Partner relationship and intimate decisions

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ZUSAMMENFASSUNG

Menschen sind soziale Wesen, die auf Unterstützung und Akzeptanz anderer angewiesen sind. Eine stabile Partnerschaft ist eine zentrale Quelle sozialer Unterstützung und trägt zum Wohlbefinden von Menschen bei (Hahlweg & Baucom 2008). Außerdem sind Partnerschaften meistens die Basis von Familien. Obwohl die Vielfalt an Familienformen in Europa zugenommen hat, besteht eine moderne Familie meistens immer noch aus einer Mann-Frau Dyade und einem oder mehreren Kindern (Hill & Kopp 2015). Deshalb spielt die intime Beziehung zwischen Mann und Frau eine große Rolle in der Familienforschung, welche Familien aus einer soziologischen Perspektive betrachtet. Bedeutende Forschungsfelder in Bezug auf Partnerschaften sind unter anderem Beziehungsstabilität und Beziehungszufriedenheit, Hausarbeitsteilung, Sexualität und Fertilität. Diese Themen werden in dieser Dissertation näher betrachtet und ihr Zusammenspiel untersucht. Insbesondere durch die Veränderungen der modernen Familie, die sich im Zuge der Individualisierung und Emanzipation im letzten Jahrhundert ergeben haben, scheint eine Analyse von Partnerschaften und ihren intimen Entscheidungen von Interesse.

Industrialisierung und Urbanisierung haben zur Verbreitung der modernen Familie – auch bekannt als Kernfamilie – beigetragen (Goode 1963). Diese besteht meistens aus Mutter, Vater und ihren Kindern. In dieser waren Frauen vorrangig verantwortlich für die Hausarbeit und die Erziehung der Kinder und Männer für den Erwerb. Bis in die 1970er waren die Rollen und Verpflichtungen durch soziale Normen größtenteils vorgegeben (Schneider 2015). Nach der Individualisierungstheorie sind die individuellen Entscheidungsspielräume allerdings in den letzten Jahrzehnten gestiegen (Beck 1994). Die Position von Frauen in der Gesellschaft hat sich auch verändert: Ihr Bildungsniveau und ihre Erwerbsbeteiligung sind gestiegen und die Emanzipation hat zu einem neuen Verständnis von der Rolle der Frau in der Gesellschaft geführt (Schneider 2015). Heirat und Elternschaft sind nicht mehr verpflichtend, sondern optional (Schneider 2015). Durch die gesteigerte Erwerbsbeteiligung sind Frauen ökonomisch unabhängiger und nicht mehr auf einen männlichen Versorger angewiesen. Der Anteil verheirateter Paare ist demnach gesunken und die Zahl der Scheidungen gestiegen (Federal Statistical Office of Germany 2019b). Deshalb werden in dieser Dissertation nicht nur verheiratete Paare betrachtet, sondern auch unverheiratete Partnerschaften.

Kinder implizieren größere Nachteile für Frauen als für Männer. Nach der Geburt eines Kindes reduzieren Frauen ihre Arbeitszeit stärker als Männer und sind deshalb in ihrer ökonomischen Unabhängigkeit gefährdet (Vogel 2009, Ziefle 2004). Besonders seit der

Einführung von modernen Verhütungsmethoden und sicheren Abtreibungen, kann die Fertilität – bis zu einem bestimmten Grad – individuell bestimmt werden. Der Prozentsatz an ungewollten Schwangerschaften ist gesunken (Schneider 2015); ebenso die Zahl der Kinder pro Frau (Federal Statistical Office of Germany 2019a). Veränderte Werte und ein Rückgang religiöser Zugehörigkeit haben diese Veränderungen beschleunigt (Lois 2011, Van de Kaa 1987). Individualisierung hat nicht nur zu mehr Entscheidungsspielräumen geführt, sondern auch zu einer Vielfalt an Familienformen. Der Anteil unverheirateter Paare, alleinerziehender Eltern und Stieffamilien hat zugenommen (Schneider 2015). Diese Individualität und Instabilität von Familien charakterisiert die postmoderne Familie (Cheal 1993). Aufgrund ihrer erhöhten Instabilität sind die Partnerschaftsstabilität und Faktoren, die diese beeinflussen, von erhöhter Bedeutung für die Familienforschung. Die Funktion von Familien hat sich auch gewandelt: Während früher die Reproduktion im Mittelpunkt stand, ist die primäre Funktion von Familien heutzutage, Sicherheit und Unterstützung durch die Familienmitglieder zu gewähren (Schneider 2015). Durch die Individualisierung wurde auch Liebe in Partnerschaften bedeutender, ökonomische Faktoren haben dagegen an Bedeutung verloren (Burkart 2018). Deshalb stellen Partnerschaftsqualität und Partnerschaftszufriedenheit relevante Themen der Partnerschaftsforschung dar.

Durch die erhöhte Erwerbsbeteiligung haben Frauen weniger Zeit für Hausarbeit und Erziehung von Kindern. Während der Anteil von Frauen an der Hausarbeit gesunken ist, ist der Anteil der Männer gestiegen (Shelton & John 1996). Die Aufteilung der Hausarbeit ist dabei zumeist geschlechtstypisch: Während Männer den Großteil der Reparaturen und Gartenarbeiten verrichten, sind Frauen hauptsächlich für die Routinehausarbeit (Putzen, Kindererziehung) verantwortlich (Dechant et al. 2014). Durchschnittlich verbringen Frauen allerdings immer noch mehr Stunden mit Hausarbeit als Männer, insbesondere nach der Geburt des ersten Kindes (Dechant et al. 2014). Diese Aufteilung wird meistens dadurch erklärt, dass Frauen durchschnittlich immer noch weniger Stunden mit Erwerbsarbeit verbringen und in niedrigeren Positionen mit geringerem Gehalt angestellt sind als Männer (Shelton & John 1996). Allerdings erledigen Frauen oft auch dann noch mehr Hausarbeit, wenn sie mehr arbeiten und verdienen als ihre Partner (Shelton & John 1996). Der Zusammenhang zwischen der Hausarbeitsteilung und Partnerschaftsstabilität, sowie Partnerschaftszufriedenheit ist bereits hinreichend untersucht. Eine (angemessene) Beteiligung der Männer an der Hausarbeit erhöht die weibliche Partnerschaftszufriedenheit und senkt die Wahrscheinlichkeit einer Trennung (Amato et al. 2003, Stauder 2002). Allerdings gibt es wenig Evidenz (vor allem von Längsschnittstudien),

wie die Hausarbeitsteilung die partnerschaftliche Koitushäufigkeit und sexuelle Zufriedenheit beeinflusst. Dieser Zusammenhang wird im ersten Artikel dieser Dissertation näher beleuchtet.

Die postmoderne Familie ist nicht mehr nur ein Mittel für die Reproduktion, sondern auch für die individuelle Selbstverwirklichung. Ein Aspekt von Selbstverwirklichung ist das Sexualleben (Lautmann 2002, Shorter 1989). Sexualität ist eines der am meisten regulierten Felder der Gesellschaft (Burkart 2018). Sexuelle Skripte definieren mit wem, wie und wann Menschen Sex haben sollten und diese werden durch Sozialisation weiter gegeben (Simon & Gagnon 1986). Diese kulturellen Einflüsse, gepaart mit individuellen Lernprozessen führen zu individuellen sexuellen Skripten und formen die sexuelle Biographie jedes Menschen (Schmidt 2003). Die sexuelle Revolution der 1960er führte zur Liberalisierung und Individualisierung von Sex (Feldmann 2006). Geschlechtsverkehr ist nicht mehr gebunden an die Ehe und strikte Normen und wird mehr in der Öffentlichkeit diskutiert (Burkart 2018). Durch die Einführung von sicheren Abtreibungen und effektiven Verhütungsmethoden konnte Sex von der Reproduktion getrennt werden und die Möglichkeiten, insbesondere für Frauen, haben sich erhöht (Anurin 2002).

Die Einführung sicherer Schwangerschaftsabbrüche hat in Kombination mit der Individualisierung und Emanzipation von Frauen dazu geführt, dass sich Frauen frei für Kinder entscheiden können (Peuckert 2012). Abtreibungen sind in Deutschland zwar weiterhin illegal. Eine Abtreibung in den ersten 12 Wochen der Schwangerschaft wird allerdings nicht strafrechtlich verfolgt, falls diese aus medizinischen (Bedrohung für die Gesundheit der Mutter), kriminologischen (z.B. nach einer Vergewaltigung) oder sozialen (psychologische Bedrohung für die Mutter) Gründen erfolgt (Helfferich 2015). Außerdem müssen Frauen vor einer Abtreibung ein verpflichtendes Beratungsgespräch in Anspruch nehmen, welches das Ziel hat, die Wichtigkeit des ungeborenen Lebens hervorzuheben (Berghahn 2015). Auch wenn die Möglichkeit des Schwangerschaftsabbruchs gegeben ist, besteht das soziale Stigma in Zusammenhang mit einer Abtreibung allerdings weiter (Busch 2015). Frauen, die einen Abbruch durchführen lassen, und Ärzte, die Abtreibungen vornehmen, müssen weiterhin soziale Ächtung fürchten (Cockrill et al. 2013, Norris et al. 2011). Aufgrund der hiermit verbundenen Schwierigkeiten in der Datenerhebung gibt es folglich wenig verlässliche Längsschnittforschung zu diesem Thema. Ein hierbei unzureichend untersuchtes Feld ist das der angeblich durch Abtreibung induzierten psychischen Folgeschäden, ebenso wie der angeblichen Belastungen von Partnerschaften als Folge einer Abtreibung. Der zweite und dritte Artikel dieser Dissertation beschäftigt sich deshalb mit Schwangerschaftsabbrüchen und deren Zusammenspiel mit Depressivität und Partnerschaftszufriedenheit, sowie -stabilität.

Das deutsche Familienpanel *pairfam* ist eines von wenigen Längsschnittdatenquellen, die es ermöglichen Sex und Schwangerschaftsabbrüche im Zusammenhang mit Partnerschaftsdynamiken zu untersuchen. Für dieses Panel werden seit 2008 jährliche Befragungen mit über 12.000 Frauen und Männer der Geburtskohorten 1991-93, 1981-83, und 1971-73 – und falls möglich deren Partner – durchgeführt. Momentan sind zehn Wellen der Daten für Analysen verfügbar (Brüderl et al. 2019, Huinink et al. 2011). *pairfam* bildet deshalb die Datenbasis für alle drei Artikel dieser Dissertation.

Der erste Artikel analysiert, ob die Hausarbeitsteilung eines Paares und deren wahrgenommene Fairness einen Einfluss auf die sexuelle Zufriedenheit und Koitushäufigkeit in Partnerschaften haben.[1] Bisherige Forschung zu diesem Thema musste auf Vergleiche zwischen Personen zurückgreifen und ergab unterschiedliche Befunde. Dieser Artikel vergleicht POLS, Random und Fixed Effects Regressionsmodelle und verwendet Längsschnittdaten von 1.315 Paaren. Außerdem wird zwischen traditionell weiblichen (z.B. Putzen, Kochen) und männlichen (z.B. Reparaturen, Gartenarbeit) Haushaltstätigkeiten unterschieden. Keine dieser Tätigkeiten scheint jedoch einen Einfluss auf die sexuelle Zufriedenheit oder Koitushäufigkeit zu haben. Veränderungen in der wahrgenommenen Fairness der Aufteilung beeinflussen ebenfalls nicht das Sexualleben von Paaren. Allerdings unterscheidet sich das Sexualleben von Paaren, die ihre Hausarbeitsverteilung als fair beurteilen, von den Paaren, die dies nicht tun. Zukünftige Studien könnten untersuchen welche unbeobachteten Faktoren für diesen Unterschied verantwortlich sind.

Der zweite Artikel dieser Dissertation behandelt die Beziehung zwischen Schwangerschaftsabbrüchen und Depression bei Männern und Frauen. Die mentale Gesundheit von Männern in Bezug auf Schwangerschaftsabbrüche wird oft vernachlässigt und Längsschnittstudien zu diesem Thema sind selten. Dieser Artikel wendet POLS, Random und Fixed Effects Regressionen an, um zu ergründen, ob das Depressionsniveau vor einem Schwangerschaftsabbruch die Wahrscheinlichkeit beeinflusst, eine ungewollte/ungeplante Schwangerschaft abzutreiben, und wie sich das Depressionsniveau nach einem Schwangerschaftsabbruch entwickelt. Die Ergebnisse zeigen, dass Frauen mit höherem Depressionsniveau eher einen Schwangerschaftsabbruch durchführen lassen. Außerdem haben Frauen in der Befragungswelle nach einem Schwangerschaftsabbruch ein etwas höheres Depressionsniveau im Vergleich zu den Befragungswellen vor dem Abbruch. Dieser Anstieg ist allerdings in den darauf folgenden Wellen nicht mehr sichtbar. Für Männer lässt sich kein

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[1] Dieser Artikel wurde veröffentlicht im Journal of Family Research 31(1), 2019. doi:10.3224/zff.v31i1.05

signifikanter Zusammenhang zwischen Depressionen und Schwangerschaftsabbrüchen ihrer Partnerinnen feststellen. Da die *pairfam* Befragung in einem Abstand von ungefähr einem Jahr durchgeführt wird und der exakte Zeitpunkt eines Schwangerschaftsabbruchs nicht bekannt ist, könnten kurzfristige Änderungen im Depressionsniveau nicht erfasst worden sein. Zukünftige Studien könnten die Intensität kurzfristiger Änderungen im Depressionsniveau nach einem Abbruch genauer untersuchen. Außerdem können die angewendeten Fixed Effects Modelle in Bezug auf das Depressionsniveau nach Schwangerschaftsabbrüchen keine Vergleiche zu den Alternativen einer Abtreibung, wie z.B. dem Austragen eines ungewollten Kindes, ziehen. Bisherige Studien lassen vermuten, dass die Auswirkungen der ergriffenen Alternativen auf den mentalen Zustand von Frauen noch stärker sind (Biggs et al. 2017).

Der dritte Artikel untersucht das Zusammenspiel zwischen Schwangerschaftsabbrüchen, Partnerschaftszufriedenheit und Trennungen.[2] Wenige Forscher haben dieses Thema bisher vertieft. Insbesondere Längsschnittanalysen fehlen hierzu. Unter zu Hilfenahme von logistischen Regressionen, diskreten Ereignismodellen und Fixed Effects Regressionen werden in diesem Artikel Partnerschaften mehrere Jahre vor und nach einem Schwangerschaftsabbruch betrachtet. Die Ergebnisse können weder bestätigen, dass Beziehungszufriedenheit ein konfundierender Faktor, noch ein mediierender Faktor zwischen einem Schwangerschaftsabbruch und der Trennungswahrscheinlichkeit darstellt. Die Beziehungszufriedenheit zeigt keine signifikanten Effekte auf die Wahrscheinlichkeit einen Schwangerschaftsabbruch zu haben. Die Trennungswahrscheinlichkeit nach einem Schwangerschaftsabbruch ist minimal erhöht, jedoch statistisch nicht signifikant. Die Beziehungszufriedenheit sinkt leicht nach einem Schwangerschaftsabbruch. Ein Jahr später ist dieser Effekt allerdings nicht mehr sichtbar. Ein Schwangerschaftsabbruch scheint diesen Analysen zufolge keine langanhaltenden Folgen für Beziehungen zu haben.

Der erste und zweite Artikel dieser Dissertation kann zeigen, dass POLS und Random Effects Modelle - im Vergleich zu Fixed Effects Modellen - den Effekt von Schwangerschaftsabbrüchen und Veränderungen in der Hausarbeitsteilung überschätzen. Dies lässt den Schluss zu, dass diese Modelle von unbeobachteter Heterogenität verzerrt sind. Fixed Effects Modelle hingegen sind besser geeignet um Veränderungen in Partnerschaften und Depressivität nach Schwangerschaftsabbrüchen oder Veränderungen im Sexualleben zu erfassen. Diese Modelle kontrollieren für alle zeitkonstanten beobachteten und unbeobachteten

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[2] Dieser Artikel wurde veröffentlicht im Journal Comparative Population Studies 46, 2021. doi:10.12765/CPoS-2021-04

Charakteristiken von Individuen und Partnerschaften, welche die Ergebnisse verzerren könnten (Brüderl & Ludwig 2015).

Je nach Modell konnten nur 85-398 Personen/Paare, die einen Schwangerschaftsabbruch vornehmen ließen, (mit bis zu 1.300 Beobachtungen) mit einbezogen werden. Zukünftige Forschung sollte versuchen diese Ergebnisse mit höheren Fallzahlen zu replizieren. Der Großteil der bisherigen Studien zu Abtreibungen war auf Daten von Frauen gegründet, die nach einem Schwangerschaftsabbruch in Kliniken zu einer Befragung eingeladen wurden. Dies bedeutet, dass zumeist retrospektive Daten zum Zustand vor dem Abbruch erhoben wurden. Ein Vorteil dieser Dissertation ist, dass die *pairfam* Daten durch ihr Paneldesign einen Vergleich von Partnerschaften und Depressivität bis zu mehrere Jahre vor einem solchen Eingriff, wie auch danach, erlauben. Dadurch kann diese Dissertation einen Beitrag leisten für die Erforschung des Sexuallebens von Paaren und von Schwangerschaftsabbrüchen.

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INTRODUCTION AND OVERVIEW

1 INTRODUCTION AND OVERVIEW

1.1 Research outline

Humans are social beings that rely on support and acceptance of others. A stable and functioning intimate partnership is a central resource of support and contributes to individual well-being (Hahlweg & Baucom 2008). Moreover, these partnerships are normally the basis of family. Almost all societies exhibit social arrangements that can be denominated as families, although the specific form may vary across time and place (Hill & Kopp 2015). Although, family form variety has increased in Europe over the last decades, a family is still generally considered to be comprised of a man-woman-dyad with one or more children (Hill & Kopp 2015). Intimate heterosexual relationships therefore play an important role in family research examining families from a sociological perspective. Love, sexuality, and intimacy are three basic elements of partnerships (Burkart 2018). Important research fields concerning intimate partnerships include relationship stability and satisfaction, distribution of (paid and unpaid) work, sexuality, and fertility, among others. These factors, both individually and their interplay, will be considered closely in this dissertation. As the modern family has changed considerably in the last century due to individualization and women's emancipation, an analysis of partner relationships and their intimate decisions seems to be of special interest.

