | 0.13 | (0.14) | -0.10 | (0.17) |
| p-value ($\beta_m$=$\beta_c$) | 0.044* | | 0.000** | |
| b. Born in 1962 or thereafter | | | | |
| 3. Partner | 0.25 | (0.09)** | 0.30 | (0.08)** |
| 4. Marriage | 0.30 | (0.11)** | 0.37 | (0.10)** |
| Cohabitation | 0.23 | (0.09)** | 0.28 | (0.08)** |
| p-value ($\beta_m$=$\beta_c$) | 0.515 | | 0.313 | |

Panel a 15,395 observations with 1,704 men and 1,773 women;
panel b 12,384 observations with 1,385 men and 1,845 women.
Standard errors in parentheses; $^{\dagger}$ p < 0.1; * p < 0.05; ** p < 0.01

## Age Cohort Differences

For younger and older individuals, marital partnership may have a different meaning. For instance, among youngsters, cohabitation is usually seen as a trial marriage, while older individuals may think of cohabitation as a long-term substitute for marriage (Brown et al., 2012; King and Scott, 2005; Vespa, 2012; Wright and Brown, 2017).

To investigate potential heterogeneity in the effects of partnership on well-being, we explore whether there are differences by age. Kohn and Averett (2014b) distinguish individuals under 45 and over 45 and indeed find different relationship effects for the two sub-samples. Following their idea, we divide the sample into two age cohorts: people born before 1962 (46-year old in the first wave 2008 of the survey) and after 1962. The relevant parameter estimates are displayed in Table 6. Panel a shows that partnership increases happiness for men born before 1962 but not for women in the same age cohort. Both men and women in the older cohort obtain larger well-being gains from marriage than from cohabitation. Panel b displays that partnership exerts a positive influence in the younger cohort and so do marriage and cohabitation. For the younger cohort, the happiness benefits from marriage are bigger than those from cohabitation but the difference is not statistically significant.

These findings raise an interesting question: why does cohabitation benefit only the younger age cohort but not the older one? We speculate that older adults may prefer to protect the wealth they have accumulated over their lifetime rather than pool the resources with their partner (Brown et al., 2012), and cohabitation allows them to retain financial and economic autonomy that would not be possible in marriage (Brown et al.,

2016; Chevan, 1996; Hatch, 1995). Furthermore, older adults, especially older women, may be less wiling to provide care-giving at a later stage of their life, and cohabitation does not explicitly enforce this kind of responsibility as marriage does (Talbott, 1998). Another possible explanation is that for people born before 1962, cohabitation was still not widely accepted when they entered the partnership market. The social attitude to cohabitation may have also influenced their individual attitude. Even though later they chose to cohabit, they still did not regard cohabitation similar to marriage. On the contrary, when individuals in the younger age cohort entered a partnership, society already bore quite a tolerant attitude to cohabitation. In the mean time cohabitation is more popular than marriage in the partnership market.

# Conclusions

We investigate whether partnership dynamics cause changes in subjective well-being of the individuals involved. Partnerships through marriage and cohabitation are analyzed separately for males and females. We also study potential differences of the subjective well-being effects between same-sex and opposite-sex couples. We did not find evidence for reverse causality which occurs if a positive shock to one's happiness induces partnership formation for the same person. To establish a causal effect from partnership dynamics to well-being, we account for selectivity which occurs if happier people are more likely to form partnerships.

We find that there is a causal effect from partnership formation to subjective well-being but there is also a selection effect, each of which explains around 50% of the positive association between partnership dynamics and subjective well-being. The causal effect on well-being is the same for opposite-sex and same-sex couples. This may seem surprising because of possible discrimination against sexual minorities once their sexual orientation is disclosed. Perhaps thanks to the effective implementation of education and policy on marriage equality and respect for sexual minorities, this prejudice against sexual minorities does not prevail in the Netherlands. Furthermore, we discover positive well-being effects of cohabitation although these effects are smaller than those of marriage. Our finding that marriage and cohabitation both improve subjective well-being but with divergent levels is consistent with previous studies and may be related to different investment levels of tangible and intangible capital.

