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The Impact of Personality Traits on Sexual Satisfaction and Frequency of Sex: Does It Differ between Single and Partnered Individuals?

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Abstract: Using representative data from Germany, this study compares the role of the Big Five personality traits in the sex life of single and partnered individuals. While extraversion has a positive influence on the sex life of both single and partnered individuals, the influence is much stronger for singles. By contrast, the positive role of conscientiousness in sexual fulfillment is stronger for partnered than for single individuals. Openness to experience and agreeableness play a positive role only in the sex life of partnered individuals. Neuroticism has a detrimental impact on people's sex life with the impact being stronger for singles than for partnered individuals. The empirical findings fit our theoretical considerations. Personality traits play different roles in the sex life of single and partnered individuals as the sexual relationships of these individuals are characterized by different time horizons.

Keywords: Big Five Personality Traits, Casual Sex, Singlehood, Romantic Relationship, Sexual Well-Being, Frequency of Intercourse, Family Economics.

JEL: D91, I31, J10, J12.

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1. Introduction

Over the past decades, economists have been increasingly interested in what constitutes happiness in life (Blanchflower and Oswald 2011; Clark 2018; Frey 2008; Frey and Stutzer 2002). However, only a few economic studies have analyzed the role of sex (Blanchflower and Oswald 2004; Cheng and Smyth 2015; Loewenstein et al. 2015; Rainer and Smith 2012). This is surprising as sex is the highest ranked activity in terms of net positive emotional affect (Kahneman et al. 2004). Moreover, the sparse economic literature on sex has largely neglected the role of personality traits in sexual well-being. One exception is a study by Jirjahn and Ottenbacher (2023). That study examines the impact of the Big Five personality traits (extraversion, openness to experience, conscientiousness, agreeableness, and neuroticism) on the sex life of individuals who have a partner.

Our study expands Jirjahn and Ottenbacher's (2023) analysis by comparing the role of personality traits in the sex life of partnered and unpartnered individuals. Expanding the analysis to unpartnered individuals is particularly interesting as singlehood has increased across the world (Kislev 2024; Mortelsmans et al. 2023). The rising prevalence of singlehood has led to the insight that there is an urgent need for studies examining the consequences of this global trend for the quality of life (DePaulo and Morris 2005). Against this background, it is important to understand the factors that influence the sex life of singles (Fischer 2023; Park and MacDonald 2022; Træn and Kvalem 2022).

Systematic studies comparing the impact of personality on the sex life of single and partnered individuals are also lacking in scientific disciplines other than economics.[1] The link between personality and sex is a topic typically examined by psychologists (Allen 2019; Allen and Walter 2018). However, psychological examinations on that link often

focus on romantic relationships or ignore that the link can differ between single and partnered individuals.

Our study follows a trend in economics to expand its scope of inquiry to topics traditionally addressed by other scientific disciplines. As emphasized by Lazear (2000), expanding the boundaries of economics into other sciences by using larger datasets or more sophisticated econometric methods would be of limited value if it does not yield additional theoretical insights. A successful expansion of the scope of inquiry into nontraditional topics requires incorporating the new topics into economic thinking. Our theoretical departure is that sexual relationships of single and partnered individuals are characterized by different time horizons. While romantic partnerships are usually long-term relationships, the sex life of singles is to a larger extent characterized by casual sex entailing a much shorter time horizon. The different time horizons imply that personality traits play a different role in the sexual fulfillment of single and partnered individuals. For partnered individuals, personality traits fostering cooperation, reciprocity, fairness, and commitment play a particular role as they help realize a long-term mutually beneficial sexual relationship among partners. By contrast, for singles, personality traits enabling an individual to get through their sexual preferences on short notice are of particular importance.

Our empirical analysis is based on the Panel Analysis of Intimate Relationships and Family Dynamics (pairfam), a large representative panel dataset from Germany. Using the pairfam, we examine the determinants of sexual satisfaction and frequency of sex. Our estimates show that, other things equal, singles are less satisfied with their sex life and have a lower frequency of sex than partnered individuals. Most salient to our topic, we find that

the impact of personality traits on the sex life of people indeed differs between single and partnered individuals. While extraversion has a positive influence on the sex life of both singles and individuals with a partner, the influence is much stronger for singles. By contrast, the positive role of conscientiousness in sexual fulfillment is much stronger for partnered than for single individuals. Openness to experience and agreeableness play a positive role only in the sex life of partnered individuals. Neuroticism has a detrimental impact on people's sex life with the impact being stronger for singles than for partnered individuals. As we will make clear, the empirical findings fit our theoretical considerations.

Our study is a first important step to expand economic sex research to the sex life of singles. The study provides a nuanced view of the impact of the Big Five personality traits on sexual fulfillment by showing that the impact depends on people's relationship status. On a broader scale, our study addresses a general research gap in family economics. Apart from some notable exceptions (Averett et al. 2021; Boxho et al. 2020; Dupuy and Galichon 2014; Flinn et al. 2018; Lundberg 2011, 2012), studies in family economics have paid little attention to personality traits. This contrasts with studies in labor economics where a rapidly increasing body of research has analyzed the impact of personality traits on human capital formation and various labor market outcomes (Alderotti et al. 2023; Almlund et al. 2011; Borghans et al. 2008; Bowles et al. 2001; Cunha et al. 2010; Heckman et al. 2005; Izadi and Tuhkuri 2024). Insights into the role of personality traits have been considered as one of the most exciting developments in labor economics in recent time (Cobb-Clark 2015). Our study shows that examining personality traits can lead to a similarly exciting development in family economics.

The rest of this paper is organized as follows. Section 2 provides the theoretical background discussion. Section 3 describes the data and variables. Section 4 presents the empirical results. Section 5 discusses the results in light of our theoretical considerations. Section 6 concludes.

2. Background Discussion

2.1 The Role of Personality in the Sex Life of Partnered and Unpartnered Individuals

Psychologists emphasize that personality traits not only influence how an individual, in general, feels about the world. Personality traits also influence the overall style of the individual's adjustment to and engagement of the social world (Buss 1996; Goldberg 1981; McAdams and Pals 2006; Nettle 2006). Personality traits describe the ability to solve social adaptive problems. Similarly, economists emphasize that personality traits play a dual role (Borghans et al. 2008). On the one hand, they influence the utility an individual derives from social relationships. On the other hand, personality traits can be viewed as capacities and constraints in the choices the individual makes. These choices, in turn, have consequences for the quality and quantity of social interactions.

The dual role of personality also applies to sexuality. Personality not only shapes the sexual preferences of an individual.[2] It also impacts the quality and quantity of sex through how the individual behaves in a sexual relationship. Jirjahn and Ottenbacher (2023) provide an economics-based approach to analyze sexuality within romantic relationships. Building from economic theories of the family (Bergstrom 1997; Weiss 1997), they emphasize that there are at least three dimensions in which the behavioral tendencies associated with personality traits play a role in the sex life of people. First, personality shapes communication and information exchange among partners about sexual

preferences – e.g., about preferences for sexual practices, frequency of intercourse, or timing of orgasm. Communication helps reduce partners' incomplete information about each other's sexual preferences so they can coordinate on shared preferences and, hence, may realize a win-win situation. Second, personality plays a role in how dissonant sexual preferences of the partners are handled. On the one hand, it influences an individual's use of persuasion and bargaining to get their way. On the other hand, personality is related to the individual's degree of altruism and, hence, to the willingness to take the partner's preferences into consideration. Third, personality has an impact on how commitment problems are solved. An individual may promise to be faithful to the partner or to practice or relinquish specific sexual practices but later may be tempted to break the promise. The individual's commitment to promises made depends on his or her self-control, fair-mindedness, inclination to comply with norms, and willingness to reciprocate the partner's cooperative behavior.

At issue is how personality influences the sex life of people who are not in a romantic relationship. Being a single does not equate to sexual abstinence. However, the sex life in the context of singlehood differs from the one in the context of a romantic relationship. The sex life of sexually active singles is to a much larger extent characterized by causal sex than the one of people with a romantic relationship (Fischer 2023; Rodrigue et al. 2015; Træn and Kvalem 2022). Casual sexual relationships range from traditional one-night stands to booty calls, fuck buddy relationships or friends with benefits relationships (Ben-Ze'ev 2023; Wentland and Reissing 2014). The prevalence of casual sex among singles suggests that personality traits play different roles in the sexual fulfillment of single and partnered individuals.