In the first chapter of this dissertation, I will give an overview on how individualization and women's emancipation affect partnership quality, housework distribution and sexual intercourse in couples, fertility decisions, and having an abortion. As the latter two topics are rather sensitive, survey participants are hesitant to give truthful answers to such questions, causing a scarcity of longitudinal data and analyses. This section also presents the German Family Panel (*pairfam*), a longitudinal study ideal for studying partnerships and intimate decisions. For this reason, it builds the base for all three papers of this dissertation. After presenting appropriate estimation techniques for handling longitudinal data, in particular fixed effects regressions, I will summarize and discuss the research outcome of this dissertation. Chapter 2 consists of my first publication on this topic, in which the association between housework distribution and sexual intercourse in couples is analysed.[3] The third chapter encompasses the second paper, considering the relationship between having an abortion and depression in men and women, while the fourth chapter (third paper) sheds light on the interplay

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[3] This paper was published in the Journal of Family Research 31(1), 2019. doi:10.3224/zff.v31i1.05

between having an abortion, relationship satisfaction, and relationship stability[4]. To my knowledge, this is the first analysis that applies longitudinal data and fixed effects regression models to analyse the topics of sexual intercourse and having an abortion.

1.2 Intimate partnerships in the context of individualization and emancipation

1.2.1 The rise of the postmodern family

Industrialization and urbanization have lead to the distribution of the nuclear, or modern family (Goode 1963). The modern family is typically described as a social constellation consisting of a mother, father, and their children. The small size of the modern family and its detachment from the wider circle of kin is one of its defining features (Cheal 1993). The family has become a specialized agent adapted to modern industrial life in terms of mobility and the distribution of (paid and unpaid) work (Hill & Kopp 2015). In the nuclear family setting women are predominantly responsible for housework and childrearing, while men are responsible for earning money. Until the 1970s, families in Europe were constructed as social institutions with clearly-defined rights and responsibilities (Schneider 2015). Each family member had a specific role in the family, which came with defined expectations. Deviations from these norms were penalised and individual arrangements had to conform with family norms (Schneider 2015).

Individualization theory postulates that individual choices and decision possibilities are growing (Beck 1994). Since the 1970s, the institutional character of the nuclear family has begun to fade, and the term "family" can be more easily shaped individually (Schneider 2015). Women's position in society has also changed: Education levels and employment rates have increased, and emancipation from traditional bonds such as gender roles and family norms (Burkart 1993) has lead to a new female perception (Schneider 2015). Traditional norms are eroding and non-binding arrangements are on the rise. Marriage and parenthood are more and more considered optional instead of obligatory. Fertility has become a rational, voluntary decision as opposed to a necessity (Schneider 2015). In particular, since the introduction of modern contraceptives and safe abortion methods in the second half of the 20th century, fertility can be deliberately controlled to a certain degree, resulting in a decrease in the percentage of unintended pregnancies (Burkart 1993). Moreover, the number of children born out of wedlock is increasing (Schneider 2015). Both fertility and marriage rates have decreased in all European countries (ibid.).

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[4] The third paper was published in the Journal Comparative Population Studies 46, 2021. doi:10.12765/CPoS-2021-04

While German women born in 1935 had 2.2 children on average, women born in 1965 had only 1.6 (Federal Statistical Office of Germany 2019b). Moreover, women's age at first birth and the percentage of childless women have also risen in Germany: In 2017, women's average age at first birth was 30. About 21% of women born in 1967 never had a child, compared to 11% of women born in 1937 (ibid.). While 689,028 couples married in 1960, only 407,466 couples married in 2017 (Federal Statistical Office of Germany 2019a). Moreover, 153,501 of those couples got a divorce in 2017 (ibid.). Divorce rates have gone up considerably since the 1960s, stagnating around 2000 (Arránz Becker 2015).

These demographic changes can be explained via women's emancipation and general individualization trends. Due to the rise of education levels, especially for women, the costs of marriage and family have also increased, whereas the costs of divorce have gone down (Arránz Becker 2015, Diekmann 1994). Having children does not affect men's employment in general, whereas for women, they often reduce their working hours as a consequence of pregnancy/motherhood, followed by a post-motherhood wage decrease (Vogel 2009, Ziefle 2004). Starting a family thus entails certain disadvantages for women's economic independence. Individualization has also led to women's biographic autonomy (Burkart 1993). Women now are economically more independent and can provide for themselves. With rising female employment rates, a separation or divorce won't threaten women's economic and social existence as it would have in the beginning of the 20th century. Changing values and the decline in religious affiliation facilitates this development (Lois 2011, Van de Kaa 1987). A divorce is no longer stigmatized and divorcees no longer socially punished. Although children are still a barrier for divorce (Brüderl & Kalter 2001), couples tend to have less children due to a decrease in fertility rates. Individualization has not only lead to less standardized lifestyles and career paths, but also to a plurality of family constellations. Higher divorce rates, same-sex parents, and re-marriages manifest in a variety of family forms. Single parents and the number of stepchildren or adopted children in the family are also rising as a consequence of these developments (Burkart 1993, Schneider 2015). Who belongs to the family and how the family is shaped is no longer dictated by norms and laws, but by individual decisions. If a partner's interests change, a family can be weakened, broken or redefined (Cheal 1993). This individuality and instability symbolizes the postmodern family (ibid.). As the nuclear family becomes more instable, union dissolution and factors that affect partnership stability become of greater importance for family research.

The function of families has also changed over the past 50 years. Whereas families were previously the means for societal reproduction, the function of the family is now on supporting

and providing security for each of the family members (Schneider 2015). Burkart postulates that the more individualized a person is, the more he or she is able to love. Individualization represents one reason why love in relationships became more important (Burkart 2018). Up until the mid-20th century, marriages were shaped by economic necessities. However, following the demographic changes described above, in particular for women, relationship quality has becomes the focal point of marriage (Dette-Hagenmeyer & Reichle 2015). There is no longer an imminent economic need for women to have a male spouse. Therefore, partnership satisfaction and quality have become more relevant for social research.

This dissertation not only considers marriages, but all heterosexual partnerships. A marriage in different cultural contexts is linked to different conditions. As the social life of humans was never fully adapted to societal and legal rules, marriage-like partnerships have always existed beyond the norm (Hill & Kopp 2004, Schneider et al. 1998). Over the course of women's emancipation and individualization, marriage-like partnerships have become more and more prominent and are now also accepted as alternatives to marriages and protected by law in some countries (Arránz Becker 2008). Only focusing on marriages would neglect a considerable part of intimate partnerships present in society. Therefore, both legal marriages and non-married partnerships are considered in the following.

1.2.2 Partnership formation and partnership quality

Individualization and the detachment from social norms has ostensibly lead to more available options on the partner market (Burkart 2018). People are no longer bound to marry individuals from specific milieus, social backgrounds, or partners who are chosen or approved by their parents. The formation of a partnership now depends on individual preferences and partner market opportunities (Klein & Stauder 2016). Individuals have preferences regarding age, education levels, or character traits, etc. of their prospective partner. However, the partner market limits opportunities to find the optimal partner, as it is based on each individual's context (Klein & Stauder 2016). The search for a partner is therefore subject to market mechanisms of supply and demand (e.g., after World War II the shortage of men limited women's partner choices in many countries). Economic and social aspects involved in partner choice have become less important, while love and affection have gained importance. On the other hand, parents still influence their children's partner decisions - not in obvious ways, but also through socialization processes (Burkart 2018). Furthermore, homogamy has been on the rise. People tend to search for available partners with similar religious affiliations, educational status, physical traits, and values (Burkart 2018).

The partner market not only influences the prospect of finding a suitable partner, but also partner stability, partnership characteristics (e.g., housework distribution), and fertility (Klein & Stauder 2016). High partner search costs decrease the likelihood of finding an optimal partner and increase the likelihood of separation (Becker et al. 1977). Union dissolution is also influenced by the available alternatives on the partner market (Häring 2014, Klein & Stauder 2016). If one partner has high chances of finding a new or better partner, he or she is more likely to end the current relationship in favor of finding another partner. Union dissolution, in turn, influences fertility. More instable partnerships are less likely to have children, whereas the foundation of a step-family might foster having a common child (Klein & Stauder 2016). Moreover, the partner market can affect housework distribution between cohabiting partners. Housework distribution reflects the power distribution between partners (Nauck 1989). As typically neither partner would choose to do (more) housework (Coltrane 2000), the partner with more resources (e.g., income, occupational prestige) can negotiate to do less housework (Shelton & John 1996). If a partner has good prospects on the partner market, his or her bargaining power rises, and that partner is therefore likely to do less housework (Klein & Stauder 1999, Nauck 1989).

In the transformation process of a platonic relationship into an intimate partnership, the perception of differences between partners decline and feelings of intimacy and commitment intensify. Partner relationships are marked by frequent and strong cognitive and affective reciprocal dependencies (Dette-Hagenmeyer & Reichle 2015). When entering into a partnership, each partner must give up some of their individuality and autonomy in order to define themselves as part of the partnership (Burkart 2018). It is still common to refer to someone in an intimate partnership as "wife", "husband" or "partner"; however, in modern partnerships, each partner's individuality seems to be more intact (ibid.). Women's biographies are no longer subordinated to the partner biography (Burkart 1993) -- they can be economically independent and keep their autonomy. The new partnership ideal is an equal partner relationship not bound to social restrictions or roles (Burkart 2018).

According to Norbert Schneider, a partnership is characterized by four criteria: exclusiveness, solidarity, stability, and cohabitation (Schneider 2009: 677f.). Some of these criteria have lost significance over the last decades. Although polygamous relationships are now more accepted compared to the 1960s, most partnerships are still monogamous (Burkart 2018). The stability aspect is threatened by increasing divorce rates. However, relationships are typically formed on a lasting basis, as it would be almost counterproductive to include a time limit. Cohabitation is common in long-term relationships, but it is no longer a prerequisite.

Numerous "living-apart-together" partnerships can also be described as stable by the same measures (ibid.). Modern partnerships claim trust, thoughtfulness, communication and equality as their basis (ibid.). If partnerships are based on emotional aspects instead of economic necessities, separations become more likely (Burkart 2018). The trend of self-fulfillment enhances the demands individuals have of their partner: They want to be loved and understood, expect honesty and openness from their partner. The higher the demands, the more difficult they are to fulfill, and the more likely partners are to be disappointed (ibid.).

There is no uniform definition of partnership quality. High relationship quality is normally agreed to represent a high degree of love, respect, intimacy, and fidelity (Dette-Hagenmeyer & Reichle 2015). A subjective measure of relationship satisfaction and an objective measure of relationship duration are often used to measure relationship quality (ibid.). Therefore, I will also focus on these two aspects of relationship quality in this dissertation. Relationship satisfaction and union dissolution can be influenced both by external factors and events as well as by individual and partnership characteristics (Dette-Hagenmeyer & Reichle 2015). According to rational choice theory and the mismatch model, separations occur if one partner can no longer satisfy the demands of his/her partner (Becker et al. 1977, Burkart 2018). If the costs outweigh the benefits of a relationship, or if the partnership utility is lower than an alternative utility (i.e., utility from being single or with a different partner), a separation is very likely. Investments in a relationship (e.g., home-ownership, children) increase both partnership benefits and the costs of separation (Brüderl & Kalter 2001). However, union dissolution is generally a process, not a decision made in one specific moment. If the benefits of the partnership decrease, love, affection and closeness will also decrease while conflicts increase (Burkart 2018), followed by union dissolution. Mutual partner support is important, and constructive communication can help to ease conflicts and raise partnership satisfaction (Carroll et al. 2013, Lawrence et al. 2008).

Non-married partnerships, partnerships without children and home ownership, bi-national partnerships, and dual-career couples have a higher likelihood of separation (Burkart 2018, Diewald et al. 2013, Hartmann 2003, Peukert 2012). On the other hand, men's unemployment can increase the risk for separation (Franzese & Rapp 2013). Furthermore, couples with educational heterogamy, a low level of education, and a large age difference have a higher likelihood for separation (Burkart 2018, Jalovaara 2013, Rapp 2013). Religious individuals and couples residing in small towns are less likely to separate (Burkart 2018). The duration of cohabitation and the duration of the relationship reduces the risk of divorce as well (Brüderl & Kalter 2001). Moreover, parent's divorce or early marriage have been shown to

influence both relationship satisfaction and union dissolution (Dette-Hagenmeyer & Reichle 2015, Diefenbach 1999, Peuckert 2012). Furthermore, partnership interaction, stress management, and the distribution of power and housework may also affect relationship satisfaction, and thus also union dissolution (Dette-Hagenmeyer & Reichle 2015). In the following section, I will elaborate on changes in a couple's housework distribution and its interplay with individualization and relationship quality.

1.2.3 Housework distribution

Traditionally, male partners play the role of the breadwinner and female partners care for the couple's children and the household (Dette-Hagenmeyer & Reichle 2015). Over the last century, however, women's hours spent doing housework decreased significantly due to technological innovations and an increase in female labor market participation (Shelton & John 1996). Women now have less time for housework due to an increase in working hours. On the other hand, innovations such as the washing machine have made housework easier and less time consuming. While women's share of household labor has decreased, the involvement of their male counterparts has increased (Shelton & John 1996). The distribution of household chores therefore reflects the trends of individualization and women's emancipation over the last century, as women are no longer solely confined to the role of the housewife and men to the role of the breadwinner with more flexible living and household arrangements. However, on average, women still shoulder the majority of the household workload, especially if the couple has children (Dechant et al. 2014). Childless partnerships tend to report more egalitarian housework arrangements. However, once the first child is born, women tend to reduce their working hours and increase their time spent in unpaid labor (i.e., housework and child care) (ibid.). The allocation of household tasks is still gendered as well. While men do most of the infrequent tasks including repairs and gardening, women are mostly responsible for routine housework such as cleaning and child care (Dechant et al. 2014).

There are three prominent explanations for the housework distribution within a couple: relative resources, time constraints, and the social construct of gender. According to the relative resources theory, housework distribution reflects men's and women's resources (Shelton & John 1996). The partner with more resources, including education, income, and prestige on the labor market, has more power which he or she can use to negotiate less appealing household tasks (ibid.). The partner with less resources should then mainly be responsible for housework. The time constraints explanation postulates that the partner who spends less time in paid labor, has more time to devote himself/herself to housework (Shelton & John 1996). The social

construct of gender is one possible explanation as to why women still do the majority of housework, even if they earn more money or work more hours in paid labor than their male partner. This approach understands housework as a way through which men and women can display or reproduce their gender (Brines 1994, Shelton & John 1996). Men who earn less money than their female partners seem to compensate for this counter-traditional arrangement by displaying an overly traditional housework distribution, thereby underlining their gender (Brines 1994). Therefore, couples with a traditional gender ideology divide housework along traditional gender lines (Dechant et al. 2014). Education is a resource and an indicator for egalitarian values (ibid.). The highly-educated are more likely to have an egalitarian perspective on the distribution of household labor. "Better educated women hold more egalitarian sex role attitudes and thus do less housework, while better educated men do more" (Shelton & John 1996: 305).

Most researchers have confirmed the relative resources hypothesis. "The smaller the gap between husbands' and wives' earnings the more equal the division of household labor" (Shelton & John 1996: 304). However, if women earn more money than men, men don't necessarily do more housework (Shelton & John 1996). Moreover, most studies find no association between women's housework participation and their occupational status (ibid.). Research has found that time spent on housework decreases for women and increases for men with an increase in women's hours of paid labor (Shelton & John 1996, Dechant et al. 2014). However, independent of their working hours, women still do the majority of housework (Shelton & John 1993). Although the number of women's paid working hours has increased over the last century, they still work less hours and earn less money than their male counterparts, especially if the couple has children (Müller 2008, Gartner & Hinz 2009). Therefore, on average female partners have less financial resources and more free time that could be spent on housework. This might explain why women still spend more time doing household chores than do men. Both the relative resources theory and time constraints can partly explain why women still do more housework than men.

However, these explanations have two flaws: First, reverse causality might also explain the association between women's income and their housework hours. Kühhirt and Ludwig (2012) found evidence that suggesting that part of the wage gap between genders is explained by women's higher commitment to housework, which might negatively influence their time and energy available for paid labor. Second, time constraints and relative resources cannot explain why men who earn less money or work less hours in paid labor than their female partners don't do the majority of the housework. Research finds that men with egalitarian

gender role attitudes participate more in the household (Shelton & John 1996, Dechant et al. 2014), and some researchers find a negative association between women's egalitarian views and their share in housework (Brayfield 1992, Presser 1994). Others, however, find no association between the two (Shelton & John 1996). Men's educational level is generally positively associated with their share in housework (Dechant et al. 2014), which is inconsistent with the relative resources theory, but supports the ideology hypothesis. Further, women's educational status is negatively associated with their housework share (Shelton & John 1996), which is in line with the relative resources theory and the gender ideology explanation. Therefore, the relative resources and time constraints perspectives as well as the gender ideology perspective seem to be (partly) supported by previous research.