Partnership formation and dissolution are likely to exert different influences on couple's subjective well-being. We investigate such symmetries and indeed find opposite

effects with similar magnitudes on subjective well-being during these two periods. Our study based on a short five-year panel supports the conclusion of the crisis model and adaptation theory that the well-being effects of marital partnership transitions can manifest in the short term rather than that they need a long time to accumulate. Finally, we analyze whether well-being effect of marital partnership is cohort-specific and detect a difference between birth cohorts. Cohabitation only benefits younger cohort but not the older cohort. This may be due to the weaker desire of pooling economic resources and lower willingness of care-giving for older cohabitants; or it might be because of different social acceptance of cohabitation when older individuals entered the partnership market a long time ago. Even though they later on chose to cohabit, they still did not regard cohabitation similar to marriage.

We are confronted with a few difficulties in the current study. First, the analysis is restricted to a short panel, so we are unable to examine whether the well-being effects of partnership dynamics will persist in the long term. Basically, the crisis model argues that these effects are temporary while the resource model claims that these effects need a long time to materialize. To investigate which of the models is more realistic, a longer panel is more helpful. Second, to analyze the heterogeneity of sexual orientation in the well-being effects of partnership dynamics in more detail, a larger dataset is needed. The number of partnership transitions and the size of same-sex sample are small in our data. Due to these limitations, our parameter estimates for same-sex partnerships are imprecise. Third, though we include a number of time-varying covariates and apply the fixed effects model to account for time-invariant unobservables, we cannot completely resolve the concern of the possible time-varying confounding unobservables. If the panel data contained information on the nature and magnitude of exogenous shocks to partnership market, we would be able to exploit such a shock to draw a more compelling causal conclusion.

# References


Acock, A. C. and Demo, D. H. (1994). *Family diversity and well-being*. Thousand Oaks, CA: Sage.

Ali, M. M. and Ajilore, O. (2011). Can marriage reduce risky health behavior for African-Americans? *Journal of Family and Economic Issues*, 32(2):191–203.

Allegretto, S. A. and Arthur, M. M. (2001). An empirical analysis of homosexual/heterosexual male earnings differentials: unmarried and unequal? *Industrial and Labor Relations Review*, 54(3):631–646.

Amato, P. R. (2000). The consequences of divorce for adults and children. *Journal of Marriage and Family*, 62(4):1269–1287.

Anusic, I., Yap, S. C. Y., and Lucas, R. E. (2014). Testing set-point theory in a Swiss national sample: Reaction and adaptation to major life events. *Social Indicators Research*, 119(3):1265–1288.

Averett, S. L., Argys, L. M., and 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.

Badgett, M. L. (1995). The wage effects of sexual orientation discrimination. *Industrial and Labor Relations Review*, 48(4):726–739.

Bakker, F., de Graaf, H., de Haas, Kedde, S., H., Kruijer, H., and Wijsen, C. (2009). *Seksuele gezondheid in Nederland 2009*. Utrecht: Rutgers Nisso Groep.

Becker, G. S. (1974). A theory of marriage: Part II. *Journal of Political Economy*, 82(2):S11–S26.

Becker, G. S. (1981). *A Treatise on the Family*. Harvard University Press.

Berg, N. and Lien, D. (2002). Measuring the effect of sexual orientation on income: Evidence of discrimination? *Contemporary Economic Policy*, 20(4):394–414.

Black, D. A., Makar, H. R., Sanders, S. G., and Taylor, L. J. (2003). The earnings effects of sexual orientation. *Industrial and Labor Relations Review*, 56(3):449–469.

Blundell, R. and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1):115–143.

Booth, A. and Amato, P. (1991). Divorce and psychological stress. *Journal of Health and Social Behavior*, 32(4):396–407.

Brown, S. L., Bulanda, J. R., and Lee, G. R. (2005). The significance of nonmarital cohabitation: Marital status and mental health benefits among middle-aged and older adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 60(1):S21–S29.

Brown, S. L., Bulanda, J. R., and Lee, G. R. (2012). Transitions into and out of cohabitation in later life. *Journal of Marriage and Family*, 74(4):774–793.

Brown, S. L., Lee, G. R., and Bulanda, J. R. (2006). Cohabitation among older adults: A national portrait. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 61(2):S71–S79.

Brown, S. L. and Lin, I.-F. (2012). The gray divorce revolution: Rising divorce among middle-aged and older adults, 1990–2010. *The Journals of Gerontology: Series B*, 67(6):731–741.