The crucial point is that sexual relationships of single and partnered individuals differ in their time horizons. Romantic partnerships are usually long-term relationships. This allows building commitment, cooperation and trust among partners. It fosters a mutually satisfying sex life where each partner to a larger or lesser degree takes the sexual preferences of the other partner into consideration. The long-term time horizon provides incentives and opportunities to invest in relation-specific human capital and to develop partner-pleasing skills (Laumann et al. 1994; Waite and Joyner 2001). The chance to make such investments and realize a mutually satisfying sex life within a romantic relationship depends on the partners' personality traits (Jirjahn and Ottenbacher 2023). This chance is higher if individuals have personality traits fostering altruism, fair-mindedness, commitment to promises made, and the willingness to reciprocate the partner's cooperative behavior. These personality traits may be less important or even counterproductive when it comes to the sex life of singles. The inherent characteristic of casual sexual relationships is a shorter time horizon.[3] This shorter time horizon means that long-term oriented investments in the sexual relationship do not pay off. The short-term nature of casual sex implies that singles are less interested in the needs of the partner and have a stronger focus on satisfying their own needs during the sexual relationship (Mark et al. 2015). Thus, a lower propensity to follow the rules and a lower degree of altruism, fair-mindedness and reliableness should not harm or even may improve the sex life of singles.

A further implication of the different time horizons is that single and partnered individuals differ in the immediate and regular availability of a sex partner. While a stable sex partner is available for individuals within a romantic relationship, this does not hold true for those who are singles (Træn and Kvalem 2022). Singlehood more often requires

searching for a partner who is willing to engage in casual sex. Thus, personality traits fostering communication and sociability should play different roles in the sex life of single and coupled individuals. For individuals in a romantic relationship, the main aspect is that communication helps overcome information asymmetries so partners can coordinate on their preferences. For singles, personality traits fostering communication and sociability have an additional function. These traits help singles get in contact with other people and persuade them to have a casual sexual relationship.

Finally, the different time horizons imply that the degree of information asymmetry associated with a sexual relationship differs between single and partnered individuals. Partners in a romantic relationship to a larger or lesser degree know each other and have sexual experiences with each other (Rainer and Smith 2012). Even though information asymmetries may remain (Knowles and Hammond 2025), these information asymmetries are less pronounced than the ones in a casual sexual relationship. Partners in a casual sexual relationship are often strangers or just have a more or less nodding acquaintance with each other. Thus, the extent of uncertainty entailed by a sexual relationship is much higher for singles than for partnered individuals.[4] This uncertainty not only involves a higher risk of sexually transmitted infections. It also entails uncertainty about physical attributes, sexual behaviors, and intentions of the partner. There is a higher risk of experiencing disappointment, disgust, embarrassment, and even emotional or physical harm (Bersamin et al. 2014; Garcia et al. 2012). Personality has an influence on how an individual deals with this uncertainty. Personality traits fostering communication should play a role. While these traits also help lower uncertainty in a romantic relationship, they appear to be particularly important to reduce critical information asymmetries in a fast and effective

way when it comes to a casual sexual relationship. Other personality traits influence how an individual feels about and handles the remaining uncertainty. An individual experiencing uncertainty as a threat is more likely to react to a partner in an inappropriate, impulsive and hostile manner. While this also affects sexual fulfillment within a romantic relationship (Jirjahn and Ottenbacher 2023), it may be specifically harmful to a casual sexual relationship which is characterized by a higher degree of uncertainty. By contrast, an individual with a personality involving thrill and excitement seeking may welcome the novelty and variety associated with casual sex and may be more likely to get sexual fulfillment from a casual relationship.

2.2 The Big Five Personality Traits

In this study, we examine the influence of the Big Five personality traits on sexual satisfaction and frequency of sex. The Big Five model is the most widely shared taxonomy of personality traits in psychology (John et al. 2008; McCrae and Costa 2008; Roberts 2009). It comprises extraversion, conscientiousness, openness to experience, agreeableness, and neuroticism. Economists have been increasingly interested in these traits for the past two decades or so as the traits reflect important non-cognitive skills (Almlund et al. 2011; Borghans et al. 2008). Jirjahn and Ottenbacher (2023) have analyzed the role of the Big Five in the sex life of partnered individuals. In what follows, we expand their discussion to compare the influence of the Big Five on the sex life of partnered and single individuals.

Extraversion. This personality trait reflects the degree to which a person orients their interests and energies toward the outer world of people; i.e., toward social attention and social interaction. Persons with a higher degree of extraversion tend to be characterized

by warmth, sociability, assertiveness, activity, excitement seeking, and positive affect. In our context, two aspects are of particular importance. As extroverts are more outgoing and talkative, they initiate and sustain more intense communication processes providing opportunities for information sharing. Moreover, greater assertiveness increases the chance of extroverts to get through their interests in bargaining situations. These characteristics should have a positive influence on the sex life of both single and partnered individuals, but under different circumstances and to a differing degree.

In a romantic relationship, an individual's extraversion contributes to a higher joint sexual surplus of the partners and helps the individual appropriate a higher share of that surplus. Information sharing helps partners build a long-term mutually satisfying sex life as it allows them to coordinate on their preferences and to find sexual activities working best for them (e.g., with respect to the frequency and timing of sex). At the same time, greater assertiveness enables an individual to get through their preferred sexual activities to a larger extent.

Extraversion can have an even greater influence on the sex life of singles. Given the short-term horizon of casual sexual relationships, assertiveness increases the chance that an individual gets through their preferred sexual activities on short notice.[5] Furthermore, the outgoingness and sociability associated with extraversion helps get in contact with potential sex mates. Research on personality and friendships has shown that extroverts make new friends faster in novel situations and attract other people with their style (Buss et al. 2024; Doroszuk et al. 2019). Indeed, extraversion is positively associated casual sex and the number of sexual partners over the life course (Allen and Desille 2017;

Gute and Eshbaugh 2008; Jonason et al. 2015; Rogowska et al. 2022; Schmitt and Shackelford 2008).

Conscientiousness. This personality trait reflects the degree to which a person is willing to comply with conventional rules, standards and norms. Persons with a higher degree of conscientiousness tend to be characterized by order, dutifulness, achievement striving, self-discipline, and deliberation.

In a romantic relationship, conscientiousness contributes to a more balanced style of communication and a more fair-minded handling of dissonant sexual preferences. Moreover, it helps overcome commitment problems. A higher degree of conscientiousness is associated with greater self-control, sense of responsibility and dependability. Thus, an individual high on conscientiousness is more likely to keep promises made to the partner (Peetz and Kammrath 2011). This helps build a long-term win-win situation where individuals mutually invest in partner-pleasing skills.

Conscientiousness should play a lesser role in the sex life of singles. Casual sexual relationships are characterized by a shorter time horizon so the long-term commitment value of conscientiousness is of little relevance. The shorter time horizon requires that an individual gets through their sexual preferences on short notice. Reliableness and fair-mindedness may be less helpful in this respect. Of course, this does not imply that conscientiousness is completely irrelevant for the sex life of a singles. Reliableness and fair-mindedness may be a signal to potential sex mates that the individual is trustworthy. This may increase the willingness of potential mates to engage in casual sex and fulfill the individual's sexual wishes. Moreover, to some degree, conscientiousness may help a single

individual to resist short-term temptations and avoid disappointing or disgusting sexual encounters.

Openness to experience. This personality trait reflects the degree to which a person is open to change, variety, intellectual stimulation, and new experiences. Persons with a higher degree of openness tend to be characterized by fantasy, creativity, curiosity and the willingness to try new things. These persons also tend have more liberal attitudes toward sexual practices (Allen and Walter 2018).