The relationship of housework distribution to relationship quality will be addressed in the following. Labor distribution is a central dimension for the measurement of changes in the family. How couples share the household duties influences their living situation and the balance of power (Schneider 2015). Since the beginning of family sociology, the belief that many partnership interactions are subject to power relations has remained prominent (Rüssmann et al. 2015). Each individual has resources (e.g., income, affection) at their disposal that can be traded for other resources, for example housework or affection from a partner (Rüssmann et al. 2015). Therefore, if one partner participates more in household tasks, the other might be happier in the relationship and respond with affection. A traditional housework distribution does not necessarily go hand in hand with lower relationship satisfaction (Dette-Hagenmeyer & Reichle 2015). The main burden of taking care of children remains the responsibility of the female partner, independent of her employment status (Schneider 2015). If mothers are employed full-time, they are then faced with a double burden which can lead to lower relationship satisfaction (Dette-Hagenmeyer & Reichle 2015). Husbands' participation in household tasks leads to improvements of wives' marital happiness (Amato et al. 2003). Moreover, couples with traditional housework distribution and older children who no longer require intense supervision have a higher risk of union dissolution than childless couples with an egalitarian housework distribution (Stauder 2002). A traditional housework distribution seems to destabilize partnerships, especially once children have left the household. Dual-career couples seem to have a higher risk for separation if the housework is divided traditionally (Stauder 2002). However, not much evidence (in particular from longitudinal studies) on how housework distribution influences couple's sexual satisfaction and sexual frequency has been presented as of yet. This will be the focus of Chapter two, the first published paper of this dissertation.

1.2.4 Sexual intercourse

Sexual intercourse is often seen as a biological fact and rarely defined as a social phenomenon or a form of interaction (Burkart 2018). This is questionable, as sexual intercourse has gained significance for individual identity in modern society (Lautmann 2002). The postmodern family is no longer a means for reproduction but for self-fulfillment, and a crucial aspect of self-fulfillment is sexual intercourse (Lautmann 2002, Shorter 1989). Sex can be seen as a communicative process or a form of intimate interaction between people (Lautmann 2002). In this setting, sexual actions are social actions. As any other human interaction, sexuality is subject to cultural rules and norms (ibid.). Sexuality is in fact one of the most regulated fields of society (Burkart 2018); for example, it cannot be practiced everywhere and deviations from the norm are often penalized. Sexual scripts define with whom, how, and when we are allowed to have sex, and are passed on through socialization (Simon & Gagnon 1986). Social norms concerning sexuality vary between societies and across time periods (Anurin 2002). Through socialization and individual learning experiences, we each form individualized, interpersonal, and intrapsychic sexual scripts (McCormick 2010). Over the life course, individual experiences and cultural influences can shape these scripts. One's sexual biography is an integral component of an individual's sexual identity – and is subject to a lifelong learning process (Schmidt 2003).

Before the 1960s, sex was depreciated and excluded from the public sphere (Burkart 2018). Sexual topics were confined to the private sphere and taboo in public. Sexual intercourse was bound to marriage, especially for women (Burkart 2018). Even over a century ago, it was common for men to lose their virginity to a women of lower social milieu who was not eligible for marriage, and affairs were not regarded as shameful for men (Anurin 2002). However, women were expected to have no sexual encounters outside of marriage (Schmidt 2000). In the 1920s, sexual liberalization tendencies started to emerge (Feldmann 2006). However, progress was delayed by World War II. In the 1950s, public debates about sexual intercourse sprouted, and then culminated in the 1960s sexual revolution (Feldmann 2006). This revolution did not bring a radical change, but was rather the peak of a long process (Eder 2010). Deviations from sexual norms of course existed before this time. Alfred Charles Kinsey and Helmut Schelsky studied frequencies of sexual intercourse and masturbation, and were the first researchers to prove the existences of deviations from societal norms as early as the 1950s (Kinsey et al. 1948, Schelsky 1955). However, these results were rarely spoken about in public, due to the persisting taboo of the subject itself.

The diminished importance of the male breadwinner role and women's economic independence lead to cultural changes in the family (Anurin 2002). Secularization forced back religious morality in the regulation of sexual intercourse, and the widespread availability of effective contraceptives made it possible to separate sexuality from fertility (Giddens 1992, Anurin 2002). Sexual intercourse is no longer bound to gender roles or marriage, and as the taboo around speaking about sexuality began to break down, sexuality has been uncoupled from love, heterosexuality, and monogamy. Homosexuality and same-sex marriage has since been legalized, multiple sex education movies and reports have been published, and the repression of sexual intercourse has been alleviated in Western society (Burkart 2018). In the 1980s, an increasing number of TV shows talked about sexual practices, and in the 1990s, sex therapy began to circulate as sex was commercialized. Today, the consensus rule is commonly practiced (Schmidt 2000, Matthiesen 2007): Everything is possible in sexual intercourse, even violence, as long as it is consented to by all partners. Possibilities have thus increased, leaving space for sex to be individualized. Sex has also become part of exchange and bargaining theory, equal to all other parts of a relationship (Burkart 2018) for which individuals can negotiate the terms. However, some double standards continue to exist. For example, sexual affairs of women are socially more condemned than of men (Anurin 2002).

Gunter Schmidt (2000) compared sexual frequency of students in 1966, 1981, and 1996. While only 10% of 18 year-old female students reported having already lost their virginity in 1966, 60% of 18 year-old female students reported having had sex in 1981 and 1996 (Schmidt 2000). In 1966, men lost their virginity at an earlier age than did women. In 1996, however, the opposite was true: women lost their virginity at a younger age compared to men (ibid.). This is a sign of emancipation of women and a change to cultural norms. In 1996, the monthly frequency of sexual intercourse was lower, and the frequency of masturbation higher than in 1981 (Schmidt 2000). Students were also asked about their reasons for having sexual relations. In 1966, most men and women had pre-marital sex with their later husband/wife, and sex was mostly associated with love, also for men (ibid.). While sex drive has lost significance over the last few decades, in 1981 *emancipation* and *tenderness*, and in 1996 *having fun* ranked amongst the most mentioned reasons for having sexual intercourse (ibid.). However, satisfying sexual encounters are mostly associated with coitus in a stable intimate partnership in 1966, as well as in 1996 (ibid.). In 2012, 90% of sexual encounters happened in a stable partnership (Böhm et al. 2016). Sexual relations also entail some level of commitment, closeness, and trust (Burkart 2018). A study of East and West German relationships and sexuality from 2002 found that in older cohorts, men had more affairs. In younger cohorts, however, the authors did not find any

differences in infidelity between men and women (Schmidt et al. 2006). Therefore, convergence tendencies concerning infidelity for men and women are visible. While a variety of cross-sectional data concerning coital frequency and sexual satisfaction exist, longitudinal data and analyses concerning this topic is still rare.

1.2.5 Abortions

One achievement of the sexual revolution was the introduction of safe abortion laws. Women not only fought for their right to sexual independence, but also for reproductive autonomy (Busch 2015). Individualization and women's emancipation lead to the liberation of normative restrictions of sexual habits and fertility. Having children still ranks high amongst the most important life goals of many people, but it is not an imperative as 50 years ago (Peuckert 2012). It has since become a decision, one of many alternatives, that is dependent on individual and partnership characteristics, as well as circumstances (Huinink 2016). Children contribute to individuals' well-being: parents can receive recognition from their social environment and children can give life-long happiness and support in their parent's old age (ibid.). However, children also affect every other area of parent's life (e.g., partnership, work, free time), and not everyone wants to dismiss these areas. Therefore, children can also pose high opportunity costs, especially for women (Huninink 2016). For example, while most men's career potential is not affected by having children, women tend to reduce their working hours after becoming mothers (Gartner & Hinz 2009). Therefore, having children is a complex decision process for many individuals and couples.

The motivation to become a parent can also change over the life course. Previous experiences, circumstances, and available resources are all influential factors of attitudes towards having children (Hunink 2016). External factors in the decision process can include family policies, living conditions, and the partner's attitudes. Internal factors on the other hand include partnership satisfaction, age, religiosity, and personal attitudes (Huinink 2016). Young single women still in school are generally less inclined to have children than women with a stable professional status and partnership. Contraceptive methods make it possible to prevent unwanted pregnancies and plan the timing of parenthood – to a certain degree. However, contraceptives are not 100% effective, particularly when not used correctly (Bajos et al. 2003). Roughly 6% of respondents to the *pairfam* survey who state that they do not plan to have a child in the next two years in fact do become parents during the following two years (Huinink 2016). Unplanned pregnancies seem to be responsible for almost one third of all births in

Germany (ibid.). Alternatively, if faced with an unplanned pregnancy, individuals can decide to have an abortion.

In ancient times abortions, were widely accepted. The fetus was seen as part of the mother's intestines and men had the right of deposition over women's body, health and reproduction (Ranke-Heinemann 2008: 99ff). With the dissemination of Christianity, the right of deposition was reattributed to God and the Christian church (Jerouschek 1993). Christianity condemned abortions - not as protection of the fetus for ethical reasons, but because God as the creator should be the only one to control reproduction (Busch 2015). Initially, the church differentiated between fetus inanimatus and fetus animates (ibid.). Abortions in the first half of the pregnancy were minor offenses; however, in 1869 Pius IX declared abortions, independent of the gestational stage, to be an act of murder (Ranke-Heinemann 2008). In the first half of the 20th century, demands of sexual and reproductive autonomy became loud enough to affect the acceptance of abortions for medical reasons in Germany in 1927. However, progressive voices were silenced during World War II (Busch 2015). Women were needed to secure the survival of the German race and were reduced to their role as housewives and mothers. Abortions were then restricted, and from 1943 onwards illegal (Busch 2015).

After World War II, the new feminist movement with the idols of Simone de Beauvoir and Sulamith Firestone started to demand autonomy of reproductive decisions and self-determination of the female body (Busch 2015). As of 1950, abortions were not persecuted in the GDR if they occurred due to medical indications (i.e., if carrying the fetus to term would endanger the child's or the mother's health). In the second half of the 1960s, social indications (e.g., psychological and physical overburden) for abortions in the first 12 weeks of gestation were made legal as well (Busch 2015). In 1976, a law passed in the Federal Republic of Germany upholding that abortions were still illegal, but some exceptions were introduced: medical reasons (threat of the mother's life), criminological reasons (e.g., rape), severe impairment of the fetus and social indications (i.e., psychological threat to the mother). After German reunification these laws were merged after a long debate headed by feminists and traditional clerical voices (Hahn 2015). Today, having an abortion is still illegal in Germany but no legal recourse is taken in the first 12 weeks of gestation if a medical, criminological, or social indication is given (Helfferich 2015). Furthermore, women must undergo obligatory consultation with the goal of stressing the importance of the unborn life before they can have an abortion (Berghahn 2015). Abortions after 12 weeks of gestation are only possible for medical reasons. As abortions are per se illegal, they are not covered by medical insurance and women must pay the costs of the procedure themselves (Berghahn 2015).

In Europe, the liberalization of abortions has been relatively progressive. In other parts of the world, abortion is still persecuted and about 22 million abortions take place every year under unsafe conditions. Every year, roughly 47,000 women die and 5 million women have complications as a consequence of unsafe abortions (WHO 2012). Recently traditional tendencies have again surfaced to challenge the accomplishments of reproductive autonomy in Germany, and the social stigma surrounding abortion is still present (Busch 2015). Women worry about social judgment, isolation, and community condemnation when undergoing an abortion (Cockrill et al. 2013). Moreover, individuals who work in abortion provision and supporters of women who have had abortions are faced with social stigmas (Norris et al. 2011). Therefore, it is understandable that many women keep their abortion a secret and that it is not easy to get reliable data on the circumstances of abortion (Norris et al. 2011). The German Family Panel (*pairfam*) is one of a few longitudinal studies that make it possible to analyse sexual intercourse and having abortions in the context of family dynamics. Using *pairfam* data, the second paper of the dissertation (see Chapter 3) will investigate the interplay of having abortions and depression. Chapter 4, the third paper of this dissertation, will focus on the association between having abortions, union dissolution, and relationship satisfaction.

1.3 Methodological approach

1.3.1 The German Family Panel pairfam

The German Family Panel *pairfam* is a nationwide, multidisciplinary, longitudinal study that focuses on partnership and family dynamics in Germany (http://www.pairfam.de).[5] Over 12,000 men and women (so-called "anchor" respondents) from the birth cohorts 1991-93, 1981-83 and 1971-73 were randomly selected from all persons living in private households in Germany in 2008. A two-stage sampling procedure was applied: First, municipalities of the Federal Republic of Germany were drawn by stratified random sampling to define 350 sample points distributed over 343 different municipalities. Second, persons of the target population whose main residence was located within the sample points were selected using local population registers. A more in-depth description of the study can be found in Huinink et al. (2011).

The *anchor* respondents have been surveyed annually since 2008, at which point the first cohort was about 15-17, the second 25-27, and the third 35-37 years old. The sample is

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[5] *pairfam* is funded as a long-term project by the German Research Foundation (DFG).

therefore currently ideal for analysing respondents in their most sexually active and fertile phase at various life stages. In addition to the panel approach, *pairfam* implements a multi-actor design, meaning the *anchor's* partners, parents, and children (so called "alteri" respondents) are interviewed as well, if the *anchor* respondent consents. Yearly repeated interviews of the *anchor* respondents and their *alteri* offer unique opportunities for the analysis of the development of partner relationships and their interconnectedness with intimate decisions.

Currently, ten waves of panel data are available for analysis. Field work for the tenth wave began in October 2017 and lasted till April 2018. The total response rate in the first wave was 36%, with panel attrition at 22% in the second wave and roughly 10% in the following waves. Nonresponse patterns are similar to other panel studies, and bias due to selective attrition does not seem to be a particularly concerning issue for *pairfam* (Müller & Castiglioni 2015). Most questions for the *anchor* survey are asked with a computer-assisted personal interview (CAPI), and a self-administered module (CASI) is included for more sensitive questions such as those related to sexuality and fertility. The partnership module encompasses questions regarding partnership development, sexual satisfaction and frequency, and partnership quality and stability. Partners receive a shortened, PAPI version of the *anchor* questionnaire, which is mailed in a return envelope or collected by the interviewer at the time of the *anchor* interview.

Table 1. *Number of pairfam anchor and partner respondents (including DemoDiff) per wave*

Wave (year)	Anchor respondents	Anchor respondents in a relationship	Partners that participate in the survey
1 (2008/2009)	12,402	7,234	3,743
2 (2009/2010)	10,558	6,554	3,372
3 (2010/2011)	9,074	5,807	2,939
4 (2011/2012)	8,073	5,407	2,731
5 (2012/2013)	7,248	5,047	2,529
6 (2013/2014)	6,574	4,641	2,357
7 (2014/2015)	5,919	4,267	2,170
8 (2015/2016)	5,461	4,006	2,051
9 (2016/2017)	5,127	3,811	1,946
10 (2017/2018)	4,750	3,587	1,799

Notes: *DemoDiff wave 1 respondents were combined with parifam wave 2, as they were interviewed in 2009/2010 for the first time.*
Source: *pairfam, Release 10.0 (Brüderl et al., 2019)*

DemoDiff is a complementary study of East German respondents from the birth cohorts 1971-73 and 1981-1983 using a largely identical set of instruments to *pairfam*. The first *DemoDiff* survey wave took place one year after the beginning of *pairfam*; therefore, one less wave exists for *DemoDiff* respondents. From wave 5 on, *DemoDiff* was fully integrated into the

pairfam main sample. Table 1 displays the number of *anchor* and partner respondents per wave including the *DemoDiff* subsample. About 50% of partners filled out the partner questionnaire. In the first wave, 7,234 of the 12,402 *anchor* respondents were currently in a relationship and 3,743 of these partners participated in the partner survey. In the tenth wave, 3,587 of 4,750 *anchor* respondents were in a relationship and 1,799 of their partners filled out the partner questionnaire. *pairfam* provides rich data from thousands of couples from both partners' perspectives over ten waves and is well-suited for the analysis of sexual frequency/ sexual satisfaction and experiencing an abortion. However, although the data are a solid base for analysis, appropriate analysis strategies are necessary to ensure reliable results.

1.3.2 Fixed effects panel regressions

One straightforward way to examine consequences of changes in everyday life is to compare relevant information before and after an event/change occurs. This is only possible with repeated observations, which calls for panel data. Estimation results will be biased if pre-existing characteristics that influence the independent and dependent variable are not controlled for. Research using pooled OLS and random effects panel regressions aim to control for confounding factors, but it is likely that some factors could have been missed or that they are unobserved in the data (e.g., personality traits). Fixed effects panel regression models, on the other hand, control for all time-constant observed and unobserved characteristics of individuals and partnerships that might bias results. In the error-component model

$$\gamma_{it} = x_{it}\beta + v_i + \varepsilon_{it} \qquad\qquad (a)$$

γ_{it} denotes the dependent variable i = entity and t = time; x_{it} is the independent variable and β the coefficient for the independent variable. The error term is split into two components: v_i is the entity-specific error (stable person-specific characteristics often unobserved by researchers, e.g. personality traits) and ε_{it} is the idiosyncratic error that varies across respondents over time. The two error terms can only be identified using panel data, as person-specific characteristics can only be inferred from repeated observations (Brüderl & Ludwig 2015). The error component model is averaged over time for each entity i:

$$\bar{\gamma}_i = \bar{x}_i\beta + v_i + \bar{\varepsilon}_i \quad \text{(between transformation)} \qquad\qquad (b)$$

Subtracting equation (b) from equation (a) results in the elimination of the person-specific error term v_i.

$$\gamma_{it} - \bar{\gamma}_i = (x_{it} - \bar{x}_i)\beta + \varepsilon_{it} - \bar{\varepsilon}_i \quad \text{(within transformation)} \qquad (c)$$

Random effects regressions use both within and between comparisons for estimation. However, between variation can be biased by the person-specific error term v_i. POLS and random effects models require exogeneity from time-constant individual characteristics. In the case of self-selection into treatment (e.g., more depressed individuals being more likely to have an abortion), the assumption is violated and estimates (e.g., mental health consequences of having abortions) are biased (Brüderl & Ludwig 2015). A fixed-effects estimator discards between variation and infers the causal effect from the within variation only, presenting the dependent variable y and the independent variable x in the form of their deviations from the entity-specific mean. Therefore, the statistical model allows within comparisons to be made (e.g., comparing the same person's depression levels before and after experiencing an abortion) instead of between comparisons (e.g., comparing individuals who experienced an abortion with individuals who didn't). Fixed-effects models therefore allow a causal effect to be identified under weaker assumptions (Brüderl & Ludwig 2015). However, fixed effects regressions are not applicable to all research questions and do not completely solve the issue of self-selection due to unmeasured time-variant variables (i.e., idiosyncratic error term ε_{it}). For more details on fixed effects estimation, see Brüderl and Ludwig (2015) and Woolridge (2010). By using *pairfam* data and (when possible) fixed effects regression models, I seek to analyse sexual intercourse and experiencing an abortion while controlling for all time-constant variables.