Brown, S. L., Lin, I.-F., Hammersmith, A. M., and Wright, M. R. (2016). Later life marital dissolution and repartnership status: A national portrait. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, page gbw051.

Brown, S. L. and Shinohara, S. K. (2013). Dating relationships in older adulthood: A national portrait. *Journal of Marriage and Family*, 75(5):1194–1202.

Buser, T., Geijtenbeek, L., and Plug, E. (2015). Do gays shy away from competition? Do lesbians compete too much? *IZA Discussion Paper*, (9382).

Calasanti, T. and Kiecolt, K. J. (2007). Diversity among late-life couples. *Generations*, 31(3):10–17.

Carpenter, C. S. (2007). Revisiting the income penalty for behaviorally gay men: Evidence from NHANES III. *Labour Economics*, 14(1):25–34.

Carr, D. and Springer, K. W. (2010). Advances in families and health research in the 21st century. *Journal of Marriage and Family*, 72(3):743–761.

Chapman, B. and Guven, C. (2016). Revisiting the relationship between marriage and wellbeing: Does marriage quality matter? *Journal of Happiness Studies*, 17:533–551.

Chevan, A. (1996). As cheaply as one: Cohabitation in the older population. *Journal of Marriage and the Family*, pages 656–667.

Clain, S. H. and Leppel, K. (2001). An investigation into sexual orientation discrimination as an explanation for wage differences. *Applied Economics*, 33(1):37–47.

Clark, A. E. and Etilé, F. (2006). Don't give up on me baby: Spousal correlation in smoking behaviour. *Journal of Health Economics*, 25(5):958–978.

Clark, A. E. and Etilé, F. (2011). Happy house: Spousal weight and individual well-being. *Journal of Health Economics*, 30(5):1124–1136.

Cooney, T. M. and Dunne, K. (2001). Intimate relationships in later life: Current realities, future prospects. *Journal of Family Issues*, 22(7):838–858.

Diener, E. and Eunkook Suh, M. (1997). Subjective well-being and age: An international analysis. *Annual Review of Gerontology and Geriatrics*, 17:304–324.

Diener, E., Lucas, R. E., and Scollon, C. N. (2006). Beyond the hedonic treadmill: revising the adaptation theory of well-being. *American Psychologist*, 61(4):305.

Diener, E., Scollon, C. N., and Lucas, R. E. (2009). The evolving concept of subjective well-being: The multifaceted nature of happiness. In *Assessing Well-being*, pages 67–100. Springer.

Duncan, G. J., Wilkerson, B., and England, P. (2006). Cleaning up their act: The effects of marriage and cohabitation on licit and illicit drug use. *Demography*, 43(4):691–710.

Dush, C. M. K. and Amato, P. R. (2005). Consequences of relationship status and quality for subjective well-being. *Journal of Social and Personal Relationships*, 22(5):607–627.

Elmslie, B. and Tebaldi, E. (2007). Sexual orientation and labor market discrimination. *Journal of Labor Research*, 28(3):436–453.

European Commission (2015). *Discrimination in the EU in 2015; special Eurobarometer 437*. European Union.

Ferrer-i Carbonell, A. and Frijters, P. (2004). How important is methodology for the estimates of the determinants of happiness? *Economic Journal*, 114(497):641–659.

Finkel, E. J., Hui, C. M., Carswell, K. L., and Larson, G. M. (2014). The suffocation of marriage: Climbing mount maslow without enough oxygen. *Psychological Inquiry*, 25(1):1–41.

Fleming, C. B., White, H. R., and Catalano, R. F. (2010). Romantic relationships and substance use in early adulthood: An examination of the influences of relationship type, partner substance use, and relationship quality. *Journal of Health and Social Behavior*, 51(2):153–167.

Gove, W. R. and Shin, H.-C. (1989). The psychological well-being of divorced and widowed men and women an empirical analysis. *Journal of Family Issues*, 10(1):122–144.

Graham, C., Higuera, L., and Lora, E. (2011). Which health conditions cause the most unhappiness? *Health Economics*, 20(12):1431–1447.

Gruskin, E. P., Hart, S., Gordon, N., and Ackerson, L. (2001). Patterns of cigarette smoking and alcohol use among lesbians and bisexual women enrolled in a large health maintenance organization. *American Journal of Public Health*, 91(6):976.