In a romantic relationship, openness to experience contributes to a mutually satisfying sex life. It fosters the willingness to listen to the partner stimulating communication and, hence, the reduction of information asymmetries. This allows partners to coordinate on shared sexual preferences. The willingness to try new things also implies that an individual is to a larger degree interested in the partner's preferences and welcomes alternative sexual activities. Furthermore, showing interest in the partner's preferences is likely to induce a process of long-term reciprocity where the partner to a larger extent takes into account the individual's sexual preferences.

The role of openness to experience in the sex life of singles is less clear from a theoretical point of view. On the one hand, interest in other people and willingness to listen can help an individual get in contact with potential sex mates, obtain relevant information, and make potential sex mates engage in casual sex by accommodating to their preferences.[6] Taking mating partners' preferences into account may even contribute to own sexual fulfillment as an individual with a high degree of openness welcomes new sexual experiences. However, on the other hand, a high degree of openness means that an individual forgoes the opportunity to bring in their own sexual preferences resulting in a

less satisfying sex life. This specifically applies to short-term sexual relationships that do not allow developing a balanced coordination of preferences. To the extent individuals high on openness anticipate this, they may be even more reluctant to engage in casual sex. Indeed, individuals high on openness are affectively self-aware and more independent in their judgement (Gute and Eshbaugh 2008).

Agreeableness. This personality trait reflects the degree to which a person needs pleasant and harmonious relations with others. Persons with a higher degree of agreeableness tend to be characterized by trust, straight-forwardness, cooperativeness, altruism, compliance, modesty, and tender mindedness.

In a romantic relationship, agreeableness allows partners realize a mutually beneficial sex life as a more harmonious communication style contributes to improved information sharing. Moreover, an individual with a higher degree of cooperativeness takes the partner's needs and desires to a larger extent into account. To the extent this induces positive reciprocal behavior of the partner and, hence, mutual gift exchange in the sexual relationship, a higher degree of agreeableness results in increased own sexual satisfaction. However, an agreeable person may compromise too much when bargaining over sexual activities. Nonetheless, even if an agreeable person to some extent sacrifices their sexual needs in favor of the partner's needs, this does not necessarily imply a negative influence on sexual satisfaction. The altruistic inclination of an agreeable individual implies that the individual also derives utility from the partner's sexual fulfillment.

Agreeableness should play a lesser or even a negative role in the sex life of singles. Causal sex entails the higher risk that sex mates take advantage of the modesty, trust and altruism of an agreeable individual. Because of the short-term nature of the sexual

encounter, sex mates are more likely to be primarily interested in their own sexual fulfillment and may not reciprocate the individual's modesty, trust and altruism. Thus, an agreeable individual may sacrifice too much of their own sexual preferences in a causal sexual relationship. The individual may also derive less utility from the sexual fulfillment of their sex mates as casual sex is not based on a love relationship and, hence, a strong emotional attachment is missing. Furthermore, a single high on agreeableness is less likely to initiate a casual sex relationship (Apostolu 2017; Gute and Eshbuagh 2008; Schmitt and Shackelford 2008). Their modesty and altruism associated with agreeableness may hinder that the individual engages in casual sex at the expense of the sexual desires of a potential sex mate.

Neuroticism (emotional instability). This personality trait reflects the degree to which a person experiences the world as threatening and beyond his or her control. Persons with a higher degree of neuroticism tend to be characterized by anxiety, angry hostility, psychological distress, self-consciousness, impulsiveness, and vulnerability. A high degree of neuroticism should negatively affect the sex life of people. While this applies to both partnered and single individuals, the degree of the negative influence may differ between these two groups of people.

An individual high on neuroticism tends to have more fears about sexuality and may be disgusted about some aspects of sexuality (Eysenck 1971, 1976). Thus, the individual may derive less utility from sex than someone with a lower score of neuroticism. Moreover, neuroticism has a negative impact on sexual satisfaction through how an individual behaves in a sexual relationship. Emotional instability entails inadequate and hostile sexual communication (Velten and Margraf 2017). An individual high on

neuroticism may overreact to criticism triggering negative responses from the partner. This leads to poor information sharing among partners. Negative emotions are also associated with low self-control and a high discounting of the future (Loewenstein 2000). This aggravates commitment problems. All in all, neuroticism makes it more difficult to realize a mutually beneficial sex life within a romantic partnership.

The negative impact of neuroticism on an individual's sex life may be even stronger for singles. The high degree of risk and uncertainty entailed by casual sex implies that an individual high on neuroticism enjoys sex less and is also more likely to behave in an inadequate way that provokes negative reactions by the sexual mate. Moreover, less self-control and a higher degree of impulsivity entails the risk that the individual engages in sexual encounters that can lead to disappointment, disgust or even emotional and physical harm.[7] Finally, even though individuals high on neuroticism have a higher propensity of short-term mating (Gute and Eshbaugh 2008; Schmitt and Schackelford 2008), their tendency to overreact and their inadequate communication style may make it more difficult to find a sex mate.

3. Data and Variables

3.1 The Data Set

Our empirical analysis uses data from the pairfam (Brüderl et al. 2018; Huinink et al. 2011). This is a nationally representative panel study for Germany funded by the German Research Foundation (DFG). The focus of the pairfam study is on intimate relationships and family relations. A nucleus of themes is addressed annually. Different additional topics are sampled in consecutive waves. The survey includes both a personal interview by a professional interviewer and a self-administered questionnaire for intimate questions. The

self-administered questionnaire is completed during the interview using the official survey laptop. In order to avoid interviewer effects, reporting bias and refusal to answer questions, all questions on sexuality are asked in the self-administered questionnaire.[8]

The first wave of interviews was conducted in the year 2008 for three birth cohorts: adolescents born between 1991 and 1993, young adults between 1981 and 1983, and middle-aged adults born between 1971 and 1973. Addresses were randomly drawn from the local population registers of 343 randomly chosen municipalities. More than 12,000 persons participated in the first wave. The sample of the first wave has been used as the basis for the following waves. Nonresponse patterns are similar to other panel studies based on voluntary participation. Bias due to panel attrition does not appear to be a large issue (Müller and Castiglioni 2015).

Information on our key variables is available for the years 2009, 2013 and 2017. We pool the three waves for our analysis. The focus of the analysis is on partnered and unpartnered persons who are heterosexual and at least 18 years old. The average age in our estimation sample is 32 years.

3.2 The Variables

Table 1 provides the definitions and descriptive statistics of the key variables. We use two dependent variables (see Appendix Tables A1 and A2 for the distribution of the dependent variables). An ordered variable for sexual satisfaction captures the utility a person derives from sex. The elven-point Likert scale of the variable ranges from 0 ‘very dissatisfied’ to 10 ‘very satisfied’. As frequency of intercourse plays an important role in sexual well-being, we also examine the link between personality and this dimension of sexuality. Frequency of intercourse during the past three months is measured on a seven-point interval

scale: Never/not in the past three months, once per month or less, 2–3 days per month, once per week, 2–3 days per week, more than 3 days per week, daily. Building from Schröder and Schmiedeberg (2015), we recode the variable to indicate frequency per month: 0, 0.67, 2.5, 4, 10, 20 and 30 days per month. This allows us applying a linear regression analysis.

Relationship status is captured by a dummy equal to 1 if the interviewee is a single in the respective year – i.e., the interviewee does not have a partner. The reference group consists of partnered interviewees. We have about 26 percent of observations from persons who are singles. To examine if relationship status has an influence on sexual satisfaction and frequency of sex, we run initial regressions with the combined sample of single and partnered persons. These regressions include the dummy for being a single. In the subsequent step, we provide separate estimates for single and partnered individuals to analyze whether the role of the Big Five personality traits depends on the relationship status.

As usual in large surveys (Rammstedt and John 2005, 2007; Soto and John 2017), personality is measured in the pairfam using a short version of the Big Five inventory. Extraversion, conscientiousness, agreeableness and neuroticism are assessed with four items, respectively. Openness to experience is assessed with five items. The items are measured on a five-point Likert scale ranging from 1 ‘strongly disagree’ to 5 ‘strongly agree’. For each of the five personality traits, we add up the respective items and divide the sum by the number of items.