1.4 Summary of results

Chapter 2 analyses whether a couple's housework distribution strategy and the perceived fairness thereof affect the couple's sexual frequency and sexual satisfaction. Past research in this field has relied on between comparisons and found conflicting results. By using data from 1,315 couples and pooled OLS, random, as well as fixed effects estimations, I compare different analysis methods and examine how changes in the distribution of housework and the perception of fairness affect sexual intercourse over time. I distinguish between "traditionally female" and "traditionally male" household tasks. Neither appear to affect sexual satisfaction nor sexual frequency. Changes in a couple's household distribution and its perceived fairness also do not influence the frequency of sexual intercourse. However, couples that perceive the household labor distribution to be fair differ from couples that do not on unobserved variables, which also affect their sexual habits. Future studies could aim to investigate which unobserved factors are responsible for the differences between couples that perceive their household distribution to be fair and couples who don't.

Chapter 3 researches the relationship between experiencing an abortion and depression in men and women. Men's mental health in relation to abortions is often neglected and longitudinal studies including these data are rare. Using pooled OLS, random, and fixed effects regression models, I analyse whether depression levels affect the likelihood of experiencing an abortion and whether depression levels change after the fact. The results show that women with higher depression levels are more likely to have an abortion. Furthermore, women show slightly higher levels of depression one wave after having an abortion as compared to their personal average pre-abortion. However, the increase in symptoms of depression does not persist over the second and third wave after reporting an abortion. For men, no significant relationship between depression levels and experiencing an abortion is visible. As *pairfam*'s waves are roughly one year apart and the exact time of the abortion is not known, short-term changes in depression levels after having an abortion might be more pronounced. Future research should use more precise measurements, if possible. Furthermore, the applied fixed effects models cannot compare changes in depression levels after experiencing an abortion to the alternatives of abortion, for example carrying an unwanted child to term. Previous research suggests that such repercussions might be more severe (Biggs et al. 2017).

Chapter 4 investigates the interplay of having an abortion, partnership satisfaction, and union dissolution. Few researchers have addressed this association to date, and there is a pronounced lack of longitudinal studies in this specific field of study. Using lagged logistic regressions, discrete time event-history models, as well as fixed effects regression models, I compare relationships before and after experiencing an abortion. The results can neither confirm that relationship satisfaction acts as a mediating factor between having an abortion and union dissolution, nor as a confounding factor that influences both the likelihood of terminating a pregnancy and union dissolution. No significant effect of relationship satisfaction on the likelihood of having an abortion was found. Moreover, no significant association between having an abortion and union dissolution post-abortion is visible. After having an abortion, relationship satisfaction decreases slightly, but only temporary. No lasting effect of having an abortion on relationships was detected.

Chapters 2 and 3 illustrate that both OLS and random effects models – in comparison to fixed effects models – overestimate the effect of experiencing an abortion and changes in housework distribution. This suggests that these models might be biased due to unobserved stable variables. Fixed effects models are thus better-suited to estimate actual changes within partnerships and depressiveness after having an abortion or changes in housework distribution. Depending on the model, only 85-398 persons/couples who experienced an abortion (with up

to 1,300 observations) were able to be included in the analysis. Future research could replicate these results with higher case numbers. Most past research on abortion had to rely on data from women recruited from abortion clinics. One particular advantage of the *pairfam* data is that questions concerning fertility and abortions are embedded in a randomly-sampled multi-topic survey, allowing for a comparison of partnerships and depressiveness up to several years before and after experiencing an abortion. By using *pairfam* data and fixed effects panel regressions, I can present new insights into the topics of housework distribution, couple's sexual intercourse, and experiencing abortions.

2

SEX AND HOUSEWORK: DOES PERCEIVED FAIRNESS OF THE DISTRIBUTION OF HOUSEWORK ACTUALLY MATTER?

2 SEX AND HOUSEWORK:
DOES PERCEIVED FAIRNESS OF THE DISTRIBUTION OF HOUSEWORK ACTUALLY MATTER?

Abstract: Recent findings suggest that couples who perceive their housework distribution to be fair have more frequent sexual encounters and are more satisfied with their sex life. However, past research has relied on between-person comparisons and might therefore be biased due to unobserved confounders. By applying fixed effects panel models, this study seeks to eliminate all time-constant, group-specific heterogeneity. Using data from 1,315 cohabiting and married couples from the German Family Panel (*pairfam*), I have examined how changes in the distribution of housework and the perception of fairness affect sexual satisfaction and sexual frequency. Moreover, I distinguish between core (traditionally female) and non-core (traditionally male) household tasks to verify the hypothesis that a gender-stereotypic distribution of household tasks fosters sexual activity. No effect of the division of labor or the perception of fairness thereof on sexual satisfaction and sexual frequency could be found.

2.1 Introduction

Housework is more often than not distributed traditionally between men and women in cohabiting relationships (Bianchi et al. 2012). Over the past few decades, men's share of housework has increased, but women still tend to carry most of the workload in the home (Bianchi et al. 2000, Bianchi et al. 2012, Blair & Lichter 1991, Klünder & Meier-Gräwe 2018). Moreover, studies show that partnership characteristics are influenced by the distribution of unpaid family work. For example, if the man's share of housework increases, the woman's partnership satisfaction seems to rise and conflicts occur less often (Amato et al. 2003, Coltrane 2000). The likelihood for second births is also higher if the father participates to a greater degree in housework and child care (Cooke 2004). Therefore, an equal distribution of housework could be beneficial to a partnership. On the other hand, some researchers suggest that it is actually the perceived fairness of the division of labor that influences partnership satisfaction, rather than the actual distribution of household tasks (Coltrane 2000). If individuals perceive their share of housework to be justified, they appear to be happier with their relationship (Coltrane 2000). However, relatively few studies to date have addressed how exactly housework distribution and the perceived fairness thereof influence a couple's sexual relationship.

Sexual frequency and satisfaction are both important factors in an intimate relationship. Sexuality has been found to be related to marital satisfaction (Smith et al. 2011) as well as union

stability (Yabiku & Gager 2009). Therefore, it is important to examine possible influences of housework on a couple's sex life. Since the Kinsey reports (Kinsey et al. 1948), the frequency of sexual intercourse and sexual satisfaction in relationships have received considerable attention in the social sciences. However, due to the lack of longitudinal data, the majority of studies has relied on cross-sectional analyses. Kornrich and colleagues (2013) examined married couples in the United States and found a positive correlation between a gender-stereotypic division of housework and sexual frequency. However, they analysed decades-old, cross-sectional data and did not take into account the perceived fairness of a couple's housework distribution.

Using data from the German Family Panel (*pairfam*), a randomly sampled panel survey with focus on partnership and family dynamics, I have examined how changes in the distribution of housework and the perception of fairness affect sexual frequency and sexual satisfaction for cohabiting and married couples from a longitudinal perspective. Johnson and colleagues (2016) also analysed *pairfam* data in this regard with autoregressive cross-lagged (ARCL) models. They found an association between men's perceived fairness of housework distribution and a couple's sex life, but no association to the actual distribution of housework. However, Johnson and colleagues did not distinguish between core (traditionally female) and non-core (traditionally male) tasks as suggested by Kornrich et al. (2013), and thus cannot fully refute the findings of Kornrich and colleagues (2013). By categorizing household tasks into traditionally male and female the following analyses aim to verify the hypothesis that a gender-stereotypic distribution of household tasks stimulates sexual scripts and leads to an increase in sexual intercourse. Further, both studies mentioned above may be biased due to unobserved heterogeneity, with one relying on between-person comparisons and the other not differentiating between and within variation. By applying fixed effects regression models, I can eliminate all couple-specific time-constant heterogeneity and examine whether a change in the division of household labor and/or the perception of fairness thereof actually influences sexual satisfaction and frequency in intimate relationships.

2.2 Theoretical framework

2.2.1 Actual distribution of housework

Most heterosexual cohabiting couples continue to maintain a traditional division of household tasks. While women tend to carry the majority of the total workload, they spend more time completing core household tasks (e.g., laundry, cooking, cleaning) whereas men

focus on more non-core household tasks such as gardening and repairs (Bianchi et al. 2000, Dechant et al. 2014). Kornrich et al. (2013) suggest that a gender-traditional division of labor stimulates a so-called sexual script which leads to an increased frequency of sexual intercourse. Sexual scripts are formed by culture to define with whom, how, and when individuals should have sex (Simon & Gagnon 1986, Dworkin & O'Sullivan 2007). Through socialization we internalize cultural scripts that define situations as sexual, and together with our own learning experiences, form individualized interpersonal and intrapsychic scripts (McCormick 2010). Teenagers learn traditional sexual scripts in which men initiate sexual encounters and women are mainly portrayed as sexual objects (Kim et al. 2007). Gender differences and gendered behaviors supposedly play a crucial role in heterosexual attraction, and Kornrich et al. (2013) argue that femininity and masculinity are linked to sexual behavior by way of such sexual scripts: The display of gender differences through traditional gender behavior, such as the distribution of housework, fuels internalized sexual scripts which creates sexual attraction and leads to sexual interactions (Kornrich et al. 2013). However, the distribution of housework is only one domain in which couples are able to display gender and consequently stimulate traditional sexual scripts.

One opposing argument is based on exchange theory, and does not distinguish between different types of housework. It assumes that neither men nor women enjoy doing housework, although housework traditionally falls into the domain of women (Coltrane 2000). On the other hand, men seem to have a higher desire for sexual intercourse, as they report more intense sexual desires, spontaneous thoughts about sex, and sexual fantasies than do women (Baumeister et al. 2001). Therefore, within this perspective, sex is seen as a female resource which can be exchanged for other goods, including housework (Baumeister & Vohs 2004), which could lead to a positive correlation between men's share of housework and a couple's sexual frequency.

However, it is debatable whether women see sexual interaction as a way to trade for other goods, implying that there might be another explanation for a positive association between men's participation in housework and a couple's sexual frequency. For example, Amato and colleagues (2003) show that husbands' participation in household tasks is linked to wives' marital happiness. Marital happiness has been shown to be associated with both sexual frequency and sexual satisfaction (Smith et al. 2011). Women that are satisfied with their partnership might therefore engage in more frequent sexual encounters. The more the male partner participates in household tasks, the happier the female counterpart could become with the relationship, and the higher the sexual frequency and satisfaction might be.

2.2.2 Perceived fairness of housework distribution

Most women perform more household tasks than their partners, but only 20 - 30% of women perceive the existing distribution of housework to be unfair (Mikula 1998). A couple with a traditional gender ideology might not perceive an unequal distribution of housework to be unfair. Moreover, a woman that does most of the housework might perceive her share of housework to be fair if her partner works more hours in paid labor and has a higher salary. The distributive justice framework proposed by Thompson (1991) attempts to explain women's sense of fairness in the distribution of household work by taking the outcome value, comparison referents, and justifications for their behavior into account. For example, a woman might perceive the division of household tasks as fair if she enjoys doing the housework herself, if she compares herself to other women that carry most of the household workload, and/or if she can justify her participation in the housework in another way (Nameda 2013: 34). Perceived inequity is associated with depression and distress (Keith & Schafer 1987), which might be reflected in relationship satisfaction. Therefore, researchers argue that the perception of the fairness of housework division is more influential to relationship satisfaction than the actual distribution (Coltrane 2000). If couples perceive their distribution of housework to be fair, they are happier with their relationship (Frisco & Williams 2003) and thus also with their sex life (Smith et al. 2011). The perception of fairness may indeed be more influential to a couple's sexual satisfaction and frequency than the actual distribution of housework. Based on these considerations, the following analyses will examine both the actual distribution of housework tasks as well as the perception thereof.

2.3 Previous research

Few previous studies have examined the relationship between the division of household tasks and a couple's sexual intercourse, some of which reporting results from small, nonrandom samples. Chethik, for example, studied 300 couples in marital therapy and found that if the male partner participates in household tasks, he is more satisfied with his sex life (Chethik 2006, cf. North 2007). Schwartz (1995), however, suggests that more egalitarian couples have less satisfying sex lives. Two studies analysed data from the National Survey of Families and Households (NSFH): Gager and Yakibu (2010) found that the frequency of sexual intercourse increases with more time spent doing housework for both men and women, although they do not consider the proportion of housework men and women engage in. Kornrich et al. (2013) use the NSFH from 1992 and 1994 to distinguish between non-core (e.g., repairs on the car or

in the house) and core housework (e.g., cleaning, laundry). They found that a traditional, gender-based division of household labor goes hand in hand with a higher frequency of sexual intercourse among married couples. However, focusing on married couples only is incomplete, as premarital sex is an ever-increasing phenomenon (Cohen & Manning 2010, Lichter et al. 2010, Yucel & Gassanov 2010). Moreover, as Schröder and Schmiedeberg (2015) have shown, relationship duration, not marital duration, has an influence on sexual frequency. Therefore, it is pivotal to also take unmarried relationships into account. As the division of household tasks and traditional gender beliefs have changed since the 1990s, Carlson et al. (2016) use more recent data to reassess the findings on housework and sexual frequency and satisfaction. They analysed MARS data from 2006, and found no significant difference in sexual frequency and satisfaction between traditional and egalitarian couples. However, counter-conventional couples (men doing most of the housework) reported lower sexual frequencies and satisfaction than the rest of the sample. On the other hand, an analysis of the National Survey of Midlife in the United States (2004-2006) found lower sexual satisfaction for couples if the female partner performs more housework than their male counterparts and if the household task arrangement is perceived to be unfair (Barrett & Raphael 2018). However, this only holds for the distributional perspective; the authors do not find any association between sexual satisfaction and reported hours of housework. Moreover, no effect was found for sexual frequency.

One of the main shortcomings in the above-mentioned studies is the use of cross-sectional data. Cross-sectional analyses are not sufficient to examine whether the division of household labor is related to sexual intercourse, as they might be biased due to unobserved differences between couples with a traditional division of labor and more egalitarian couples. The only known longitudinal study has been conducted by Johnson and colleagues (2016) using *pairfam* data to compute ARCL models in order to examine the effect of the division of housework on a couple's sex life. Controlling for relationship duration, age, the number of children in the household, relationship satisfaction, residence in former East Germany, and self-rated health, they found no relationship between the two, but they did find that male partners who perceive their housework contribution to be fair report higher sexual satisfaction and a higher frequency of intercourse (Johnson et al. 2016). However, the authors only considered core household tasks. Therefore, they cannot fully test whether a gendered division of household tasks may have an effect on a couple's sexual encounters. Most importantly, ARCL models are likely to have estimation biases. These models summarize the cross-lagged association between two constructs across time, but do not dissect between and within-person variation, and are thus not able to appropriately control for unmeasured variables (Pan et al.

2015). Panel data per se do not solve the problem of unobserved heterogeneity, and estimation techniques that rely on between-variation are often biased (Brüderl & Ludwig 2015). In contrast, fixed effects estimations only consider intra-individual changes over time, and can thus discover whether a change in the division of household labor, or the perception of fairness thereof, within a partnership actually leads to a change in sexual frequency and satisfaction while controlling for time-constant unobserved heterogeneity. Using longitudinal data from the German Family Panel between 2009 and 2015, this study attempts to resolve these issues.

2.4 Data

2.4.1. Sample

The German Family Panel *pairfam* is a nationwide randomly sampled longitudinal study that focuses on partnership and family dynamics in Germany (http://www.pairfam.de). Respondents from the birth cohorts 1991-93, 1981-83, and 1971-73 are surveyed annually. The first wave was conducted in 2008 and comprised a sample of over 12,000 focal, or *anchor*, respondents. Most questions are asked face-to-face by the interviewer (CAPI), but a self-administered module (CASI) is included for more sensitive questions such as those related to sexual behavior. In addition to the panel approach, *pairfam* implements a multi-actor design, meaning the *anchor*'s partners, parents, and children are interviewed as well. Nonresponse patterns are similar to other panel studies, and bias due to selective attrition does not seem to represent a large issue (Müller & Castiglioni, 2015). A more in-depth description of the study can be found in Huinink et al. (2011).

This analysis is based on data from the *anchor* and partner surveys of waves 3, 5 and 7, Release 7.0 (Brüderl et. al. 2016).[6] The sample is restricted to married and unmarried cohabiting couples for which both partners took part in the survey and to the birth cohorts 1981-83 and 1971-73, as respondents of the youngest cohort were approximately 16 in the first wave and rarely lived together with their partner. The complete sample consists of 6,268 couple-year observations. Homosexual couples (56 observations) and respondents that have never had sex (2 observations) were excluded. Furthermore, 118 couples who stated that none of the available categories of housework distribution applied to their situation and 211 couples that employ third parties to do all of their housework were eliminated. In addition, 1,643 observations with

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[6] The frequency of sexual intercourse was not included in the first wave and the perception of fairness in the distribution of housework was only asked in waves 1, 3, 5 and 7.

missing values on the included variables and 8 cases with inconsistent data were excluded.[7] After restricting the sample to couples that participated in at least two waves (dropping 1,046 observations) the final sample includes 3,192 observations from 1,315 couples.