Hansen, T., Moum, T., and Shapiro, A. (2007). Relational and individual well-being among cohabitors and married individuals in midlife: Recent trends from Norway. *Journal of Family Issues*, 28(7):910–933.

Hatch, R. (1995). *Aging and cohabitation*. New York, NY: Garland.

Hatzenbuehler, M. L., McLaughlin, K. A., Keyes, K. M., and Hasin, D. S. (2010). The impact of institutional discrimination on psychiatric disorders in lesbian, gay, and bisexual populations: A prospective study. *American Journal of Public Health*, 100(3):452–459.

Huebner, D. M., Rebchook, G. M., and Kegeles, S. M. (2004). Experiences of harassment, discrimination, and physical violence among young gay and bisexual men. *American Journal of Public Health*, 94(7):1200–1203.

Hughes, M. E. and Waite, L. J. (2009). Marital biography and health at mid-life? *Journal of Health and Social Behavior*, 50(3):344–358.

Johnson, D. R. and Wu, J. (2002). An empirical test of crisis, social selection, and role explanations of the relationship between marital disruption and psychological distress: A pooled time-series analysis of four-wave panel data. *Journal of Marriage and Family*, 64(1):211–224.

Kalmijn, M. (2017). The ambiguous link between marriage and health: A dynamic reanalysis of loss and gain effects. *Social Forces*, 95(4):1607–1636.

Kamp Dush, C. M. and Amato, P. R. (2005). Consequences of relationship status and quality for subjective well-being. *Journal of Social and Personal Relationships*, 22(5):607–627.

Kennedy, S. and Ruggles, S. (2014). Breaking up is hard to count: The rise of divorce in the United States, 1980–2010. *Demography*, 51(2):587–598.

Killewald, A. (2013). A reconsideration of the fatherhood premium: Marriage, coresidence, biology, and fathers' wages. *American Sociological Review*, 78(1):96–116.

Kim, H. K. and McKenry, P. C. (2002). The relationship between marriage and psychological well-being: A longitudinal analysis. *Journal of Family Issues*, 23(8):885–911.

King, V. and Scott, M. E. (2005). A comparison of cohabiting relationships among older and younger adults. *Journal of Marriage and Family*, 67(2):271–285.

Klawitter, M. M. and Flatt, V. (1998). The effects of state and local antidiscrimination policies on earnings for gays and lesbians. *Journal of Policy Analysis and Management*, 17(4):658–686.

Kohn, J. L. and Averett, S. L. (2014a). 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.

Kohn, J. L. and Averett, S. L. (2014b). The effect of relationship status on health with dynamic health and persistent relationships. *Journal of Health Economics*, 36:69–83.

Kurdek, L. A. (1991). The relations between reported well-being and divorce history, availability of a proximate adult, and gender. *Journal of Marriage and the Family*, 53:71–78.

Latten, J. J. and Mulder, C. H. (2014). Partner relationships in the Netherlands: New manifestations of the Second Demographic Transition. *Genus*, 69(3):103–121.

Lillard, L. A. and Panis, C. W. (1996). Marital status and mortality: The role of health. *Demography*, 33(3):313–327.

Lucas, R. E. and Clark, A. E. (2006). Do people really adapt to marriage? *Journal of Happiness Studies*, 7(4):405–426.

Lucas, R. E., Clark, A. E., Georgellis, Y., and Diener, E. (2003). Reexamining adaptation and the set point model of happiness: Reactions to changes in marital status. *Journal of Personality and Social Psychology*, 84(3):527.

Lundberg, S. and Pollak, R. A. (2015). The evolving role of marriage: 1950–2010. *The Future of Children*, 25(2):29–50.

M, K. D. C. (2013). Marital and cohabitation dissolution and parental depressive symptoms in fragile families. *Journal of Marriage and Family*, 75(1):91–109.

Mastekaasa, A. (1995). Age variations in the suicide rates and self-reported subjective well-being of married and never married persons. *Journal of Community & Applied Social Psychology*, 5(1):21–39.

Mays, V. M. and Cochran, S. D. (2001). Mental health correlates of perceived discrimination among lesbian, gay, and bisexual adults in the United States. *American Journal of Public Health*, 91(11):1869–1876.