Psychologists typically assume that the Big Five change only modestly after they have developed in childhood and adolescence (Costa et al. 2000). Some researchers even emphasize an important genetic component contributing to a relatively high stability of

personality (Bouchard and Loehlin 2001; Kandler et al. 2010). Econometric studies also suggest that the Big Five personality traits are reasonably stable (Cobb-Clark and Schurer 20212; Elkins et al. 2017). Mean level changes of the Big Five personality traits are usually small across time. Against this background, most of the econometric studies on the consequences of personality consider personality traits as exogenous (e.g., Caliendo et al. 2014; Cobb-Clark and Tan 2011; Mueller and Plug 2006; Risse et al. 2018).

As shown in Appendix Table A3, mean level changes of the Big Five personality traits for the periods 2009/2013, 2013/2017 and 2009/2017 are also small in our data. The table reports Cohen's d – a measure defining the mean level change in terms of a standard deviation change of the respective trait. All values for Cohen's d amount to less than 0.2. Thus, we follow the econometric literature and assume with suitable caution that our personality variables are exogenous.[9] Of course, our regressions may not allow definite causal inferences to be drawn – a limitation we share with other econometric studies on the consequences of personality traits. Nonetheless, our study provides an important first step to compare the role of the Big Five personality traits in the sex life of single and partnered individuals.

Table 2 shows the means of the sexuality and personality variables for single and partnered individuals. Singles are on average sexually less satisfied and have sex less often than partnered individuals. Singles and partnered individuals on average also differ in their personality. Singles score higher on openness and neuroticism and lower on extraversion, conscientiousness and agreeableness than individuals with a partner. At issue is the question of how these personality traits influence the sex life of single and partnered

individuals. We address this question with a multivariate analysis estimating the determinants of sexual satisfaction and frequency of sex.

The dataset allows controlling for a broad set of other factors influencing sexual satisfaction and frequency of sex. Appendix Table A4 shows the definitions and descriptive statistics of the control variables. We control for the economic situation by including variables for the years of schooling and the person's labor market status. A variable for health satisfaction accounts for overall health status. Demographic characteristics are captured by variables for the number of children in the household and for the person's gender, religious affiliation, migration background and age. In order to account for a nonlinear influence of age on sexuality, we also include a quadratic age variable. Moreover, we control for the number of previous marriages to capture a person's history. Furthermore, we include wave dummies, cohort dummies and a dummy variable for residing in East Germany. Finally, for partnered individuals, we account for the duration of the relationship with the current partner. In the regressions with the combined sample of single and partnered persons, this variable is set equal to 0 if the person is a single.

4. Empirical Analysis

4.1 Sexual Satisfaction

Table 3 shows the key results on sexual satisfaction. Control variables are included in the regressions but are suppressed to save space (see Appendix Table A5 for the full results). The determinants of sexual satisfaction are estimated by using a random effects ordered logit model.[10] The random effects model accounts for cross-period correlation of individual-specific error terms. Furthermore, we cluster the standard errors at the individual level. In order to provide a quantitative assessment, the table does not only provide

coefficients, but also marginal effects on the probability of answering one of the four highest categories of the eleven-point Likert scale for sexual satisfaction.

Column (1) shows the results for the combined sample of single and partnered individuals. Being a single is a negative determinant of sexual satisfaction. This finding is not only statistically significant, but also quantitatively very meaningful. Being a single is associated with an almost 39 percentage point lower likelihood of reporting one of the four highest satisfaction categories. The five personality variables also take significant coefficients. Extraversion, openness to experience, conscientiousness, and agreeableness are positive determinants of sexual satisfaction while neuroticism is a negative determinant.

At issue is whether personality plays a different role in the sexual satisfaction of single and partnered individuals. To examine this issue, columns (2) and (3) provide separate estimations by relationship status. Column (4) shows whether differences in the estimated coefficients are statistically significant.[11] The separate estimations reveal an interesting pattern.

While extraversion has a significantly positive influence on the sexual satisfaction of both single and partnered individuals, the influence is stronger for singles than for those who have a partner. For singles, an additional point on the one to five point scale of extraversion is associated with a 3.9 percentage point higher likelihood of reporting one of the four highest satisfaction categories. Taking into account that 29.1 percent of singles fall into these categories (see Table A1), this implies an increase in the likelihood by 13.4 percent. For partnered individuals, an additional point on the scale of extraversion is associated with a 1.1 percentage point higher likelihood of reporting one of the four highest

satisfaction categories. Given that 59.7 percent of partnered individuals fall into these categories, this implies an increase in the likelihood by 1.8 percent.

Conscientiousness also takes significantly positive coefficients in the two regressions. In contrast to extraversion, this personality has a less strong influence on the sexual satisfaction of singles than on the sexual satisfaction of partnered individuals. For singles, an additional point on the scale of conscientiousness increases the likelihood of reporting one of the four highest satisfaction categories by 3.1 percentage points. For partnered individuals, it increases that likelihood by 6.2 percentage points.

Agreeableness and openness to experience emerge as significantly positive determinants of sexual satisfaction only for partnered individuals, but not for singles. For partnered individuals, an additional point on the scale of agreeableness is associated with a 3.4 percentage point increase in the likelihood of reporting one of the four highest categories of sexual satisfaction. An additional point on the scale of openness to experience is associated with a 2.4 percentage point increase in that likelihood.

Neuroticism takes a significantly negative coefficient in each of the two regressions. The negative influence is stronger for singles than for individuals who have a partner. For singles, an additional point on the scale of neuroticism decreases the likelihood of reporting one of the four highest categories of sexual satisfaction by 7.7 percentage points. For partnered individuals, an additional point on the scale of neuroticism decreases that likelihood by 6.8 percentage points.

4.2 Frequency of Sex

Previous studies have shown that the frequency of sex is an important ingredient to happiness (Blanchflower and Oswald 2004; Cheng and Smyth 2015; Schmiedeberg et al.

2017). At issue is the question of how personality traits influence the frequency of sex. Table 4 shows the key results of linear random effects regressions on the determinants of frequency of intercourse per month (see Appendix Table A6 for the full results).

Column (1) provides the estimates for the combined sample of single and partnered individuals. Being a single emerges as a negative determinant of the frequency of sex. This result is not only statistically significant, but also quantitatively very meaningful. Singles have more than 6 days per month less sex than partnered individuals. The five personality variables also emerge with significant coefficients. Extraversion, openness to experience, conscientiousness, and agreeableness are associated with a higher frequency of sex while neuroticism is associated with a lower frequency of sex.

Columns (2) and (3) show separate estimations for single and partnered individuals. Extraversion plays a significantly positive role in the frequency of sex for both single and partnered individuals with the role being stronger for the first group. For singles, an additional point on the scale of extraversion is associated with an increase in the monthly frequency of sex by a nine-tenth day. Taking into account that singles on average have sex 1.8 days per month, this implies an increase in the frequency of sex by 50 percent. For partnered individuals, an additional point on the scale of extraversion is associated with a one-third day increase in the monthly frequency of intercourse. Given that partnered individuals on average have sex 5.8 days per month, this implies a 5.7 percent increase in the frequency of sex.

Openness to experience, conscientiousness and neuroticism emerge with significant coefficients only in the estimation for partnered individuals, but not in the estimation for singles. For partnered individuals, openness to experiences and

conscientiousness are positive determinants of frequency of sex while neuroticism is a negative determinant. Both an additional point on the scale of openness to experience and an additional point on the scale of conscientiousness are associated with a two-fifth day increase in the monthly frequency of intercourse. An additional point on the scale of neuroticism is associated with a decrease in the frequency by more than half a day per month.

Agreeableness takes a significant coefficient only in the estimation for singles, but not in the one for partnered individuals. For singles, agreeableness is a negative determinant of frequency of sex. An additional point on the scale of agreeableness is associated with a one-third day decrease in the frequency of sex.

4.3 The Link between Frequency of Sex and Sexual Satisfaction

So far our analysis has shown that singlehood and personality traits play a role in both frequency of sex and sexual satisfaction. At issue is whether singlehood and personality traits influence sexual satisfaction directly or indirectly through their impact on the frequency of sex. In order to address this issue, we provide estimations on the determinants of sexual satisfaction that control for the frequency of sex. Compared to the estimations in Table 3, we lose more than 800 observations. Thus, for a matter of comparison, Table 5 provides both regressions with and without frequency of sex using the same estimation sample.