2.4.2 Descriptive statistics

A summary of the variables used for these analyses can be found in Table 2. Based on waves 3, 5, and 7, the first column reports the percentage of observations for categorical variables and mean values with standard deviation in brackets for metric variables. The second column indicates the share of respondents in each category in at least one of the three waves (only for categorical variables). The last column shows the percentage of respondents that changed status between waves. For example, over all waves, 80.1% of all observations were married (Column 1). About 84.6% were married in at least one wave (Column 2) and 11.1% of couples changed their marital status between waves (Column 3).

Sexual satisfaction was measured on a scale ranging from 0 (*very unsatisfied*) to 10 (*very satisfied).* The mean satisfaction with sexual intercourse over all waves is 6.3. The frequency of sexual intercourse with the main respondent's reported partner in the last three months was measured on a scale from 1 to 7 *(never/not in the past 3 months, once per month or less, 2-3 times per month, once per week, 2-3 times per week, more than 3 times per week, daily*). In order to apply regression models for count data, these answer categories were recoded to indicate the rounded mid-points of the respective class (frequency of sexual intercourse per month: 0, 1, 3, 4, 10, 20, 30). Over all waves, the mean frequency of sexual intercourse is 4.6, meaning that on average, co-residing couples have sex 4 to 5 times per month. Over 64.6% of couples experienced a change in their sex frequency between waves.

The data set contains one item summarizing the distribution of core housework (laundry, cooking, cleaning) and one concerning non-core housework (repairs in and around the house, car maintenance). The housework variables were measured on a scale from 1 (*my partner does all of the housework*) to 5 (*I do all of the housework*), which have been recoded so that the value 1 reflects that the female partner does all of the housework; value 2 means that the female partner does most of the housework; value 3 reflects that the couple shares the housework equally; value 4 means that the male partner does most of the housework; and value 5 reflects that he does all of the housework. If the couple employs household help, they were asked to only refer to the portion of work done by the respondent themselves and/or the partner. As

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[7] Observations of those who reported to work over 80 hours a week were excluded.

individuals tend to overestimate their share of housework tasks (Coltrane 2000), the female and male statements of housework distribution were averaged per couple (adding both scales and dividing them by two). As expected, most men do the traditionally male tasks and most women engage in traditionally female housework. Less than 1% of men do all of the core housework and less than 1% of women do all of the non-core housework (numbers not in the table). Over 65% of couples change their distribution of core and/or non-core housework between the waves. About 19% of couples agree that they share core housework equally and 6% agree to share non-core housework equally (numbers not in the table).

Table 2. *Descriptive statistics (N = 3,192 observations from 1,315 couples)*

Variable	Mean (SD) / Percent	Percent of couples in the category in at least 1 wave	Percent of couples with change between waves
Metric variables:			
Sexual satisfaction[a]	6.3 (2.5)		80.7
Frequency of sexual intercourse per month[b]	4.6 (4.5)		64.6
Distribution of core housework[c]	2.1 (0.7)		65.6
Distribution of non-core housework[d]	4.3 (0.7)		67.2
Health status male partner[e]	3.7 (0.9)		61.0
Health status female partner[f]	3.6 (0.9)		67.0
Male partner's paid working hours	40.9 (13.8)		74.3
Female partner's paid working hours	22.5 (17.1)		74.6
Female partner's age	35.2 (5.6)		100.0
Categorical variables:			
Distribution of household tasks perceived as fair[g]	46.4	64.8	37.4
Relationship duration			
0-1 years	0.4	1.1	1.1
1-2 years	1.5	3.6	3.6
2-3 years	2.3	5.6	5.6
3-5 years	7.0	16.4	16.2
5-7 years	9.3	22.3	22.3
7-10 years	17.5	34.0	31.2
10-13 years	18.2	36.0	33.2
13-16 years	14.8	29.4	27.9
>16 years	29.1	35.4	13.2
Married	80.1	84.6	11.1
Age of youngest child in the household			
No children in household	22.7	27.9	10.0
0-2 years old	17.4	34.9	32.9
2-6 years old	27.9	48.4	40.8
6-13 years old	25.2	36.4	23.4
13-25 years old	6.9	11.0	7.8
Wave			
Wave 3	28.1	68.1	68.1
Wave 5	37.9	92.1	92.1
Wave 7	34.0	82.5	82.5

Notes: [a]*Sexual satisfaction: range 0 - 10.* [b]*Frequency of sexual intercourse per month: range 0 - 30.* [c]*Distribution of core housework: range 1 - 5.* [d]*Distribution of non-core housework: range 1 - 5.* [e]*Health status male partner: range 1 - 5.* [f]*Health status female partner: range 1 - 5.* [g]*Distribution of household tasks perceived as fair: 0 = not fair, 1= fair.*

The perceived fairness of housework distribution was also measured proportionally on a scale of 1 to 5 (*I do a lot more than my fair share, I do a bit more than my fair share, I do my fair share, I do a bit less than my fair share, I do a lot less than my fair share*). A dichotomous variable was generated using responses from both partners indicating whether they perceived their distribution of housework to be fair, or if one or both of them perceived it to be in some way unfair. More than half (64.8%) of the couples perceived the distribution of housework in their cohabiting relationship to be fair in at least one wave. Moreover, 37.4% experienced a change of one or both partners' perception of fairness between waves.

Relationship duration, marital status, the age of the youngest child in the household, health status of both partners, both partners' paid working hours, and women's age were included as control variables, as they can influence both sexual satisfaction and frequency as well as the housework distribution. Sexual frequency and satisfaction are expected to decline with relationship duration (Schröder & Schmiedeberg 2015) and age (Call et al. 1995). The distribution of housework is expected to become more traditional with age and an increase in relationship institutionalization (Coltrane 2000). Non-married cohabiting partners should have a less traditional housework distribution and a higher sexual frequency than do married couples (Call et al. 1995). The age of the youngest child in the household (*no children, youngest child 0-2 years, 2-6 years, 6-13 years, 13-25 years old*) should create stronger situational constraints the younger the children, as they demand more care and impose more hindrances on parents (Call et al. 1995). Therefore, a couple's sexual satisfaction and frequency of sexual encounters might decline with young children in the household. Furthermore, women tend to reduce their working hours and increase their time spent doing housework after childbirth (Bianchi et al. 2000). The transition to parenthood and the age of a child also influence women's perception of fairness of housework distribution (Perales et al. 2015). Lower frequency of sexual intercourse and lower sexual satisfaction might also be caused by declining health (Call et al. 1995). Furthermore, health status can influence the amount of housework a person is able to do. Therefore, the health status of both male and female partners was included (*1 = bad, 2 = not so good, 3 = satisfactory, 4 = good, 5 = very good health*). The working hours of both partners have been included in the analysis as well, in order to control for time constraints on a couple's sex life and the time available for household chores (Coltrane 2000). As for paid working hours and health status, responses from both partners were used. Moreover, wave dummies are included in the analysis. As fixed effects models observe individual changes over time, it is not necessary to control for time-constant variables such as religiosity or migration status.

2.4.3 Statistical model

The following analysis specifies linear regression models with cluster-robust standard errors for the dependent variable sexual satisfaction, and Poisson regression models for sexual frequency. Pooled OLS (POLS) as well as random (RE) and fixed effects (FE) models are estimated. POLS models treat the data as cross-sectional and infer the causal effect from between-variation only. RE models (as well as ARCL models) consider personal changes over time, but do not parse within and between-person variation. Between-person variation can be biased by person-specific error (Brüderl & Ludwig 2015), meaning that couples with higher sexual satisfaction and an egalitarian housework distribution could differ from couples with lower sexual satisfaction and a less egalitarian housework distribution on unobserved characteristics. The fixed effects estimator discards between-variation and can therefore not be biased by person-specific, time-invariant characteristics. However, fixed effects models still do not solve the problem of unmeasured time-variant variables (Brüderl & Ludwig 2015). By comparing the POLS and RE results to those from the FE models, I can examine whether a change in the distribution of housework leads to a change in sexual encounters, or if differences in a couple's sexual habits are due to unobserved time-invariant confounding variables.

2.5 Results

2.5.1 Actual distribution of housework

Table 3 displays the POLS regression, RE, and FE panel models concerning sexual satisfaction. The effects of the distribution of core and non-core housework are rather small and not significant in any model. The same results are visible when sexual frequency is used as dependent variable (see Table A.1 in the appendix). A correlation between the distribution of household tasks and sexual frequency or satisfaction can therefore not be confirmed with these analyses.

2.5.2 Perceived fairness of housework distribution

All models were additionally run with perceived fairness as the independent variable and all control variables as used in the previous analysis. Estimates for sexual satisfaction are displayed in Table 4. If the distribution of housework was perceived as fair by both partners, the sexual satisfaction increased, but only in the POLS and RE models. In the FE model, the effect is substantially smaller and non-significant. The effects on sexual frequency show a similar pattern: the POLS model indicates a significant effect of the perception of fairness of

housework distribution on sexual frequency, but not the RE or FE models (Table A.2 in the appendix). A change in the perception of fairness seems not to have an effect on the frequency of sexual intercourse or sexual satisfaction.

Table 3. *Summary of pooled OLS (POLS), random (RE), and fixed effects (FE) regression analyses estimating sexual satisfaction*

Variable	POLS	RE	FE
Distribution of core housework	0.016	-0.015	-0.087
Distribution of non-core housework	0.143	0.124	0.066
Relationship duration (ref.: more than 16 years)			
0-1 years	1.514*	1.327*	1.028
1-2 years	0.494	0.479	0.247
2-3 years	0.868*	0.588	0.365
3-5 years	0.133	0.117	0.091
5-7 years	0.163	0.170	0.285
7-10 years	0.013	0.015	0.142
10-13 years	-0.011	0.051	0.231
13-16 years	-0.178	-0.022	0.179
Married	0.568***	0.285*	-0.330
Age of youngest child in the household (ref.: no children)			
0-2 years old	-0.535**	-0.655***	-0.935***
2-6 years old	-0.268	-0.350*	-0.641*
6-13 years old	-0.000	-0.027	-0.333
13-25 years old	0.348	0.142	-0.422
Health status male partner	0.269***	0.194***	0.099
Health status female partner	0.249***	0.217***	0.167**
Male partner's paid working hours	-0.001	0.001	0.004
Female partner's paid working hours	-0.001	-0.003	-0.006
Female partner's age	-0.038**	-0.033*	-0.260
Wave (ref.: Wave 3)			
Wave 5	-0.040	-0.073	0.400
Wave 7	-0.174	-0.212*	0.760
N (observations)	3,192	3,192	3,192
N (couples)	1,315	1,315	1,315

Notes: Coefficients from linear regression models.
         *p<.05, **p<.01, ***p<.001
Source: pairfam waves 3, 5, 7, Release 7.0 (own calculations)

2.5.3 Validity analyses

Missing data may bias the results if item non-response is selective. However, if selectivity occurs due to inter-individual differences regarding respondents' willingness to answer questions, FE models inherently control for this. Observations with missing values for any of the interesting variables were deleted in the data preparation process (1,643 cases), most of which due to missing values for sexual frequency. The mean and standard errors are almost identical for household task distribution and the perception of fairness thereof between couples

who did not want to answer the question regarding sexual frequency and the ones who did give valid responses: t-tests find no significant difference between the groups. Therefore, bias due to missing data is expected to be rather small, although cannot be ruled out completely.

Table 4. Summary of pooled OLS (POLS), random (RE), and fixed effects (FE) regression analyses estimating sexual satisfaction

Variable	POLS	RE	FE
Distribution of household tasks perceived as fair	0.469***	0.271**	0.024
Relationship duration (ref.: more than 16 years)			
0-1 years	1.431*	1.273*	1.012
1-2 years	0.504	0.459	0.237
2-3 years	0.881*	0.602*	0.376
3-5 years	0.121	0.102	0.093
5-7 years	0.134	0.150	0.289
7-10 years	0.000	-0.003	0.144
10-13 years	-0.019	0.042	0.234
13-16 years	-0.167	-0.020	0.179
Married	0.551***	0.285*	-0.333
Age of youngest child in the household (ref.: no children)			
0-2 years old	-0.492**	-0.626***	-0.926***
2-6 years old	-0.209	-0.313*	-0.632*
6-13 years old	0.032	-0.011	-0.332
13-25 years old	0.368	0.158	-0.421
Health status male partner	0.266***	0.195***	0.097
Health status female partner	0.238***	0.215***	0.165**
Male partner's paid working hours	-0.001	0.002	0.004
Female partner's paid working hours	-0.000	-0.003	-0.007
Female partner's age	-0.040**	-0.034*	-0.261
Wave (ref.: Wave 3)			
Wave 5	-0.049	-0.073	0.410
Wave 7	-0.172	-0.208*	0.776
N (observations)	3,192	3,192	3,192
N (couples)	1,315	1,315	1,315

Notes: Coefficients from linear regression models.
          *p<.05, **p<.01, ***p<.001*
Source: pairfam waves 3, 5, 7, Release 7.0 (own calculations)

The distribution of housework chores was measured on a scale from 1 to 5 and treated as a linear variable in the regression analyses. The introduction of quadratic terms for the distribution of housework or treating it as a strictly categorical variable did not produce substantially different results (Table A.3 and A.4 in the appendix). Moreover, using the femlogit ado introduced by Klaus Pforr (2014), multinomial logit fixed effects models that treat the frequency of sexual intercourse as a categorical variable were estimated. Neither the distribution of housework nor the perceived fairness thereof showed any significant effect in these models (see Table A.5 in the appendix). Analyses concerning the actual distribution of

housework were able to be run over 6 or even 7 waves.[8] The additional information did not lead to fundamental changes in the results (Table A.6 in the appendix). Therefore, for a better comparison, all models presented here are based on the same sample as the model estimating the effect of the perception of fairness of housework distribution (waves 3, 5 and 7). In addition to the variables included by Johnson and colleagues (2016), my analyses also control for marital status and both partners' paid working hours. Running the analyses with the same control variables as Johnson et al. (2016) and only with core housework constructed analogously to Johnson and colleagues did not produce different results (Table A.7 and A.8 in the appendix). Distinguishing between men's and women's reports of sexual satisfaction and frequency also did not reveal different outcomes (Table A.9 - A.12 in the appendix). Results seem to be stable regardless of variable specification and sample composition. Admittedly, it is easier to show that a non-effect is robust against several methodological decisions than a positive or negative effect. However, none of the main coefficients were significant – even at the 10% level.

2.6 Discussion

2.6.1 Summary

Using data from the German Family Panel (*pairfam*), this study investigates the correlation between the distribution of housework and sexual encounters within co-residing relationships. Pooled OLS, random effects, and fixed effects panel regression models found no correlation between the actual distribution of core and non-core housework and the frequency of intercourse or the level of sexual satisfaction. Couples that perceive the household distribution to be fair seem to differ from couples that do not on one or more unobserved variables, which also affects their sexual habits. However, a change in the perception of fairness seems to have no effect on couples' sexual satisfaction or frequency. Therefore, the assumption that the perception of fairness influences relationship satisfaction and that this might influence a couple's sex life cannot be confirmed. Moreover, neither the exchange theory nor sexual scripts theory could be confirmed by this analysis: The hypotheses that women exchange sex for housework or that a gender-traditional division of housework activate sexual scripts and consequently increases the frequency of intercourse and/or sexual satisfaction are not visible in the *pairfam* data.

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[8] The estimation with the frequency of sexual intercourse as the independent variable was able to be run over 6 waves. With sexual satisfaction as the independent variable, 7 waves were available for analysis.

In contrast to Kornrich and colleagues (2013), the POLS regression showed no correlation between the distribution of housework and the frequency of intercourse. There are several reasons that might explain these differences. Firstly, Kornrich et al. (2013) used data from 1992-1994 gathered in the United States, whereas these analyses are based on more recent German data. Interestingly, two analyses of U.S. data from 2004 and 2006, respectively, found no differences in sexual frequency between traditional and egalitarian couples (Barrett & Raphael 2018, Carlson et al. 2016). Therefore, the differences to Kornrich et al. (2013) might not stem from cultural differences between countries, but from changing gender attitudes in the United States over the past decades. Secondly, these three studies only analyse cross-sectional data, while *pairfam* data allows for panel regression models. Longitudinal analyses are better suited for this analysis as changes over time in the distribution of household tasks and its effect on couple's sexual behaviors can be examined. By linking year-by-year changes in the independent variable to the dependent variable, their association can be analysed more closely and selection effects due to unobserved stable characteristics can be ruled out.

The POLS and RE models here show a correlation between the perception of housework distribution fairness and sexual frequency and satisfaction in accord with the findings of Johnson and colleagues (2016) who also used *pairfam* data. However, this effect is not visible in the FE regression models. There are three major differences between the analyses of Johnson et al. (2016) and mine. Firstly, control variables differ slightly. Secondly, my analyses also consider the share of non-core household tasks and both partners' indication of household task distribution. Thirdly, Johnson et al. (2016) computed ARCL models, while I conduct fixed effects panel models. As I also run the analyses with the same variables as Johnson et al. (2016) and the results did not change, the different methods must account for the differing results. Longitudinal data analysis does not solve the problem of unobserved heterogeneity, per se. ARCL as well as RE regression models consider personal changes over time, but do not distinguish between within and between-variation. By applying FE models, my results are based on a within-person comparison solely, controlling for unobserved time-constant heterogeneity. This hints towards time-stable unobserved confounders which bias the POLS and RE models here as well as the results found by Johnson and colleagues (2016). Less educated couples or couples with more traditional gender roles might have more sexual encounters and engage in more traditional housework distribution. Future research might investigate which factors confound this association.

2.6.2 Limitations

One shortcoming of this analysis is that the questionnaire did not explicitly state that respondents should regard the sexual satisfaction with their reported current partner. However, it was implied, as in the previous question respondents were specifically asked about the sexual frequency with their current partner. Nonetheless, it cannot be ruled out that some answers might be biased if the respondent referred to more than one sexual partner. Furthermore, the housework distribution is collected proportionally on a scale of 1 to 5 in the *pairfam* study. Admittedly, proportionate questions are not ideal and hourly estimates of time spend on housework or time diaries would produce more accurate results. To account for a possible bias of this rather subjective measurement, the mean value of both partners' statements regarding housework distribution has been considered. However, future studies should seek to replicate these results with hourly measures of time spent completing household tasks. Moreover, the analyses presented are only based on three waves, compared to some extended analyses that included 6 or 7 waves (see appendix). However, the additional information did not lead to different results.