McCabe, S. E., Bostwick, W. B., Hughes, T. L., West, B. T., and Boyd, C. J. (2010). The relationship between discrimination and substance use disorders among lesbian, gay, and bisexual adults in the United States. *American Journal of Public Health*, 100(10):1946–1952.

Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychological Bulletin*, 129(5):674.

Michael, R. T. (2004). Sexual capital: An extension of Grossman's concept of health capital. *Journal of Health Economics*, 23(4):643–652.

Monden, C. W., Van Lenthe, F., De Graaf, N. D., and Kraaykamp, G. (2003). Partner's and own education: does who you live with matter for self-assessed health, smoking and excessive alcohol consumption? *Social Science & Medicine*, 57(10):1901–1912.

Musick, K. and Bumpass, L. (2012). Reexamining the case for marriage: Union formation and changes in well-being. *Journal of Marriage and Family*, 74(1):1–18.

Nock, S. L. (1995). A comparison of marriages and cohabiting relationships. *Journal of Family Issues*, 16(1):53–76.

Patacchini, E., Ragusa, G., and Zenou, Y. (2015). Unexplored dimensions of discrimination in Europe: Homosexuality and physical appearance. *Journal of Population Economics*, 28(1):1045–1073.

Pearlin, L. I. (1999). Stress and mental health: A conceptual overview. *A handbook for the study of mental health: Social contexts, theories, and systems*, pages 161–175.

Pearlin, L. I. (2009). The life course and the stress process: Some conceptual comparisons. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 65(2):207–215.

Plug, E. and Berkhout, P. (2004). Effects of sexual preferences on earnings in the Netherlands. *Journal of Population Economics*, 17(1):117–131.

Plug, E., Webbink, D., and Martin, N. (2014). Sexual orientation, prejudice, and segregation. *Journal of Labor Economics*, 32(1):123–159.

Rhoades, G. K., Kamp Dush, C. M., Atkins, D. C., Stanley, S. M., and Markman, H. J. (2011). Breaking up is hard to do: the impact of unmarried relationship dissolution on mental health and life satisfaction. *Journal of Family Psychology*, 25(3):366.

Ross, C. E. (1995). Reconceptualizing marital status as a continuum of social attachment. *Journal of Marriage and the Family*, pages 129–140.

Rusbult, C. E. (1980). Commitment and satisfaction in romantic associations: A test of the investment model. *Journal of Experimental Social Psychology*, 16(2):172–186.

Sandberg-Thoma, S. E. and Kamp Dush, C. M. (2014). Casual sexual relationships and mental health in adolescence and emerging adulthood. *The Journal of Sex Research*, 51(2):121–130.

Sandfort, T. G., Bakker, F., Schellevis, F. G., and Vanwesenbeeck, I. (2006). Sexual orientation and mental and physical health status: Findings from a Dutch population survey. *American Journal of Public Health*, 96(6):1119–1125.

Sassler, S. (2010). Partnering across the life course: Sex, relationships, and mate selection. *Journal of Marriage and Family*, 72(3):557–575.

Simon, R. W. (2002). Revisiting the relationships among gender, marital status, and mental health. *American Journal of Sociology*, 107(4):1065–1096.

Simpson, J. A. (1987). The dissolution of romantic relationships: Factors involved in relationship stability and emotional distress. *Journal of Personality and Social Psychology*, 53(4):683.

Soons, J. P. and Kalmijn, M. (2009). Is marriage more than cohabitation? Well-being differences in 30 European countries. *Journal of Marriage and Family*, 71(5):1141–1157.

Soons, J. P., Liefbroer, A. C., and Kalmijn, M. (2009). The long-term consequences of relationship formation for subjective well-being. *Journal of Marriage and Family*, 71(5):1254–1270.

Stanley, S. M., Rhoades, G. K., and Markman, H. J. (2006). Sliding versus deciding: Inertia and the premarital cohabitation effect. *Family Relations*, 55(4):499–509.

Stanley, S. M., Whitton, S. W., and Markman, H. J. (2004). Maybe I do: Interpersonal commitment and premarital or nonmarital cohabitation. *Journal of Family Issues*, 25(4):496–519.

Stevenson, B. and Wolfers, J. (2007). Marriage and divorce: Changes and their driving forces. *Journal of Economic Perspectives*, 21(2):27–52.

Stroebe, M., Schut, H., and Stroebe, W. (2007). Health outcomes of bereavement. *The Lancet*, 370(9603):1960–1973.