Columns (1) and (2) show the estimates with the combined sample of single and partnered individuals. Frequency of sex emerges as a significantly positive determinant of sexual satisfaction. One extra day of sex per month is associated with a 4 percentage point higher likelihood of reporting one of the four highest satisfaction categories.

When controlling for frequency of sex the negative coefficient on singlehood drops in magnitude by about one half but still remains statistically significant. Thus, while lower frequency of sex plays a substantial mediating role in the negative link between singlehood and sexual satisfaction, it is not the whole story. Our finding shows that there is also a direct link between singlehood and satisfaction suggesting that the quality of sex is lower among singles than partnered individuals.

Considering the personality variables, the coefficients on openness to experience, conscientiousness, agreeableness, and neuroticism change only relatively modestly when frequency of sex is included in the specification. These personality traits appear to largely play a direct role in sexual satisfaction. By contrast, the coefficient on extraversion drops in magnitude by more than 40 percent when frequency of sex is controlled for. While the coefficient remains (weakly) significant, the drop in the magnitude suggests that extraversion plays a substantial indirect role in sexual satisfaction through a higher frequency of sex.

Columns (3) and (4) show the estimations for singles and columns (5) and (6) the estimations for partnered individuals. Frequency of sex plays a significantly positive role of similar magnitude in sexual satisfaction among both groups. Controlling for frequency of sex does not change the pattern of results on openness to experience, conscientiousness, agreeableness and neuroticism. Conscientiousness has a significantly positive influence on the sexual satisfaction of both single and partnered individuals with the influence being stronger for partnered individuals. Agreeableness and openness to experience take significantly positive coefficients only for partnered individuals, but not for singles.

Neuroticism is a significantly negative determinant of sexual satisfaction for both single and partnered individuals with the negative influence being stronger for singles.

The results on extraversion suggest that this personality trait largely plays an indirect role. Extraversion shows a significantly positive association with the sexual satisfaction for both single and partnered individuals when frequency of sex is not controlled for. This association is particularly strong for singles. Controlling for frequency of sex results in a sharp drop in the magnitude of the estimated coefficient for both groups and renders the coefficient insignificant.

5. Discussion of Results

Using a large-scale representative dataset from Germany and controlling for a long list of economic, socio-demographic and psychological factors, our study shows that the sex life of singles, on average, suffers from lower satisfaction and frequency of intercourse than the one of partnered individuals. The lower frequency of sex only partially explains the lower sexual satisfaction of singles. Single individuals are nonetheless less sexually satisfied than their partnered counterparts.

These findings conform to our theoretical considerations. The sex life of singles is characterized by causal sex and, hence, by a shorter time horizon of sexual relationships. This has a series of critical implications. While a sex partner is immediately and regularly available within a romantic relationship, singles lack such availability entailing a lower frequency of sex. Importantly, beyond the frequency of sex, the shorter time horizon implies that casual sexual encounters are less committed and partners have a stronger focus on satisfying their own needs during the encounters. By contrast, due to a longer time horizon, partners in a romantic relationship can realize a mutually satisfying sex life

through commitment, reciprocity and investments in relation-specific human capital. Finally, the time horizon plays a role in the risk and uncertainty that is associated with a sexual relationship. The short-term horizon of casual sex means that partners are strangers or have only nodding acquaintance with each other. They face a high degree of risk and uncertainty with respect to disappointment, embarrassment, and even emotional or physical harm. By contrast, the long-term horizon of a romantic relationship involves less risk and uncertainty as partners to a larger or lesser degree know each other.

At issue is how personality traits influence the sex life of single and partnered individuals. Our theoretical considerations suggest that personality traits play different roles in the sex life of single and partnered individuals because of the different time horizons. The empirical results conform to this expectation. Conscientiousness is a significantly positive determinant of frequency of sex only for partnered individuals. It emerges as a significantly positive determinant of sexual satisfaction for both singles and partnered individuals with the influence being much stronger for the latter. Thus, while a rule abiding and more balanced behavior to some extent also improves the sex life of singles, the basic point is that conscientiousness plays a much more pronounced role in the sex life of partnered individuals. This finding supports the view that conscientiousness is of greater importance if an individual is in a long-term, romantic relationships. Conscientiousness is a personality trait fostering a mutually beneficial sex life through commitment and cooperation on a long-term basis.

Furthermore, our estimates show that openness to experience and agreeableness are specifically important for a fulfilling sex life of partnered individuals. Openness to experience is a significantly positive determinant of sexual satisfaction and frequency of

sex for partnered individuals whereas it do not emerge with significant coefficients for singles. Agreeableness is also a significantly positive determinants of sexual satisfaction only for partnered but not for single individuals. For singles, it is even significantly negatively associated with frequency of sex. The findings conform to the notion that, in a long-term relationship, openness to the partner's sexual preferences and the willingness to take the partner's preferences into account help build a mutually beneficial sex life which is based on coordination of preferences and reciprocity. By contrast, the short-term nature of casual sex makes it less likely that a sex mate invests in reciprocating an individual's altruism and openness. The sex mate is more likely to focus on their own sexual fulfillment. Thus, openness to experience and agreeableness do not improve the sex life of singles. The short-term nature of casual sex implies that a single high on openness to experience or agreeableness forgoes the opportunity to bring in their own sexual preferences.

Neuroticism negatively affects the sexual satisfaction of both single and partnered individuals with the negative influence being stronger for single individuals. This finding fits the notion that emotional instability is particularly harmful in a short-term sexual relationships. The risk and uncertainty entailed by a short-term sexual encounter not only implies that an individual with a higher degree of emotional instability enjoys sex to a lesser extent. The risk and uncertainty also implies that the individual is more likely to behave in an inadequate way that triggers negative responses from the sexual mate.

However, we find that neuroticism is associated with lower frequency of sex only among partnered but not among single individuals. This finding does not necessarily contradict the notion that emotional instability is particularly harmful to the sex life of singles. On the one hand, an individual's emotional instability discourages the partner's

propensity to have sex with the individual. This is likely to apply to both a partner within a romantic relationship and a potential sex mate within a casual sexual relationship. On the other hand, an individual high on neuroticism has a larger propensity to engage in casual sex because of low self-control and a high discounting of the future. This aspect appears to be particularly relevant for singlehood. Casual sex plays the dominant role in the sex life of singles. Thus, for singles, there are two opposing effects of neuroticism on the frequency of sex that appear to largely offset each other. While an individual's emotional instability negatively affects a potential mate's propensity to have sex with the individual, the individual's lack of self-control increases the likelihood to engage in short-term sexual encounters with any mate.

Extraversion plays a positive role in the sexual satisfaction of both single and partnered individuals. However, this role is largely an indirect one. Extraversion has a positive influence on the frequency of sex and a higher frequency of sex, in turn, increases sexual satisfaction. The estimates show that the role of extraversion in the sex life of people is much stronger for single than for partnered individuals. For an individual in a romantic relationship, extraversion fosters frequency of sex as the individual more openly initiates communication with the partner about sex and expresses their sexual needs and desires. For singles, extraversion is even more important as a single individual has to find potential partners and persuade them to them to have casual sex. Sociability, outgoingness and assertiveness help get in contact with potential partners and get through their desire for sex on short notice.

6. Conclusions

While studies in labor economics have increasingly recognized the importance of personality traits, the economic literature on sexuality has largely ignored personality so far. Our study brings a new twist to that fledgling literature by showing that personality plays a role in sexual well-being and that this role depends on the relationship status of people.

Using a large representative dataset from Germany, we examine the influence of the Big Five personality traits on frequency of sex and sexual satisfaction for both partnered and single individuals. Expanding the analysis to singles is of particular interest as singlehood is increasing in many countries around the world. This gives rise to the question of what factors impact the sex life of singles and how these factors differ from the ones that constitute a full-filling sex life within a romantic relationship.