2.6.3 Conclusion

This investigation aimed to better understand the relationship between household task distribution, its perceived fairness, and couples' sexual satisfaction and frequency. Responses from both partners regarding the distribution of housework and the perceived fairness thereof have been considered, and core and non-core household tasks were differentiated in pooled OLS, random effects, and fixed effects panel regressions. The results suggest that changes in the household distribution of chores or in the perceived fairness thereof do not affect a couple's sexuality in terms of frequency nor satisfaction. In sum, couples needn't worry about negative effects on their sex life when deciding who is going to do the dishes today.

3

ABORTION AND DEPRESSION

IN MEN AND WOMEN

3 ABORTION AND DEPRESSION IN MEN AND WOMEN

Context: The present study investigates the relationship between having an abortion and depression levels in both men and women. Men's mental health before and after their partner having an abortion is often neglected. In addition, prior research on the mental health consequences of having an abortion has primarily used between-person comparisons, and might therefore be biased by time-constant individual characteristics that influence both the likelihood of having an abortion and levels of depression.

Methods: This study analyses whether depression levels affect the likelihood of having an abortion, and whether depression levels change after having an abortion using data from the German Family Panel *pairfam*, a longitudinal study of a nationwide, randomly drawn sample of initially more than 12,000 men and women from the birth cohorts 1991-93, 1981-83 and 1971-73. Participants were followed between 2009 and 2015 for up to six years before and three years after an abortion was reported. Pooled OLS, random, and fixed effects regressions are conducted. Applying the latter the effect of having an abortion on mental health can be inferred by using within-person variation only.

Results: This study finds that women with higher depression levels are more likely to have an abortion, and that women show slightly higher levels of depression one wave after having an abortion as compared to their personal average over the pre-abortion waves. However, the increase in symptoms of depression seen in the first wave does not persist over the second and third wave after reporting an abortion. Moreover, women's responses vary substantially: most women don't present major changes in the intensity of depression symptoms after having an abortion, whereas some do on a large scale. For men, no significant relationship between depression and abortion is found with *pairfam* data.

Conclusion: By comparing fixed effects regressions to pooled OLS and random effects models, the present study illustrates why some previous research might have overestimated the psychological repercussions of having an abortion by not appropriately controlling for co-occurring risk factors.

3.1 Introduction

According to the German statistics, 98,721 abortions took place in Germany in 2016 (Federal Statistical Office of Germany 2017); in other words, 56 out of 10,000 women had an abortion. Only 4% of these women had an abortion for medical reasons or as a consequence of

rape or sexual misconduct (Federal Statistical Office of Germany 2017). Most women choose to abort a pregnancy due to partner-related issues, timing, finances, or because they want to focus on their other children (Biggs et al. 2013). Moreover, research suggests that a woman's physical and mental health both influence her decision to abort (Biggs et al. 2013).

The belief that most women experience mental health repercussions after having an abortion is based on early case studies of women with psychological problems and studies that did not implement an appropriate control group or did not control for co-occurring risk-factors (e.g., Adler et al. 1990, Broen et al. 2006, Coleman 2006). However, rigorous literature reviews have since come to the conclusion that the relative risk of mental health problems among women who have a first-trimester abortion of an unwanted pregnancy is no greater than the risk among women who deliver an unwanted child (Adler et al. 1990, Major et al. 2009). Rocca and colleagues (2013) indicate that 95% of women do not regret their decision to abort. Furthermore, women report better psychological statuses after having an abortion than they themselves had expected (Quinley et al. 2014). Men have been neglected in most studies of this topic thus far, although some research suggests that men's characteristics also play a role in the decision to abort a pregnancy, and that they might face psychological problems afterwards (Buchanan & Robins 1990, Zavodny 2001). Therefore, this study will investigate both men's as well as women's mental health in relation to having an abortion.

Methodological challenges associated with the assessment of abortion and mental health are finding an appropriate comparison group, controlling for pre- and co-occuring risk factors, a lack of longitudinal data, and statistical challenges. Some previous research has not considered psychological states prior to having an abortion, or use only retrospective data. Longitudinal studies investigating abortions are very scarce and when available, the full potential of the panel data has not been exhausted. Studies suggest that women choose to abort due to pre-existing mental health issues (Biggs et al. 2013, Kero et al. 2001, Larsson et al. 2002) and that women with unwanted pregnancies are exposed to several pre-pregnancy factors that place them at risk for having both mental health impairments and deciding to have an abortion (Major et al. 2009). Therefore, when analysing the psychological repercussions of having an abortion, selectivity plays a crucial role.

Hence, I will first investigate whether mental health problems of men and women increase the likelihood of having an abortion. In case of such self-selection, the exogeneity assumption is violated and statistical models that rely on between-person comparisons such as pooled OLS (POLS) or random effects (RE) regressions might overestimate the psychological

repercussions of having an abortion. In contrast, fixed effects (FE) panel regressions only consider intra-individual changes in depression levels. Additionally, FE estimations control for all time-constant unobserved characteristics such as educational background or physical abuse during childhood, which might influence both depression levels as well as the likelihood of having an abortion. Secondly, I examine both women and men's mental health after having had (or their partner having had) an abortion. By comparing FE panel regressions to POLS or RE regressions, I am able to investigate whether models using between-person comparisons overestimate the psychological repercussions of having an abortion.

3.2 Depression before having an abortion

3.2.1 Theoretical background and previous research

Depressiveness may influence the likelihood to have an abortion in two ways: women with higher depression levels might 1) be more likely to experience an unintended pregnancy and 2) be more likely to decide to have an abortion. Studies have indicated that women with higher depression levels show an increased risk of infrequent or non-use of contraceptives (Brooks et al. 2002, Hall et al. 2013). Therefore, depressed women might have a higher risk of experiencing an unintended pregnancy, which in turn might lead to the decision to have an abortion.

Second, according to the value-of-children approach (VOC) and the economic theory of fertility (ETF), individuals consider the costs and benefits of having children in advance (Becker 1960, Hoffman & Hoffman 1973, Robinson 1997). Only if the benefits outweigh the costs will the decision to have children be made. The costs may be financial (related to child-rearing), opportunity costs, or psychological and physical costs. Individual circumstances and characteristics influence the way in which people evaluate the costs and benefits of having children (Levels et al. 2012). For example, someone with a history of psychological problems might be more pessimistic or already feeling overwhelmed without having to take care of any children, and therefore consider the costs of having a child to be higher. According to this logic, women with higher levels of depression would be more likely to have an abortion when faced with an unintended pregnancy.

Moreover, a woman's decision might also be influenced directly by their partner's opinion when deciding for or against an abortion (Broen et al. 2005). Men's depressiveness might also affect their opinion regarding children, and therefore influence their female partner's

decision making process. However, men's depressiveness might not be as strongly associated with the decision to abort, as (in most cases) the final decision is left to the female partner.

In a review, Kirkman and colleagues (2009) identified three main categories of reasons why women abort: women-focused, others-focused, and material reasons. Part of the women-focused category includes physical and mental health problems: If a woman has mental health issues, she might not feel confident enough to raise a child, and therefore choose to have an abortion in the case of pregnancy. To my knowledge there are no studies that adequately investigate the effect of depression on the decision to abort; however, some studies have retrospectively asked women for their reasons for aborting a pregnancy, and some indicated physical or psychological health problems (Biggs et al. 2013, Kero et al. 2001, Larsson et al. 2002). Furthermore, women who have had an abortion are more likely to report a history of mental disorder than those who haven't (van Ditzhuijzen et al. 2013). However, there is no known study addressing the influence of men's depressiveness on the likelihood of their partner having an abortion.

3.2.2 Sample and methods

The following analyses are based on *pairfam* data from Release 8.0 (Brüderl et al. 2017) using waves two to eight, as questions concerning abortion(s) and depression were not asked in wave one. Field work for the second wave was conducted at the end of 2009 / beginning of 2010, and the eighth wave at the end of 2015 / beginning of 2016. At this stage, panel models cannot be specified as for most respondents, only one unwanted/unexpected pregnancy or abortion was recorded during the seven-year observation period. Therefore, pooled logistic regression models with cluster-robust standard errors have been estimated. The sample was defined as follows: women who had an abortion are compared to women who had an unwanted/unexpected pregnancy and gave birth. Analogously, men whose female partner had an abortion are compared to men whose partner gave birth. In waves 2 and 3, respondents were asked whether the timing of the pregnancy was inconvenient, or whether the pregnancy was not wanted at all. In waves 4 to 8, the question was posed differently, asking whether the pregnancy was "unexpected". These two variables were used here to indicate whether a pregnancy was unwanted/unexpected. The independent variables of one wave (e.g. wave 2) are merged with the indication of a birth or an abortion of the following wave (e.g. wave 3). After excluding 27 cases with missing values on the included variables, the final sample consists of 454 observations, 136(85) births and 148(85) abortions recorded by female(male) respondents.

3.2.3 Analytical model

Female respondents were asked from wave two onwards if they had had an abortion since the last interview; male respondents were asked whether their female partner had undergone an abortion since the last interview (or since the start of the relationship in case of a new partner since the last wave).[9] Depressiveness was measured with an index of ten items from the German translation of the State-Trait-Depression Scale (Spaderna et al. 2002). This scale consists of five items assessing negative mood (dysthymia) and five items representing positive mood (euthymia), all measured on a scale from one to four. The index generated here ranges from 10 to 40, with values of 25 and higher considered clinically relevant depression (Lehr et al. 2008).

Age, relationship status, and the number of children were identified as confounding variables that could influence both the decision to abort as well as individual depressiveness. Un-married individuals are more inclined to both abort a pregnancy (Biggs et al. 2013, Rossier et al. 2007, Sihvo et al. 2003, Skjeldestad et al. 1994) and exhibit higher levels of general depression (LaPierre 2009, Lorant et al. 2007) as compared to married individuals. The number of children appears to positively influence the decision to abort (Broen et al. 2005, Kero et al. 2001), and parents seem to generally be more depressed than childless individuals (Dooley et al. 2000, Horwitz et al. 1996). Most women who reported having had an abortion are between the ages of 20 and 29 (Jones & Jerman 2017), while depression levels are lowest for middle-aged men and women (approx. 45 years old) (Mirowsky & Ross 1992). To account for nonlinear effects, a quadratic age term is included as well. These confounders plus wave dummies are included as control variables in the following regression analyses. Table A.13 in the appendix presents mean values and standard deviations for the included metric variables and the percentage of observations for categorical variables.

3.2.4 Results

The mean value of depression for women before child birth is 18, and 20 before having had an abortion. A t-test confirms a significant difference between the two groups: Women seem to score significantly higher on the depression scale if they report having an abortion in the following wave. For men, the mean value of depression is roughly 17 before fathering a child, and 18 before their partner having an abortion. According to a t-test, the difference is not statistically significant on the 5% level for men. Multivariate results confirm these bivariate

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[9] It is assumed that male respondents are the would-be father of the fetus if their female partner has had an abortion.

findings (see Table 5): Women with higher depression levels have a higher likelihood of having an abortion in the following year, whereas men's depressiveness doesn't seem to be significantly associated to their (partner's) decision to abort.

Table 5. *Summary of pooled logistic regression analyses estimating the likelihood of having an abortion*

Variable	Women	Men
Depression *(range: 10-40)*	0.075**	0.035
Relationship status (ref.: married)		
Single	1.608***	-
Non-cohabiting	0.645	0.334
Cohabiting unmarried	0.010	0.104
Age	-0.273	-0.409
Age squared	0.004	0.008*
Number of living children	0.063	0.063
Pseudo R^2	0.122	0.071
N (observations)	284	170

Notes: *Coefficients from pooled logistic regression models. All models include wave dummies.*
             * $p<0.05$, ** $p<0.01$, *** $p<0.001$
Source: *pairfam waves 2-8, Release 8.0 (own calculations)*

Figure 1 shows men's and women's conditional predicted probabilities of having an abortion estimated from the POLS model above. The probability of a woman having an abortion increases with an increase in depression levels: Women with a depression scale score of 10 have a predicted probability of 35%, while women with a depression scale score of 30 have an abortion probability of 69% if the pregnancy was unwanted/unexpected. Men's increase in the probability of their partner having an abortion is smaller and not significant. Household income and employment status were not included as control variables as it is unsure if they influence depression or if they are influenced by it; causality seems to go both ways (Lorant et al. 2003). Further estimations including these variables did not yield results different from those presented (see Table A.14 in the appendix).

These analyses are meant to explore whether men and women with higher depression levels are more likely to experience an abortion. For women, this association could be confirmed with *pairfam* data. These findings support the notion that between-person comparisons might overestimate the psychological repercussions of having an abortion due to self-selection. The following chapter therefore presents FE panel regression models that rely on within-person comparisons. These are then compared to between-person models (POLS and RE models) in order to investigate depression levels after having an abortion.

Figure 1. *Women's and men's conditional predicted probabilities of having an abortion depending on depression levels estimated from pooled logistic regression models*
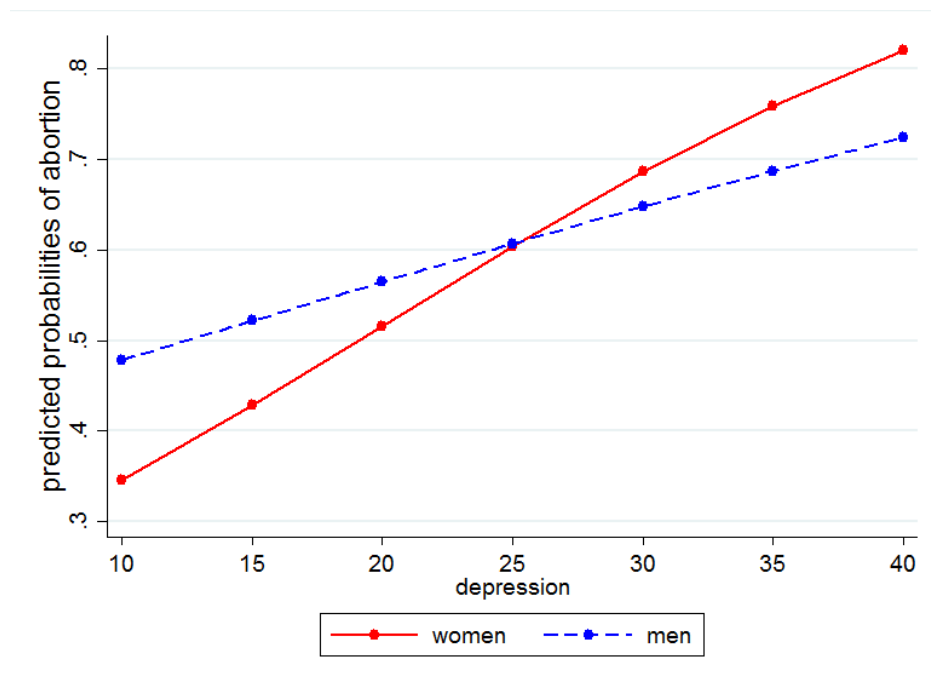
3.3 Depression after having an abortion

3.3.1 Theoretical background and previous research

According to psychological theories of stress and coping (e.g., Lazarus & Folkman 1984), abortion can be regarded as a potentially stressful life event. However, an unwanted pregnancy can also represent a stressful event, and the effects of both might be difficult to disentangle (Adler et al. 1990). Therefore, psychological responses might not stem from having an abortion, but from an unwanted pregnancy. From this perspective, abortion can either resolve the stress of an unwanted pregnancy, or add additional stress. This view emphasizes the variability in women's emotional response to abortion: Some might experience negative consequences, while others experience positive effects (Adler et al. 1990). Individual circumstances, such as pre-abortion mental health, likely also influence the response to abortion (Steinberg & Finer 2011).

The sociocultural context can influence a woman's perception of having an abortion and might therefore trigger mental health issues. The current sociopolitical climate stigmatizes women who undergo an abortion procedure, which might lead to negative psychological reactions (Major & O'Brien 2005, Major et al. 2009). Women who internalize stigma associated with having an abortion (e.g., who believe that they committed a crime and expect to have

mental health impairments) are more likely to experience psychological distress (Major et al. 2009). In contrast, support groups and social messages that encourage women to be more positive about past abortions can improve women's mental health (Trybulski 2006).

An unplanned pregnancy and the decision to abort can also be very stressful for men. Depending on their commitment to the relationship and their involvement in the decision-making process, men's emotional response might vary as well. However, men are expected to have a less pronounced emotional response to abortion as they don't experience the physicality of a pregnancy nor an abortion, whereas women experience changes to their body and undergo an invasive process to terminate the pregnancy. Abortion stigma might also be worse for women if they are seen as the driving agent behind an abortion. Therefore, women might be faced with more negative feedback after having an abortion as compared to their partners.

Another perspective stresses that mental health problems may be caused by other factors associated with an unwanted pregnancy or the decision to abort (Major et al. 2009). Personal characteristics play an important role in the decision-making process, and group differences must be considered. Intimate partner violence and exposure to sexual or physical abuse during childhood, for example, are risk factors for both unplanned pregnancies and abortions (Coker 2007, Dietz et al. 1999, Finer & Henshaw 2006, Steinberg & Tschann 2013) as well as mental health issues (Belle 1990, Coker et al. 2002, Neumann et al. 1996, Steinberg et al. 2016, Tinglöf et al. 2015). Therefore, having an abortion might not necessarily lead to mental health problems, but both occurrences might be consequences of common risk factors.