Strohschein, L., McDonough, P., Monette, G., and Shao, Q. (2005). Marital transitions and mental health: Are there gender differences in the short-term effects of marital status change? *Social Science & Medicine*, 61(11):2293–2303.

Stutzer, A. and Frey, B. S. (2006). Does marriage make people happy, or do happy people get married? *Journal of Socio-Economics*, 35(2):326–347.

Talbott, M. M. (1998). Older widows' attitudes towards men and remarriage. *Journal of Aging Studies*, 12(4):429–449.

Umberson, D. (1992). Gender, marital status and the social control of health behavior. *Social Science & Medicine*, 34(8):907–917.

Umberson, D. and Karas Montez, J. (2010). Social relationships and health: A flashpoint for health policy. *Journal of Health and Social Behavior*, 51:S54–S66.

Van den Berg, G. J. and Gupta, S. (2015). The role of marriage in the causal pathway from economic conditions early in life to mortality. *Journal of Health Economics*, 40:141–158.

Vespa, J. (2012). Union formation in later life: Economic determinants of cohabitation and remarriage among older adults. *Demography*, 49(3):1103–1125.

Waite, L. J. and Gallagher, M. (2000). *The Case for Marriage: Why Married People are Happier, Healthier, and Better Off Financially*. Broadway Books.

Waldron, I., Hughes, M. E., and Brooks, T. L. (1996). Marriage protection and marriage selection? Prospective evidence for reciprocal effects of marital status and health. *Social Science & Medicine*, 43(1):113–123.

Wheaton, B. (1990). Life transitions, role histories, and mental health. *American Sociological Review*, pages 209–223.

White, J. M. (1992). Marital status and well-being in Canada an analysis of age group variations. *Journal of Family Issues*, 13(3):390–409.

Williams, K. and Umberson, D. (2004). Marital status, marital transitions, and health: A gendered life course perspective? *Journal of Health and Social Behavior*, 45(1):81–98.

Wilson, C. M. and Oswald, A. J. (2005). How does marriage affect physical and psychological health? A survey of the longitudinal evidence. *IZA Discussion Paper*, (1619).

Wright, M. R. and Brown, S. L. (2017). Psychological well-being among older adults: The role of partnership status. *Journal of Marriage and Family*, 79(3):833–849.

# Appendix A: Details on our data

## A1: Sexual orientation

It is hard to measure an individual's sexual orientation in surveys. There are basically three ways to do this and each method has its limitations. The first method is simply asking for sexual preferences: "Regarding your sexual preference, are you attracted to men or to women?" Answers could be in five categories: one only to men; two especially to men, but to some extent also to women; three as much to men as to women; four especially to women, but to some extent also to men; five only to women. This measure was employed by Plug and Berkhout (2004), and Buser et al. (2015). The second measure of sexual orientation is through sexual activity. Badgett (1995) and Black et al. (2003) used answers to the question "How many males and females did you have sex with?" The third measure of sexual orientation is based on the gender of respondents' partner. This measure was used by Klawitter and Flatt (1998) and Allegretto and Arthur (2001).

The three measures of sexual orientation have their own advantages and shortcomings: sexual preference and past sexual activity ask directly about sexual orientation so they can identify sexual orientation with just cross sectional data even for respondents who are single at the time of the survey. However, they may result in plenty of non-responses because of the privacy. Besides, past sexual activity will probably wrongly classify, for example, individuals who participated in opposite-sexual activity a few times but then figured out they are gay. Data of the gender of respondents' partner are more widely accessible than sexual preference and past sexual activity. Moreover, sexual orientation based on partner's gender is more observable to the respondents' family and employers. Thus, if the researchers want to investigate outside influence related to sexual orientation, this measure is more appropriate. Nevertheless, for respondents who were partnered in none of the waves of the panel, this measure can not detect their sexual orientation. This may lead to sample selection (Plug and Berkhout, 2004). The three measures capture different respects of sexual orientation hence are not necessary to be completely consistent. Which measure to use empirically depends on the specific problem to be investigated. We study the effect of partnership on subjective well-being where in part of our analysis we distinguish between opposite-sex and same-sex relationships. Since such an effect is directly related to the respondents' partner during the partnership, the measure of sexual orientation based on partner's gender is most suitable.