Singlehood does not equate to sexual abstinence. However, the sex life of singles is largely characterized by casual sex. Thus, from a theoretical viewpoint, the time horizon of sexual encounters of single individuals is shorter than the time horizon of individuals who have sex in a romantic relationship. The shorter time horizon of causal sex implies that personality traits enabling an individual to get through their sexual preferences on short notice play a particular role in the sex life of singles. By contrast, the longer time horizon of a romantic relationship requires personality traits helping realize a long-term mutually beneficial sex life of partners.

The empirical results fit our theoretical expectations. While extraversion plays a role in the sex life of both single and partnered individuals, that role is much more pronounced among single individuals. For singles, extraversion is particularly important as

it helps an individual get in contact with potential mates and persuade them to have sex. By contrast, conscientiousness is particularly important for the sex life of partnered individuals. This personality trait facilitates building commitment and cooperation in a long-term sexual relationship. Furthermore, our estimates show a positive role of openness to experience and agreeableness only for partnered but not for single individuals. Being interested in the partner's sexual preferences and being willing to take these preferences into account foster reciprocity and, hence, a mutually satisfying sex life on a long-term basis. In a short-term sexual relationship, these traits may just imply that an individual forgoes the opportunity to bring in their own sexual preferences. Finally, neuroticism negatively affects the sex life of both partnered individuals and singles with the influence being stronger for the latter. Emotional instability appears to be even more harmful in a short-term sexual relationship because such relationship entails a high degree of risk and uncertainty.

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Table 1: Definitions and Descriptive Statistics of the Key Variables

Variable	*Definition*	*Mean (Std.dev.)*
Sexual satisfaction	Score of sexual satisfaction. The interviewee answers the question "How satisfied are you with your sex life?" on an eleven-point Likert scale. The scale ranges from 0 "very dissatisfied" to 10 "very satisfied".	6.075 (2.731)
Frequency of sex	Frequency of intercourse per month during the past three months: 0, 0.67, 2.5, 4, 10, 20 or 30 days per month.	4.680 (5.838)
Single	Dummy equals 1 if the person does not have a partner.	0.264 (0.441)
Extraversion	Score of extraversion constructed from adding up four survey items measured on a five-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree". The sum of items is divided by 4. The items are: (1) I am usually modest and reserved. (2) I get enthusiastic easily and can motivate others easily. (3) I tend to be the strong and silent type. (4) I am expansive and gregarious. Items (1) and (3) were recoded in inverse order before adding up.	3.522 (0.814)
Openness	Score of openness to experience constructed from adding up five survey items measured on a five-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree". The sum of items is divided by 5. The items are: (1) I am interested in many kinds of things. (2) I am intellectual and like to contemplate things. (3) I am very imaginative. (4) I appreciate artistic and aesthetic impressions. (5) I am hardly interested in art. Item (5) was recoded in reverse order before adding up.	3.637 (0.691)
Conscientiousness	Score of conscientiousness constructed from adding up four survey items measured on a five-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree". The sum of items is divided by 4. The items are: (1) I complete my tasks thoroughly. (2) I make things comfortable for myself and tend to be lazy. (3) I am proficient and work fast. (4) I make plans and carry them out. Item (2) was recoded in inverse order before adding up.	3.829 (0.628)
Agreeableness	Score of agreeableness constructed from adding up four survey items measured on a five-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree". The sum of items is divided by 4. The items are: (1) I tend to criticize others. (2) I trust others easily and believe that people are inherently good. (3) I can be cold and distanced in my behavior. (4) I can be gruff and dismissive with others. Items (1), (3) and (4) were recoded in inverse order before adding up.	3.26 (0.712)
Neuroticism	Score of neuroticism constructed from adding up four survey items measured on a five-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree". The sum of items is divided by 4. The items are: (1) I easily become depressed or discouraged. (2) I am relaxed and don't let myself be worried by stress. (3) I worry a lot. (4) I easily become nervous and insecure. Item (2) was recoded in reverse order before adding up.	2.679 (0.799)

Number of observations = 14,711. For frequency of sex, the number of observations equals 14,211.

Table 2: Mean Comparisons

Variable	*Singles Mean*	*Partnered Individuals Mean*	*Test of Equality of Means t-statistic*
Sexual satisfaction	4.679	6.576	39.007***
Frequency of sex	1.779	5.771	38.144***
Extraversion	3.433	3.554	7.976***
Openness	3.686	3.620	5.163***
Conscientiousness	3.683	3.882	17.125***
Agreeableness	3.170	3.292	9.157***
Neuroticism	2.729	2.661	4.527***

*** Statistically significant at the 1% level.

Table 3: Determinants of Sexual Satisfaction

Explanatory Variables	*(1) Combined Sample of Singles and Partnered Individuals*	*(2) Only Singles*	*(3) Only Partnered Individuals*	*(4) Test of Equality of Coefficients (Z-Value)*
Single	-2.1942*** (34.44) [-0.385]	-----	-----	-----
Extraversion	0.1234*** (4.37) [0.023]	0.2693*** (4.56) [0.039]	0.0666* (1.93) [0.011]	3.23***
Openness	0.1047*** (3.41) [0.020]	0.0074 (0.13) [0.001]	0.1449*** (3.77) [0.024]	1.60
Conscientiousness	0.3072*** (8.42) [0.057]	0.2137*** (3.05) [0.031]	0.3682*** (8.06) [0.062]	1.81*
Agreeableness	0.1203*** (4.10) [0.022]	-0.0572 (0.99) [-0.008]	0.2038*** (5.54) [0.034]	3.47***
Neuroticism	-0.4147*** (13.94) [-0.077]	-0.5354*** (9.07) [-0.077]	-0.4051*** (11.00) [-0.068]	2.31**
Controls	Included	Included	Included	-----
Log likelihood	-31642.96	-8695.70	-22762.92	-----
Number of persons	7,999	2,850	6,241	-----
Number of observations	14,711	3,882	10,829	-----

Method: Random effects ordered logit. The table shows the estimated coefficients. Z-statistics are in parentheses. Standard errors are clustered at the person level. Average marginal effects in square brackets are calculated on the probability of answering one of the four highest satisfaction categories of the eleven-point Likert scale. *** Statistically significant at the 1% level; ** at the 5% level, * 10% level.

Table 4: Determinants of Frequency of Sex

Explanatory Variables	*(1) Combined Sample of Singles and Partnered Individuals*	*(2) Only Singles*	*(3) Only Partnered Individuals*	*(4) Test of Equality of Coefficients (Z-Value)*
Single	-6.1729*** (42.36)	-----	-----	-----
Extraversion	0.4977*** (7.57)	0.8889*** (9.42)	0.3370*** (3.99)	4.41***
Openness	0.1302* (1.77)	-0.0654 (0.69)	0.2000** (2.08)	1.73*
Conscientiousness	0.1885** (2.16)	-0.0230 (0.19)	0.2181* (1.91)	1.76*
Agreeableness	-0.1472** (2.01)	-0.3401*** (3.59)	-0.0623 (0.65)	1.34
Neuroticism	-0.3795*** (5.63)	-0.0826 (0.91)	-0.5421*** (6.21)	3.72***
Controls	Included	Included	Included	-----
R squared	0.1776	0.0545	0.1148	-----
Number of persons	7,755	2,830	5,990	-----
Number of observations	14,211	3,883	10,328	-----

Method: Random effects GLS. The table shows the estimated coefficients. Z-statistics are in parentheses. Standard errors are clustered at the person level. *** Statistically significant at the 1% level; ** at the 5% level, * 10% level.