Studies investigating men's psychological response to abortion are rare. Men as well as women seem to have ambivalent feelings towards past abortions (Kero & Lalos 2000), although they mostly agree it was the right decision (Kero et al. 2001). Most men feel a sense of relief and become more mature after experiencing an abortion (Kero & Lalos 2004). Buchanan and Robins (1990) found that men whose female partner had an abortion in early adulthood experience more psychological distress later in life than those who didn't experience the termination of an (unplanned) pregnancy, or those who got married and had (planned) children. Findings hint towards overall lower emotional distress for men as compared to women (Korenromp et al. 2007, Lauzon et al. 2000). However, there is no known panel study investigating men's emotions or psychological response to abortion.

Some studies have compared women who had had an abortion to women who wanted to terminate their pregnancy but were refused, and did not find higher levels of depression and anxiety among the women who had the abortion (Biggs et al. 2016, Biggs et al. 2017, Foster et

al. 2015). Biggs and colleagues used longitudinal data from the Turnaway Study to compare symptoms of anxiety, self-esteem, life satisfaction, depression, PTSD, and PTSS of over 800 women who had had or were denied an abortion (Biggs et al. 2016, Biggs et al. 2017). They found similar levels of depression in both groups and more anxiety symptoms, lower self-esteem, and lower life satisfaction for women who were not able to get an abortion. Their study implements an appropriate comparison group, but the authors must rely on a retrospective assessment of depression before the abortion, which is not ideal.

Studies without a control group, or which compared women who aborted to women who delivered a child, found mixed results. Some report negative effects of having an abortion on women's mental health (e.g., Agrawal et al. 2012, Broen et al. 2006, Coleman 2006, Cougle et al. 2003, Fergusson et al. 2006, Söderberg et al. 1998), whereas more rigorous studies found no effect after controlling for co-occuring risk factors such as finances or a history of physical abuse (e.g., Steinberg & Finer 2011, Steinberg & Russo 2008, Steinberg et al. 2011, Steinberg et al. 2014, Warren et al. 2010). Therefore, controlling for co-occurring risk factors seems to be pivotal for abortion research. Except for Fergusson and colleagues (2006) and Warren et al. (2010), all mentioned studies use retrospective data. Analysing retrospective data is problematic, as recall bias or ex-post-rationalization can affect any individual's recollection of a past event.

Warren and colleagues (2010) used the first three waves of data from the Longitudinal Study of Adolescent Health and found no effect of having had an abortion on women's self-esteem or depressiveness. The authors included the wave 1 measure of pre-abortion self-esteem as a covariate in their logistic regression analyses, but as they do not employ panel regression estimators, the full potential of the panel data at hand was not exhausted. Faure and Loxton (2003) compared women's emotional states directly before and three weeks after having an abortion and in fact report a decrease in anxiety and depression. However, anticipation of the upcoming procedure could explain higher anxiety and depression levels immediately before the abortion procedure. A measure of mental health some weeks or months before the abortion would be better suited to investigate this research question.

Munk-Olsen and colleagues (2011) used Danish registry data to follow women 9 months before a first-trimester induced abortion or successful birth up to 12 months after the event and conducted Poisson and Cox regression analyses. The relative risk of psychiatric contact before and after having an abortion did not significantly differ, but did increase after childbirth as compared to before. Fergusson et al. (2006) analysed data from the Christchurch Health and

Development Study using random effects models and found elevated rates of depression, anxiety, and suicidal behaviors among women who aborted a fetus. RE models are based on between-respondent comparisons, meaning they look at differences between persons and cannot properly detect individual changes in depression levels over time, for example here before and after an abortion. Results will be biased if pre-existing characteristics that influence both mental health and the likelihood of having an abortion are not controlled for. To date, previous research has controlled for some common risk factors of both, but it is likely that other factors could have been left out or were unobservable. FE regression models, on the other hand, control for all time-constant (unmeasured) characteristics of individuals that might bias the association, whether observed or unobserved. However, no known study to date has combined longitudinal data with FE estimations in order to investigate whether men's and women's mental health status changes after having (or their partner having) an abortion.

3.3.2 Sample and variables

The following analyses are based on *pairfam* data from Release 8.0 (Brüderl et al. 2017) using waves two to eight. All *pairfam* participants, regardless of gender, were included in the gross sample. Observations with missing values on any of the variables of interest were excluded (N = 2,401). Respondents who did not want to answer the question regarding abortion did not significantly differ in their levels of depression symptoms as compared to those who gave valid responses (t-tests find no significant difference). However, the included persons were roughly one year older and cohabited with their partner or were married more often than single respondents or those in a non-cohabiting relationship. No significant differences between the number of children or abortion prevalence was found. In order to have a baseline measurement of depressiveness, only respondents who did not have an abortion in the first year observed as part of the panel were included (dropping 208 observations). After excluding persons with less than two recorded observations (N = 1,606), the final sample includes 24,053 observations from 4,558 women and 21,632 observations from 4,204 men over a maximum of 7 waves.

To model mental health after having an abortion over time, three dummy variables were generated: *one wave after abortion, two waves after abortion, and three waves after abortion*. The first variable is coded 1 if an abortion took place since the last interview, and 0 again in the next wave (assuming no further abortion was reported). The latter two variables are coded 1 two/three waves after an abortion took place, respectively, and 0 otherwise. With this strategy, I can explore how mental health after having an abortion changes over time. Three percent of women and two percent of men experienced at least one abortion over the seven waves

observed. The following analyses include 138 cases in which women reported having an abortion and 98 male-reported instances.

3.3.3 Descriptive and bivariate results

The same control variables as described in the analytical model above (age, relationship status, number of children, and wave) are used here. A summary of these variables, separated by gender, is presented in Table 6. The first column shows the percentage of observations for dichotomous variables, and mean values with standard deviation in brackets for metric variables. The second column indicates the percentage of respondents who changed their status regarding each variable between waves. For example, over all waves, 26.5% of women were single (column 1) and 34.3% changed their relationship status between waves (column 2). The mean value of depression symptoms lies at 17.7 (with a standard deviation of 5.2) for women and at 16.9 for men (standard deviation: 4.7). Cronbach's alpha for the ten depression items is 0.90 for women and 0.87 for men. Over all waves, 8% of men and 11% of women score 25 or higher on the State-Trait-Depression Scale, meaning they are clinically depressed.

According to the Federal Statistical Office of Germany, 39% of women who experience an abortion are married (2017). In the *pairfam* sample, only 22% of women who aborted a fetus were married in the wave after the abortion.[10] In the wave following an abortion, 19% of women were under 21 years old, 41% between 21 and 30, 34% between 31 and 40, and 6% were 41 or older. The *pairfam* sample includes less women who experienced an abortion in the middle age group and more women under the age of 21 compared with German abortion statistics (Federal Statistical Office of Germany 2017)[11]. Moreover, women who reported an abortion in the *pairfam* sample seem to have proportionally less children compared to national statistics (Federal Statistical Office of Germany 2017)[12]. Unfortunately, no national statistics exist for male partners of women who have an abortion.

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[10] In the year of having reported an abortion, 3 women were divorced and 7 women got married.
[11] According to German abortion statistics 8% of women were under 21 years old, 45% between 21 and 30, 40% between 31 and 40, and 7% 41 or older when they had an abortion (Federal Statistical Office of Germany 2017).
[12] According to German abortion statistics, 39% of women had no children, 25% had one child, 23% had two children and 13% had three or more children when they had an abortion (Federal Statistical Office of Germany 2017). In the *pairfam* sample, 49% had no children, 22% had one child, 17% had two children, and 12% had three or more children when they reported having an abortion.

Table 6. *Descriptive statistics (N = 24,053 observations from 4,558 women and 21,632 observations from 4,204 men)*

Variable	Women		Men	
	Mean (SD) / Percent	Percent of women with change between waves	Mean (SD) / Percent	Percent of men with change between waves
Metric variables:				
Depression (*range: 10-40*)	17.7 (5.2)	97.9	16.9 (4.7)	97.7
Age	30.3 (8.7)	99.7	29.2 (8.7)	99.7
Number of living children	1.0 (1.2)	17.2	0.6 (1.1)	16.0
Categorical variables:				
Abortion				
One wave after abortion	0.6	2.6	0.5	2.2
Two waves after abortion	0.4	1.9	0.3	1.5
Three waves after abortion	0.3	1.5	0.2	1.0
Relationship status				
Single	26.5	34.3	39.5	36.0
Non-cohabiting	19.0	35.9	17.5	36.4
Cohabiting unmarried	16.3	24.9	14.3	22.1
Married	38.3	11.9	28.7	11.4
Wave				
Wave 2	15.3	80.5	15.4	79.4
Wave 3	15.5	81.7	15.8	81.2
Wave 4	16.2	85.6	16.4	84.1
Wave 5	15.1	79.8	15.3	78.6
Wave 6	13.8	73.1	13.8	70.8
Wave 7	12.5	65.9	12.3	63.0
Wave 8	11.6	61.3	11.2	57.4

Source: *pairfam waves 2-8, Release 8.0 (own calculations)*

In the first wave after an abortion took place, most men and women did not show major changes in the intensity of depression symptoms compared to the wave before the abortion was reported (Table 7). About 63% of women and 78% of men presented only minor changes in raw scores of depression symptoms after experiencing an abortion compared to the wave before (-4 till +4). A decrease of 5 or more points was observed in 10% of women and 11% of men, whereas 27% of women and 11% of men show an increase of 5 or more points on the depression scale. These bivariate results reveal that the change in depressiveness of both men and women after having an abortion compared to before varies significantly, and hint towards a greater psychological effect of abortion on women as compared to men.

Table 7. *Changes in raw scores of depression symptoms in the wave after reporting an abortion compared to the observation in the wave before (N = 138 women and 98 men)*

Change in depression after abortion (raw scores)	Women		Men	
	Frequency	Percent	Frequency	Percent
-23 till -14	0	0	0	0
-13 till -9	4	3	1	1
-8 till -5	9	7	10	10
-4 till -1	39	28	38	39
0 till +4	49	35	38	39
+5 till +8	23	17	7	7
+9 till +13	12	9	4	4
+14 till +23	2	1	0	0
Total	138	100	98	100

Source: pairfam waves 2-8, Release 8.0 (own calculations)

3.3.4 Regression analyses

For a multivariate analysis, I specify linear regression models with cluster-robust standard errors in order to estimate and compare POLS as well as RE and FE regression models. As FE regressions are based on a within-person comparison, only cases that experience a change over the observation period are relevant to the estimation of the specific variable. In other words: only respondents that reported experiencing an abortion are relevant to the estimation of the effect of having an abortion on depression levels (610 observations from 138 women and 480 observations from 98 men). Therefore, respondents who don't experience an abortion throughout the panel could be left out of the FE estimation of having an abortion over time. However, this group remains in the analysis sample in order to provide reliable estimations for the control variables (Brüderl 2010). For the control variables wave, age, relationship status, and number of children, all cases that experienced a change on the respective variable are used for their estimation. Tables 8 and 9 compare the results of POLS, RE, and FE analyses for women and men, respectively.

Table 8. *Summary of POLS, RE, and FE regression analyses estimating levels of depression symptoms in women*

Variable	POLS	RE	FE
Abortion			
One wave after abortion	3.367***	1.684***	1.179**
Two waves after abortion	1.800**	0.559	0.155
Three waves after abortion	1.702*	0.704	0.330
Relationship status (ref.: married)			
Single	1.840***	1.317***	0.909***
Non-cohabiting	0.965***	0.490**	0.099
Cohabiting unmarried	0.573**	0.433**	0.166
Age	0.103	0.134**	0.220
Age squared	-0.002*	-0.002***	-0.003***
Number of living children	0.274***	0.106	-0.125
R^2	0.029	0.026	0.013
R^2 (between)	-	0.028	0.007
R^2 (within)	-	0.029	0.030
N (observations)	24,053	24,053	24,053
N (women)	4,558	4,558	4,558

Notes: *Coefficients from linear probability models. All models include wave dummies.*
            * p<.05, ** p<.01, *** p<.001
Source: *pairfam waves 2-8, Release 8.0 (own calculations)*

Table 9. *Summary of POLS, RE, and FE regression analyses estimating levels of depression symptoms in men*

Variable	POLS	RE	FE
Abortion			
One wave after abortion	1.066*	0.487	0.351
Two waves after abortion	-0.163	-0.488	-0.554
Three waves after abortion	0.500	0.200	0.101
Relationship status (ref.: Married)			
Single	2.318***	1.436***	0.909***
Non-cohabiting	1.254***	0.706***	0.282
Cohabiting unmarried	0.595**	0.342**	0.092
Age	0.323***	0.241***	0.283*
Age squared	-0.004***	-0.003***	-0.003**
Number of living children	0.267**	0.166*	0.152
R^2	0.040	0.038	0.017
R^2 (between)	-	0.039	0.015
R^2 (within)	-	0.038	0.038
N (observations)	21,632	21,632	21,632
N (men)	4,204	4,204	4,204

Notes: *Coefficients from linear probability models. All models include wave dummies.*
            * p<.05, ** p<.01, *** p<.001
Source: *pairfam waves 2-8, Release 8.0 (own calculations)*

According to these results, women's depressiveness is slightly higher one wave after having an abortion than in the waves before. However, POLS and RE models seem to overestimate the actual effect. In the POLS model, women score an average of 3.4 points higher on the depression scale (range: 10-40) in the wave after reporting having had an abortion as compared to before. In the RE model, the coefficient is smaller, and in the FE model, it is almost one-third the size of the POLS estimate (1.2). In the following years, the coefficients diminish greatly: The coefficients of two and three waves after abortion is significant in the POLS model, but not in either the RE or FE models, which show no significant difference in women's level of depression symptoms two and three waves after an abortion as compared to their personal average over the pre-abortion waves. As for men, the intensity of depression symptoms does not seem to be associated to their partner having an abortion. The magnitude of the coefficient is smaller in the FE model than in the POLS and RE models. Moreover, only the estimation of the first wave after reporting an abortion was significant in the POLS estimation, but not in the RE or FE model. Therefore, women's depressiveness seems to be more associated to having an abortion than men's.

3.3.5 Sensitivity analyses

Due to panel mortality as well as cases for which an abortion was recorded in the eighth and/or final wave of participation, the records for "two waves after abortion" only contain 88 women and 62 men. Three waves afterwards, the sample dwindles to only 66 women and 43 men. This might pose an issue when interpreting the coefficients of two and three waves after an abortion if those with higher depression levels were only interviewed once after having an abortion. However, the mean change in raw scores of depression symptoms in the year immediately following an abortion is almost the same for the women interviewed one year later (mean difference in depression score: 1.28) compared to women for whom no further records are available (mean difference in depression score: 1.53). A t-test did not detect any statistically significant difference in the mean values. Therefore, the estimation of the coefficients as presented should not be biased by self-selection.

A considerable amount of data was dropped due to missing values. However, only 9 of the dropped cases reported having had an abortion. Further analyses including differentiated categories for missing values on the independent variables were conducted, but these results did not differ substantially from the ones presented (see Table A.15 in the appendix). Again, household income and employment status were not included as control variables in the original

analyses. Further estimations including these variables did not yield results different from those presented (see Table A.16 in the appendix).

3.4 Discussion

3.4.1 Summary

This article sought to investigate the relationship between having an abortion and levels of depression in both men and women. So far, little research has analysed the effect of depression on the decision to abort, and men's psychological states in this situation have mostly been disregarded. As prior research uses between-person comparisons for analysis, their estimations of psychological repercussions after having an abortion might be biased. Longitudinal data in combination with appropriate estimation techniques are needed to investigate possible mental health consequences of having an abortion. In order to analyse whether depression symptoms increase after having an abortion, or if self-selection processes are at play, I used *pairfam* data and compared fixed effects to POLS and RE regression models.

Women with higher depression scores were shown to have a higher likelihood of experiencing an abortion in the following year. These findings are in line with previous research that found a higher likelihood of having a history of mental health issues for women who decided to terminate a pregnancy (van Ditzhuijzen et al. 2013). However, men's depressiveness does not seem to be significantly associated with (their partner) having an abortion. Women's (but not men's) levels of depression seem to be slightly higher roughly one year after having an abortion, which reflects previous studies that predicted lower levels of psychological distress for men compared to women (Korenromp et al. 2007, Lauzon et al. 2000). Moreover, bivariate results suggest that the change in depression scores of women varies significantly: Some show major improvement following an abortion, while the level of depression symptoms of others seems to be aggravated after terminating a pregnancy. However, the majority of both men and women don't seem to exhibit any severe psychological changes after experiencing an abortion. As FE models control for stable co-occurring risk factors, my results support stress theory, which predicts varied response patterns -- some women seem to experience changes in their level of depression symptoms after having an abortion, while others do not.

By using FE regression models, I make use of the full potential of panel data and show that POLS and RE regression models overestimate the effects of having an abortion on depression. This might explain why some previous studies that applied between-person comparisons found higher levels of depression in women that terminated a pregnancy as

compared to women who didn't (e.g., Broen et al. 2006, Fergusson et al. 2006). My results also find a slight increase in women's depressiveness after having abortion; however, the FE model shows an increase of only 1 point on a scale from 10 to 40. This effect seems rather small and no significant difference in depression levels were found two and three waves after having an abortion compared to pre-abortion waves in the *pairfam* data. These findings are also in line with previous studies that found no long-term effects of having an abortion on depression after controlling for co-occurring risk factors (e.g., Steinberg & Finer 2011, Steinberg et al. 2014, Warren et al. 2010).

3.4.2 Limitations

The *pairfam* data set has some limitations regarding this research question. Firstly, men are only able to report abortions of their declared partners, making the inclusion of non-partners impossible. Secondly, in comparison to national statistics, the women in the *pairfam* sample that report having had an abortion have fewer children and are more often unmarried. This might pose constraints to the generalizability of the results if married women and women who already have children are more likely to experience mental health repercussions after having an abortion. However, no such effect has been shown to date.