From the background variables in the LISS-panel, we know the position within the household of each of the respondents, i.e., whether they are household head, wedded

partner, cohabiting partner, parent (in law), child living at home, house mate, and family member or boarder. We also know marital status which includes never married, married, separated, divorced, and widowed. Information on the domestic situation includes single without child(ren), single with child(ren), (un)married cohabitation without child(ren), (un)married cohabitation with child(ren), and other. With these variables we are able to identify the sexual orientation of every household head and their partner.

First, we combine the originally 93 monthly waves to construct an initial panel. Second, in the initial panel we keep only the partnered household heads and their (un)wedded partner using the categories of (un)married cohabitation with(out) child(ren) in "domestic situation". Third, we identify the sexual orientation of every partnered individual by comparing one's gender with that of one's (un)wedded partner and record the corresponding person numbers in the gay group and straight group respectively.[8]

## A2: Definitions and descriptives of variables

The subjective well-being indicator is collected annually, while other variables including the partnership dynamics are available on a monthly basis. In our analysis all variables are specified on an annual basis. This means some loss of information, for example, multiple changes in partnership status within a year are ignored.

[8]There are two exceptions, bisexuals and trans-genders, which consist of 30 individuals together. Following previous studies (Plug et al., 2014; Buser et al., 2015) we categorize them into gay people since they all belong to the sexual minorities. In the interpretation and discussion we will use the expression of same-sex instead of sexual minorities.

Table 7: Definitions of Variables

| Variable | Definition |
|---|---|
| Subjective well-being | Score on question "On the whole how happy would you say you are?" (zero to ten) |
| Partnered | Dummy variable if partnered |
| Married | Dummy variable if married |
| Cohabiting | Dummy variable if cohabiting |
| Single | Dummy variable if never married, separated, divorced or widowed |
| Single to Partnered | Dummy variable if partnership formation |
| Partnered to single | Dummy variable if partnership dissolution |
| Single to married | Dummy variable of transition from single to married |
| Married to single | Dummy variable of transition from married to single |
| Cohabiting to married | Dummy variable of transition from cohabiting to married |
| Married to cohabiting | Dummy variable of transition from married to cohabiting |
| Single to cohabiting | Dummy variable of transition from single to cohabiting |
| Cohabiting to single | Dummy variable of transition from cohabiting to single |
| Gay | Dummy variable if classified as gay group |
| Children number | Number of living-at-home children |
| Home owner | Dummy variable if home owner |
| Net income | Personal net monthly income in Euros |
| Missing info net income | Dummy variable if net income is missing |
| College | Dummy variable if with college diploma |
| Drinking | Dummy variable if drink alcohol during the last seven days |
| Drinking days | Number of days in the past seven days drink alcohol |
| Smoking | Dummy variable if smoke now |
| BMI | Body Mass Index |
| Physical problem | Number of physical problems diagnosed by physicians |
| Missing info physical problem | Dummy variable if physical problem is missing |
| Age20–70p | Age cohort dummies, reference cohort is teenagers |

Table 7 provides an overview of the definition of the variables we use in our analysis. Table 8 presents the descriptives of these variables.