Table 5: Determinants of Sexual Satisfaction – Controlling for Frequency

Explanatory Variables	*Combined Sample of Singles and Partnered Individuals*		*Only Singles*		*Only Partnered Individuals*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Single	-2.207*** (33.723) [-0.387]	-1.149*** (18.021) [-0.216]	-----	-----	-----	-----
Extraversion	0.139*** (4.763) [0.026]	0.056* (1.938) [0.011]	0.279*** (4.504) [0.040]	0.072 (1.182) [0.010]	0.084** (2.373) [0.014]	0.020 (0.587) [0.004]
Openness	0. 109*** (3.469) [0.020]	0.099** (3.194) [0.019]	0.021 (0.344) [0.003]	0.040 (0.654) [0.006]	0.144*** (3.684) [0.024]	0.123*** (3.262) [0.021]
Conscientiousness	0.281*** (7.457) [0.053]	0.264*** (7.081) [0.050]	0.197*** (2.635) [0.028]	0.211** (2.930) [0.030]	0.333*** (7.118) [0.057]	0.316*** (6.870) [0.055]
Agreeableness	0.120*** (3.385) [0.019]	0.143*** (4.816) [0.027]	-0.095 (-1.588) [-0.013]	-0.026 (-0.445) [-0.004]	0.194*** (5.156) [0.033]	0.230*** (6.314) [0.040]
Neuroticism	-0.411*** (-13.421) [-0.077]	-0.382*** (-12.704) [-0.073]	-0.542*** (-8.737) [-0.077]	-0.550*** (-9.064) [-0.079]	-0.398*** (-10.532) [-0.068]	-0.339*** (-9.254) [-0.059]
Frequency of Sex	-----	0.211*** (37.869) [0.040]	-----	0.271*** (15.126) [0.039]	-----	0.210*** (34.000) [0.036]
Controls	Included	Included	Included	Included	Included	Included
Log likelihood	-29883.83	-28447.70	-8126.32	-7828.80	-21582.88	-20460.62
Number of persons	7,615	7,615	2,689	2,689	5,946	5,946
Number of observations	13,874	13,874	3,630	3,630	10,244	10,244

Method: Random effects ordered logit. The table shows the estimated coefficients. Z-statistics are in parentheses. Standard errors are clustered at the person level. Average marginal effects in square brackets are calculated on the probability of answering one of the four highest satisfaction categories of the eleven-point Likert scale. *** Statistically significant at the 1% level; ** at the 5% level, * 10% level.

Appendix

Table A1: Distribution of Sexual Satisfaction (in %)

Scale of Sexual Satisfaction	*Singles*	*Partnered Individuals*
0 (very dissatisfied)	10.20	2.25
1	4.84	2.04
2	10.07	4.04
3	11.72	5.69
4	9.12	5.41
5	16.36	11.13
6	8.58	9.66
7	10.38	17.25
8	9.20	19.38
9	3.53	12.07
10 (very satisfied)	6.00	11.07
Number of observations	3,882	10,829

Table A2: Distribution of Frequency of Sex (in %)

Intervals of Frequency of Sex	*Singles*	*Partnered Individuals*
No sex	55.14	7.54
Once a month	16.64	13.76
2–3 days a month	14.11	23.00
Once a week	6.46	24.46
2–3 days a week	5.12	22.80
3 or more days a week (but not daily)	2.14	6.87
Daily	0.39	1.57
Number of observations	3,883	10,328

Table A3: Changes in Personality over Time

	Change between 2009 and 2013		*Change between 2013 and 2017*		*Change between 2009 and 2017*	
Personality Trait	Mean	Cohen's d	Mean	Cohen's d	Mean	Cohen's d
Extraversion	-0.095	-0.117	-0.016	-0.019	-0.111	-0.133
Openness	-0.126	-0.184	-0.005	-0.007	-0.131	-0.185
Conscientiousness	-0.042	-0.070	-0.005	-0.009	-0.048	-0.078
Agreeableness	0.044	0.065	-0.095	-0.137	-0.051	-0.072
Neuroticism	0.018	0.023	0.013	0.016	0.031	0.038

Number of observations = 2,036. The calculations are based on the estimation sample of the regression on sexual satisfaction and persons who participated in the survey in all three years. Cohen's d is the mean level change divided by the pooled standard deviation.

Table A4: Definitions and Descriptive Statistics of the Control Variables

Variable	*Definition*	*Mean (Std.dev.)*
Enrollment in education	Dummy equals 1 if the person is enrolled in education.	0.229 (0.42)
Full-time	Dummy equals 1 if the person is employed full-time.	0.426 (0.495)
Part-time	Dummy equals 1 if the person is employed part-time.	0.126 (0.332)
Self-employed	Dummy equals 1 if the person is self-employed.	0.053 (0.224)
Irregular employment	Dummy equals 1 if the person has an irregular job (e.g., internship, occasional job, mini job).	0.034 (0.182)
East Germany	Dummy equals 1 if the person resides in East Germany.	0.259 (0.438)
Female	Dummy equals 1 if the person is a woman.	0.521 (0.5)
Migration background	Dummy equals 1 if the person is a first- or second generation immigrant.	0.179 (0.383)
Number of children	Number of children living with the person in the same household.	0.839 (1.073)
Education	Years of schooling.	12.783 (3.617)
Previous marriages	Number of previous marriages.	0.081 (0.284)
Health	Ordered variable for the person's health status during the past four weeks. The variable ranges from 1 "bad" to 5 "very good".	3.744 (0.994)
Relationship duration	Duration of the relationship with the current partner in months. The variable is set equal to 0 if the person is a single.	82.278 (90.46)
Age	The person's age in years.	31.899 (8.189)
Age^2	The person's age squared.	1084.611 (524.484)
Protestant	Dummy equals 1 if the person has a Protestant religious affiliation.	0.319 (0.466)
Catholic	Dummy equals 1 if the person has a Catholic religious affiliation.	0.28 (0.449)
Other religion	Dummy equals 1 if the person has another religious affiliation.	0.058 (0.235)
Cohort dummies	Dummy variables for the birth cohort.	-----
Wave dummies	Dummy variables for the years of observation.	-----

Number of observations = 14,711. The reference group of the variables for employment status (variables for religion) consists of persons who are unemployed or out of the labor force (persons who are not religious).

Table A5: Determinants of Sexual Satisfaction; Full Results

Explanatory Variables	*(1) Combined Sample of Singles and Partnered Individuals*	*(2) Only Singles*	*(3) Only Partnered Individuals*
Single	-2.1942***	-----	-----
	(34.44)		
Extraversion	0.1234***	0.2693***	0.0666*
	(4.37)	(4.56)	(1.93)
Openness	0.1047***	0.0074	0.1449***
	(3.41)	(0.13)	(3.77)
Conscientiousness	0.3072***	0.2137***	0.3682***
	(8.42)	(3.05)	(8.06)
Agreeableness	0.1203***	-0.0572	0.2038***
	(4.10)	(0.99)	(5.54)
Neuroticism	-0.4147***	-0.5354***	-0.4051***
	(13.94)	(9.07)	(11.00)
Enrollment in education	0.0211	-0.1539	0.0787
	(0.26)	(0.93)	(0.77)
Full-time	0.0300	-0.1893	0.0844
	(0.43)	(1.24)	(0.99)
Part-time	0.0360	0.0544	0.0524
	(0.46)	(0.24)	(0.58)
Self-employed	-0.0694	0.1827	-0.1160
	(0.66)	(0.73)	(0.94)
Irregular employment	0.0352	0.0335	0.0057
	(0.31)	(0.13)	(0.04)
East Germany	0.1171**	-0.0733	0.1851***
	(2.06)	(0.62)	(2.64)
Female	0.2087***	0.2268**	0.1949***
	(4.21)	(2.31)	(3.10)
Migration background	0.2456***	0.1867	0.2501***
	(3.59)	(1.37)	(3.00)
Number of children	-0.0139	0.1863*	-0.0406
	(0.49)	(1.80)	(1.28)
Education	-0.0354***	-0.0103	-0.0545***
	(5.33)	(0.82)	(6.29)
Previous marriages	0.2592***	0.0639	0.3779***
	(2.73)	(0.36)	(3.05)
Health	0.1475***	0.1382***	0.1665***
	(7.17)	(3.31)	(6.59)
Relationship duration	-0.0038***	-----	-0.0040***
	(9.07)		(8.07)
Age	-0.1357***	-0.1296*	-0.1645***
	(3.65)	(1.69)	(3.53)
Age^2	0.0019***	0.0020**	0.0023***
	(4.73)	(2.35)	(4.54)

Protestant	0.0106 (0.19)	-0.2199** (1.97)	0.0748 (1.08)
Catholic	0.1040* (1.69)	-0.0224 (0.18)	0.1517** (2.01)
Other religion	0.4818*** (4.28)	0.5195** (2.41)	0.5314*** (3.73)
Cohort dummies	Included	Included	Included
Wave dummies	Included	Included	Included
Log likelihood	-31642.96	-8695.70	-22762.92
Number of persons	7,999	2,850	6,241
Number of observations	14,711	3,882	10,829

Method: Random effects ordered logit. The table shows the estimated coefficients. Z-statistics are in parentheses. Standard errors are clustered at the person level. *** Statistically significant at the 1% level; ** at the 5% level, * 10% level.

Table A6: Determinants of Frequency of Sex; Full Results

Explanatory Variables	*(1) Combined Sample of Singles and Partnered Individuals*	*(2) Only Singles*	*(3) Only Partnered Individuals*
Single	-6.1729*** (42.36)	-----	-----
Extraversion	0.4977*** (7.57)	0.8889*** (9.42)	0.3370*** (3.99)
Openness	0.1302* (1.77)	-0.0654 (0.69)	0.2000** (2.08)
Conscientiousness	0.1885** (2.16)	-0.0230 (0.19)	0.2181* (1.91)
Agreeableness	-0.1472** (2.01)	-0.3401*** (3.59)	-0.0623 (0.65)
Neuroticism	-0.3795*** (5.63)	-0.0826 (0.91)	-0.5421*** (6.21)
Enrollment in education	-0.0727 (0.36)	-0.2206 (0.80)	0.0096 (0.03)
Full-time	0.0376 (0.23)	-0.1049 (0.40)	0.1776 (0.86)
Part-time	0.3072* (1.79)	0.0669 (0.21)	0.5008*** (2.61)
Self-employed	-0.3206 (1.30)	-0.2789 (0.64)	-0.1264 (0.44)
Irregular employment	0.2809 (1.03)	-0.3287 (0.99)	0.5629* (1.68)
East Germany	0.3196** (2.34)	0.1685 (0.86)	0.3359* (1.91)
Female	-0.3540*** (3.07)	-0.5799*** (3.70)	-0.3295** (2.07)
Migration background	0.7061*** (4.37)	-0.1654 (0.69)	0.9984*** (4.90)
Number of children	-0.0223 (0.33)	0.5494*** (2.82)	-0.0509 (0.67)
Education	-0.0312* (1.87)	0.0262 (1.32)	-0.0819*** (3.36)
Previous marriages	0.2451 (1.15)	-0.0460 (0.17)	0.3398 (1.16)
Health	0.0667 (1.35)	0.0132 (0.18)	0.0872 (1.41)
Relationship duration	-0.0175*** (17.50)	-----	-0.0167*** (13.89)
Age	-0.2006** (2.22)	0.0918 (0.79)	-0.5062*** (4.19)
Age^2	0.0022** (2.23)	-0.0016 (1.21)	0.0065*** (4.91)

Protestant	-0.1176 (0.87)	-0.5300*** (2.76)	0.0010 (0.06)
Catholic	-0.1710 (1.14)	-0.1805 (0.83)	-0.2214 (1.17)
Other religion	-0.1850 (0.68)	-0.3253 (0.75)	0.0281 (0.08)
Constant	10.6822*** (6.75)	-0.2334 (0.12)	16.4949*** (7.78)
Cohort dummies	Included	Included	Included
Wave dummies	Included	Included	Included
R squared	0.1776	0.0545	0.1148
Number of persons	7,755	2,830	5,990
Number of observations	14,211	3,883	10,328

Method: Random effects GLS. The table shows the estimated coefficients. Z-statistics are in parentheses. Standard errors are clustered at the person letvel. *** Statistically significant at the 1% level; ** at the 5% level, * 10% level.

Endnotes

[1] One exception may be a psychological study by Hoan and MacDonald (2024). The authors claim that the role of personality in sexual satisfaction does not differ between single and partnered individuals. However, their analysis is based on small-scale data. Unfortunately, the authors do not provide any details on their regression analysis. Thus, it is difficult to assess the quality of Hoan and MacDonald's research.

[2] For example, Peterson et al. (2011) show that preferences for sex acts depend on personality traits.

[3] While this is most obvious when it comes to classical one-night stands, even friends with benefits relationships are less likely to be long lasting compared to romantic relationships (Machia et al. 2020).

[4] This uncertainty is most obvious when it comes to online dating where people often engage in deceptive self-presentation (Blackhart et al. 2014; Guadagno et al. 2012; Huang et al. 2021). A high degree of uncertainty may even remain in friends with benefits relationships which are based on serial hookups where partners have little to do with each other aside from establishing sexual interactions (Mongeau et al. 2016). While the various types of casual sex may differ in the degree of uncertainty, the basic point is that the uncertainty entailed by casual sex is on average higher than the one within a romantic relationship.

[5] Extraverts tend to take the lead in initial social interactions (Cuperman and Ickes 2009).

[6] Individuals scoring high on openness to experience tend to initiate a greater number of conversation sequences during initial social interactions to encourage partners to share their fantasies and experiences (Cuperman and Ickes 2009).

[7] Indeed, psychological research suggests that neuroticism is positively associated with several facets of sexual risk-taking (Ball and Schottenfeld 1997; Cooper et al. 2000; McCown 1992).

[8] Self-reports are the dominant method of data collection in sexual behavior research. Questions on sexuality address very sensitive issues and may entail possible problems of reporting bias or item nonresponse. Optimizing self-report methodology is widely seen as having the greatest potential

for improving sexual behavior research (McCallum and Peterson 2012). A series of studies show that self-administered questionnaires substantially improve the quality of a survey. Castelo-Branco et al. (2010) find that interviewees are less likely to over-report sexual activity and importance of sex in anonymous questionnaires than in personal interviews. Gnambs and Kaspar's (2015) meta-study shows that, particularly, computerized surveys contribute to truthful responding. Furthermore, there is evidence that anonymous and computerized surveys not only mitigate biased reporting, but also reduce the problem of item nonresponse to sensitive questions (Kays et al. 2012; Langhaug et al. 2010; de Leeuw et al. 2003; Wood et al. 2006).

[9] We recognize that there is an ongoing discussion on the impact of life events on changes in the Big Five personality traits. However, that discussion appears to be inconclusive so far. While some studies indicate some moderate and rather specific influences of single life events (Angeli et al. 2018, Anger et al. 2017), others conclude that intra-individual changes are generally only weakly or even not related to major life events and that changes are not economically meaningful (Cobb-Clark and Schurer 2012; Costa et al. 2000). Moreover, there can be reverse causation with personality influencing life events (Specht et al. 2011). We recognize that personality may also change with age (Almlund et al. 2011; Borghans et al. 2008; Specht 2011). Thus, in our estimations, we control for the age of the interviewee.

[10] We prefer the random effects (RE) over a fixed effects (FE) approach. The FE approach only accounts for the within variation of variables, but throws away all the information contained in the between variation in the data. Thus, time-invariant variables cannot be included. While variables with small variation across time may be included, this can result in highly inefficient estimates. Attenuation bias due to measurement errors is also likely to be more severe in FE estimations (Freeman 1984; Swaffield 2001). Finally, while the FE approach solves the problem of unobserved time-invariant influences, it can aggravate a possible bias due to omitted time-varying variables because dropping the between variation increases the influence of time-varying misspecification on parameter estimates (Plümper and Troeger 2019). A potential limitation of the RE approach is

the requirement that the random effects are uncorrelated with the explanatory variables. However, Clark and Linzer (2015) provide Monte Carlo simulations showing that the RE approach may be preferred even if this requirement is violated. As long as the correlation between the random effects and the explanatory variables is not too high and, hence, the resulting bias is sufficiently small, the lower variance of the RE estimator produces root mean square errors below those of the FE estimator. This advantage is particularly strong in regressions including variables with small within variation. Moreover, note that comparisons of RE and FE estimates are often made under the assumption that both include the same set of explanatory variables. Yet, the RE model allows to control for time-invariant factors reducing the risk that the random effects are correlated with the explanatory variables.

[11] This test is based on a fully relationship status interacted estimation on the combined sample of single and partnered individuals.