Table 8: Descriptives

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| Variable | Mean | Minimum | Maximum | Mean | Minimum | Maximum |
| Evaluative happiness | 7.6 | 0 | 10 | 7.6 | 0 | 10 |
| Number of children | 0.8 | 0 | 7 | 0.9 | 0 | 7 |
| Net income/$10^4$ | 0.2 | 0 | 16.3 | 0.1 | 0 | 28.6 |
| Drinking days | 2.8 | 0 | 7 | 1.9 | 0 | 7 |
| BMI | 25.7 | 13.9 | 64.4 | 25.4 | 12.4 | 81.4 |
| Physical problem | 0.8 | 0 | 10 | 0.8 | 0 | 18 |
| Percentages | | | | | | |
| Partnered | 80.7 | 0 | 100 | 76.0 | 0 | 100 |
| Married | 62.8 | 0 | 100 | 57.4 | 0 | 100 |
| Cohabiting | 18.0 | 0 | 100 | 18.6 | 0 | 100 |
| Single | 19.3 | 0 | 100 | 24.0 | 0 | 100 |
| Home owner | 75.7 | 0 | 100 | 72.8 | 0 | 100 |
| Missing info net income | 5.0 | 0 | 100 | 5.3 | 0 | 100 |
| College | 34.0 | 0 | 100 | 26.8 | 0 | 100 |
| Drinking | 73.4 | 0 | 100 | 56.1 | 0 | 100 |
| Smoking | 21.3 | 0 | 100 | 18.4 | 0 | 100 |
| Missing info physical problem | 5.2 | 0 | 100 | 5.0 | 0 | 100 |
| Straight | 74.1 | 0 | 100 | 69.5 | 0 | 100 |
| Gay | 1.4 | 0 | 100 | 1.7 | 0 | 100 |
| Unknown orientation | 24.5 | 0 | 100 | 28.8 | 0 | 100 |
| Age to 19 | 4.3 | 0 | 100 | 5.2 | 0 | 100 |
| Age 20 to 29 | 8.3 | 0 | 100 | 10.6 | 0 | 100 |
| Age 30 to 39 | 12.8 | 0 | 100 | 15.2 | 0 | 100 |
| Age 40 to 49 | 17.9 | 0 | 100 | 18.9 | 0 | 100 |
| Age 50 to 59 | 20.5 | 0 | 100 | 21.1 | 0 | 100 |
| Age 60 to 69 | 23.0 | 0 | 100 | 18.8 | 0 | 100 |
| Age 70 plus | 13.2 | 0 | 100 | 10.2 | 0 | 100 |

Based on 12,955 observations of 3,088 men and 14,824 observations of 3,617 women.

# Appendix B: Parameter Estimates Baseline Model

Table 9 presents a full set of parameter estimates related to Table 3 panel d. The first two rows indicate the effects of marriage and cohabitation, identical to the ones presented in Table 3 panel d. Teenagers (the reference of the age group dummies) appear to have the highest level of happiness. The happiness of men aged 20 to 29 is somewhat lower while from age 30 onward well-being drops even further. However, for females the age gradient is hardly present. The number of children has a negative effect on happiness although only for females this effect is significantly different from zero. Net income has a positive effect on happiness for males but not for females. Physical problems have a negative happiness effect for males and smoking has a positive effect for males. Most of the other variables have no significant effect on happiness.

Table 9: Parameter Estimates Effects of Partnership on Subjective Well-being; Full Baseline Model

| | Males | | Females | |
|---|---|---|---|---|
| Marriage | 0.33 | (0.08)** | 0.39 | (0.08)** |
| Cohabitation | 0.21 | (0.07)** | 0.21 | (0.07)** |
| Children number | -0.04 | (0.03) | -0.07 | (0.03)** |
| Home owner | -0.08 | (0.07) | -0.02 | (0.06) |
| Log(net income) | 0.04 | (0.01)** | -0.00 | (0.01) |
| Missing info net income | 0.30 | (0.12)* | -0.19 | (0.09)* |
| College | 0.09 | (0.08) | 0.10 | (0.08) |
| BMI | 0.01 | (0.01) | -0.00 | (0.00) |
| Physical problem | -0.03 | (0.01)* | -0.02 | (0.01) |
| Missing info physical problem | -0.02 | (0.04) | -0.00 | (0.04) |
| Smoking | 0.09 | (0.04)$^{\dagger}$ | 0.04 | (0.05) |
| Drinking | -0.02 | (0.03) | 0.03 | (0.03) |
| Drinking days | -0.00 | (0.01) | -0.01 | (0.01) |
| Age 20 to 29 | -0.13 | (0.08)$^{\dagger}$ | -0.11 | (0.07)$^{\dagger}$ |
| Age 30 to 39 | -0.34 | (0.12)** | -0.14 | (0.10) |
| Age 40 to 49 | -0.45 | (0.13)** | -0.15 | (0.11) |
| Age 50 to 59 | -0.56 | (0.14)** | -0.13 | (0.12) |
| Age 60 to 69 | -0.44 | (0.15)** | -0.09 | (0.13) |
| Age 70 plus | -0.39 | (0.16)* | 0.05 | (0.15) |
| Constant | 7.37 | (0.21)** | 7.62 | (0.16)** |

Note: Column 1 contains 12,955 observations of 3,088 men; column 2 14,824 observations of 3,617 women.
Standard errors in parentheses; $^{\dagger}$ $p < 0.1$; * $p < 0.05$; ** $p < 0.01$