Moreover, as *pairfam*'s waves are roughly one year apart (depending on the exact interview date), we cannot know exactly how much time has passed since the reported abortion took place -- only that it occurred at some point since the last interview. Therefore, short-term changes in mental health might be more severe than estimated here. Long-term changes in depression levels after having an abortion are not visible, with the coefficients diminishing tremendously and losing significance as early as one wave after the reported abortion. However, the coefficients might not reach significance due to the small sample size. In the year of a reported abortion only 138, one year later 88, and two years later 66 women were interviewed. No systematic panel attrition was detectable, although a larger sample size would be ideal to confirm these results found here.

Due to the yearly panel design, it is also possible that some women were already pregnant at the time of the previous interview, which would facilitate the separation of stressful effects of an unwanted pregnancy from the stress of an abortion in the analyses on psychological repercussions. However, most respondents did not indicate a pregnancy at that point in time, so that we cannot be sure whether elevated depressiveness stems from the stress of an unwanted pregnancy or from having an abortion. Moreover, my analyses cannot distinguish whether

women with higher depression levels are more likely to have an unwanted pregnancy, or to decide to have an abortion if faced with an unwanted pregnancy.

Unfortunately, not all time-variant covariates could be included in these analyses. Stressful life events and exposure to partner violence were only recorded in a few waves, and were therefore not reliable measures here. The analyses on the likelihood to have an abortion are based on POLS regression models because for most respondents, only one unwanted/unexpected pregnancy or abortion was recorded during the seven-year observation period. These models are prone to bias and the results must be interpreted with care. A larger sample and a longer observation period would aid in solving this issue.

Furthermore, it should be considered that the above analyses on the changes in mental health after having an abortion were based on intra-individual changes. The advantage of these models is that they consider the level of depression symptoms before reporting having had an abortion, as well as control for stable co-occurring risk-factors. However, the presented models cannot compare repercussions to the alternatives of abortion, such as carrying an unwanted child to term and/or adoption. Birthing a child can also have negative effects on women's mental health: Postpartum depression is a common phenomenon, and if women are denied an abortion (or decide against one), emotional distress due to the birth of a child can be high. Biggs and colleagues (2017), for example, showed that women who were denied an abortion experience lower life satisfaction, lower self-esteem and more symptoms of anxiety compared to women who terminated a pregnancy.

3.4.3 Conclusion

This study found that women with higher levels of depression are more likely have an abortion. Furthermore, slightly elevated levels of depression are recorded for women one wave after having an abortion, but not for men. Moreover, no significant change in depressiveness was visible two and three waves after having an abortion as compared to the average over pre-abortion waves. In comparison to FE methods, both POLS and RE regression methods showed higher changes in depressiveness after having an abortion, which explains why some previous studies may have overestimated psychological repercussions of having an abortion.

4

THE INTERPLAY OF HAVING AN ABORTION, RELATIONSHIP SATISFACTION, AND UNION DISSOLUTION

4 THE INTERPLAY OF HAVING AN ABORTION, RELATIONSHIP SATISFACTION, AND UNION DISSOLUTION

Abstract: This study researches the associations between having an abortion, relationship satisfaction, and union dissolution. Empirical evidence on this topic is scarce, and there is a pronounced lack of studies analysing longitudinal data: Most previous studies have used data from women recruited from abortion clinics who are about to undergo an abortion, and therefore do not incorporate a prospective measure of relationship satisfaction pre-pregnancy. Panel studies, on the other hand, collect prospective data on various topics and allow for the estimation of more advanced models that can help identify causal mechanisms. Using data from the German Family Panel *pairfam* in combination with pooled logistic regressions, discrete-time event history models, as well as fixed effects regression models, this study compares relationships up to nine years before having had an abortion and eight years afterwards. The findings of the analyses can neither confirm that relationship satisfaction acts as a confounding factor that influences both the likelihood of terminating a pregnancy and union dissolution, nor as a mediating factor between having an abortion and union dissolution. A negative effect of having an abortion on relationship satisfaction appears to be only temporary. In the year of an abortion, relationship satisfaction decreases slightly. In the following years, a significant difference in relationship satisfaction to pre-abortion years is no longer visible. By using panel data, the temporal order of events can be retraced, resulting in the discovery that relationship satisfaction and union dissolution do not change drastically from pre-abortion values after having an abortion.

4.1 Introduction

Stressful life events can have an impact on relationship satisfaction and stability (Randall & Bodenmann 2009). For example, having children, relocating, and chronic illness can negatively influence partnership quality and even lead to union dissolution (Belsky et al. 1985, Boyle et al. 2008, Schmaling & Goldman Sher 2000). Research has shown that induced abortions (from now on "abortions") can be stressful for both the men and women involved (Kero & Lalos 2000). Having an abortion can thus be regarded as a stressful life event that might influence relationrship satisfaction and union dissolution. On the other hand, relationship satisfaction can influence the decision to abort a pregnancy (Kero et al. 2001), with relationship problems ranking amongst the most often mentioned reasons for having an abortion (Biggs et al. 2013, Kirkman et al. 2009). A negative association between having an abortion and

relationship satisfaction might therefore be explained by relationship satisfaction pre-pregnancy and not by a stressful abortion experience.

Only if the temporal order of events is considered can the causal mechanism be revealed. Cross-sectional data can compare the relationship satisfaction of couples who have had an abortion with couples who did not experience an abortion. However, this type of data cannot distinguish whether relationship satisfaction changed after having an abortion, or if couples terminated a pregnancy because they were less satisfied with their relationship. Therefore, longitudinal data is required, which not only can detect associations, but also help identify causal effects. Panel data enables an observation of individual changes following specific actions, events, or developments. By using panel data for this investigation, relationship satisfaction can be compared for the same individual before and after having an abortion, allowing for the detection of changes in relationship satisfaction in relation to having an abortion. Moreover, panel data permit the use of statistical models (such as fixed effects regression models) that control for all time-stable variation between couples who have reported having had an abortion and couples who haven't, allowing causal effects to be identified under weaker assumptions (Brüderl & Ludwig 2015).

The connection between having an abortion, stress, and mental health is a well-studied topic; however, few studies have addressed relationship satisfaction and stability after experiencing an abortion. Most studies addressing this topic haven't found any differences in sexual satisfaction or relationship quality between couples who report having had an abortion and those who haven't (Barnett et al. 1992, Freudenberg & Barnett 1988, Mauldon et al. 2015). However, some do find negative effects of abortion on relationships (e.g., Bianchi-Demicheli et al. 2001, Coleman et al. 2009), using either retrospective data or respondents recruited from abortion clinics (who are about to have an abortion). These data sources have the disadvantage that they do not incorporate an appropriate measure of pre-abortion relationship satisfaction. Longitudinal studies analysing the association between having an abortion and partnership characteristics are thus far very scarce, aside from one study by Väisänen (2017) that analyses register data. Unfortunately, these data do not contain a measure of relationship satisfaction.

The German Family Panel *pairfam*, on the other hand, allows the comparison of relationship satisfaction and stability up to nine years before and eight years after a couple experiences an abortion. Having an induced abortion is illegal in Germany, but no legal recourse is taken in the first 12 weeks of gestation if a medical, criminological, or social indication is given and if the individual underwent obligatory consultation (according to § 218a of the
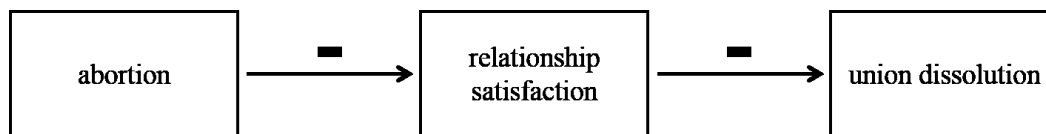
German Criminal Code). Abortions after 12 weeks of gestation are only possible for medical reasons. The social stigma surrounding abortion is still present, and few women talk about their experiences (Busch 2015). In 2019, 100,893 abortions took place in Germany – a ratio of 57 to 10,000 women (Federal Statistical Office of Germany 2020). The number of abortions was 9% lower in 2019 than in 2009 (Federal Statistical Office of Germany 2020).

Using *pairfam* data, I am able to address this topic from different angles: It enables an analysis of factors that influence the likelihood of having an abortion, as well as partnership characteristics after a couple has experienced an abortion. First, I analyse the likelihood of having an abortion depending on relationship satisfaction. Second, I examine the risk of union dissolution for couples that have experienced an abortion. Third, relationship satisfaction after having an abortion is investigated. With this three-step approach, I aim to examine the complex association between relationship satisfaction, having an abortion, and union dissolution, as well as demonstrate the advantages of using panel data to detect causal mechanisms.

4.2 Relationship satisfaction as a mediating or confounding factor

The termination of a pregnancy can be defined as a (potentially) stressful life event, as it constitutes a demanding or even threatening situation perceived as stressful by most (Kero & Lalos 2000, Wheaton 1996). Individual stress can then expand to partnership stress: Bodenmann (2005) defined dyadic stress as a stressful event that affects both partners either directly (if both partners are faced with the same event) or indirectly (if the stress of one partner spills over to the other). An abortion can therefore constitute a dyadic stressor, as it can often be stressful for both partners. Even if one partner perceives an abortion as less stressful, the stress the other partner is confronted with might spill over. Dyadic coping strategies and cooperative use of common resources are expected to follow in order to minimize the stress felt (Bodenmann 2005). The consequences of dyadic stress on an intimate relationship depends on each partner's vulnerabilities and coping resources (Karney & Bradbury 1995). Poor adaptive processes, such as the inability to empathize or defensive problem-solving, may affect couples' communication and lead to partnership dissatisfaction or even dissolution (Randall & Bodenmann 2009). High relationship satisfaction, on the other hand, can lower the likelihood of union dissolution (Karney & Bradbury 1995, Lillard & Waite 1993). Hence, the stress of an abortion might lower relationship satisfaction and, consequently, lead to a higher likelihood of union dissolution. This logic implies that relationship satisfaction is a mediator between having an abortion and union dissolution, as shown in Figure 2.

Figure 2. *Illustration of relationship satisfaction as a mediator between having an abortion and union dissolution*

On the other hand, the association between having an abortion and partnership characteristics might be explained by an opposite causal path. Some women worry that their relationship is too new or unstable to support a child without considerable strain (Kirkman et al. 2009, McIntyre et al. 2001). Relationship satisfaction may influence the decision to abort a pregnancy (Kero et al. 2001), as partner-related issues are one of the main reasons given for having an abortion (Biggs et al. 2013). Partnership dissatisfaction pre-pregnancy might explain a positive association between having an abortion and partnership dissatisfaction and union dissolution after an abortion. Furthermore, it might be less likely to decide to become a parent if a separation seems likely in the near future, as separation costs are higher in the presence of a child (Lillard & Waite 1993). Thus, abortions might not cause union dissolutions, but might occur more frequently shortly before a separation. Figure 3 depicts relationship satisfaction as a confounder, with a negative effect on having an abortion as well as union dissolution. If this is indeed the case, a positive association between having an abortion and union dissolution might be explained by pre-abortion relationship dissatisfaction. In the following, several analyses are conducted in order to shed light on the complex association between relationship satisfaction, having an abortion, and union dissolution with the goal of identifying whether relationship satisfaction acts as a mediator or confounder.

4.3 Previous research

Longitudinal analyses of Finnish register data reveal that experiencing a union dissolution is associated with a higher risk of abortion within the same year (Väisänen 2017). Register data offer a rich and reliable data source; however, relationship satisfaction is not reported. Therefore, the study cannot confirm whether relationship satisfaction is a confounder or a mediator in this relationship. Mauldon and colleagues (2015) used data from the Turnaway Study to compare women who had an abortion to women who were denied an abortion. Giving birth temporarily prolonged the latter group's current romantic relationship; however, just two years later, no differences were found between groups (Mauldon et al. 2015). Barnett and

colleagues (1992) and Freudenberg and Barnett (1988) each recruited about 100 women from abortion clinics and questioned them a few days before having an abortion and one year later. Women in a stable partnership who reported using contraception were questioned as the control group. Some women indicated that the abortion experience resulted in their partnership dissolution (Barnett et al. 1992, Freudenberg & Barnett 1988). However, post hoc rationalization might account for this finding since, objectively, no differences in union dissolution were found (Barnett et al. 1992). Separation often occurred more unexpectedly among the control group. Some women who had an abortion reported that the abortion experience served as an occasion to reflect on their relationship, realizing that the continuation was not desirable (Freudenberg & Barnett 1988).

Figure 3. *Illustration of relationship satisfaction as a confounder of having an abortion and union dissolution*
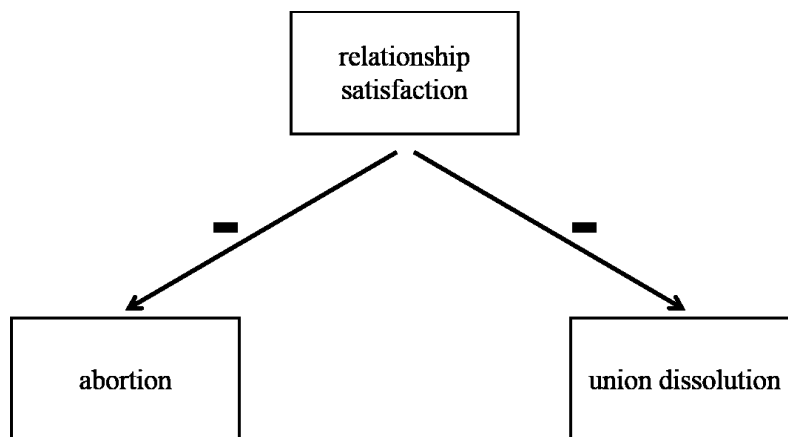
Source: own design

Women in problematic relationships or who recently experienced a separation seem to be more likely to decide to have an abortion (Finer et al. 2005, Kirkman et al. 2009). Evidence on the effect of having an abortion on consequent relationship satisfaction seems to be rather thin. When retrospectively asked about their experience, most women don't report any effects of having an abortion on their relationship quality; however, some reported experiencing negative or positive changes in their relationship (Canario et al. 2011, Kero & Lalos 2005, Miller 1992, Miller et al. 1998). Philipps and colleagues only found one of four relationship quality items to differ between groups: women who reported having had an abortion (in the current or a past relationship) communicated less with their partners than women who never had an abortion (Phillips et al. 2015). Moreover, Coleman et al. (2009) found an increased risk of sexual dysfunction, arguments about finances, conflict over relatives, and jealousy among

women who reported having an abortion with their current partner or in a previous relationship compared to women who never had an abortion. However, these two analyses do not distinguish whether the reported abortion happened in the current or a previous relationship. Therefore, effects of having an abortion in the current relationship can hardly be inferred. Barnett and colleagues (1992) and Freudenberg and Barnett (1988) detect more conflicts in the relationship shortly before having an abortion when compared to the control group. One year after the fact, no differences in relationship quality were detected.

So far, no known study has included an appropriate measure of relationship satisfaction pre-abortion. Some researchers that recruited respondents from abortion clinics questioned them a few days before the planned abortion (e.g. Bianchi-Demicheli et al. 2002, Freudenberg & Barnett 1988). However, evidence suggests that both men and women are more distressed in the days immediately preceding an abortion procedure compared to control groups. Women who have already decided to have an abortion experience elevated stress levels (Lauzon et al. 2000). Panel data, more specifically *pairfam* data, on the other hand, allow for a comparison of relationships several years before and after having had an abortion.

4.4 Data and Variables

pairfam is a multidisciplinary longitudinal study focusing on partnership and family dynamics in Germany. The partnership module encompasses questions regarding the development of intimate and sexual relationships and partnership quality and stability. Most questions are asked by an interviewer (CAPI), whereas sensitive questions regarding sexuality and abortion are included in a self-administered module (CASI). Over 12,000 randomly sampled men and women from the birth cohorts 1991-93, 1981-83, and 1971-73 are surveyed annually. The first wave was conducted at the end of 2008/ beginning of 2009, at which point the first cohort was 15-17, the second 25-27, and the third 35-37 years old. Field work for the eleventh wave started in October 2018 and finished in August 2019. A more detailed description of the study can be found in Huinink et al. (2011). The subsequent analyses are based on anchor and partner data from waves 1-11, Release 11.0 (Brüderl et al. 2020). The variables were measured as follows:

Abortion: From wave 2 onwards, female respondents were asked whether they had an abortion, and male respondents whether their female partner had an abortion since the last interview (or since the start of the relationship, if they reported having a new partner since the last wave). In 2019, 0.57% of German women had an abortion (Federal Statistical Office of

Germany 2020). In the *pairfam* data, an average of 0.82% of women had an abortion in a single wave. However, *pairfam* observes respondents in their most fertile phase in life; a higher percentage of abortion occurrence is therefore plausible.

Union dissolution: Respondents indicate whether their relationship ended since the last wave, including up until which month it lasted.

Relationship satisfaction: Relationship satisfaction was measured on a scale from 0 to 10 *(0: very dissatisfied – 10: very satisfied)* in the *pairfam* data.

Control variables: Relationship duration, the number of living children, relationship institutionalization (*categories: non-cohabiting, cohabiting unmarried, married*), the male partners' labour force status, the female partner's education level and age at the start of the relationship, and the gender of the main respondent can all influence relationship satisfaction, union dissolution, as well as the likelihood of having an abortion. Therefore, these variables are included as control variables in the subsequent analyses. In the following, several arguments as to why these variables can be considered confounders and therefore should be controlled for are discussed.

Relationship duration: If a partnership is new, the likelihood of having an abortion (Kirkman et al. 2009, Väisänen 2017) as well as union dissolution (Brüderl & Kalter 2001) is higher than in long-standing partnerships. However, relationship satisfaction is higher at the beginning of a relationship (Karney & Bradbury 1995). Relationship duration is measured in months, then divided by 12 to represent relationship duration in years (both linear and quadratic terms are included in the analyses).

Number of children: The number of children appears to positively influence the decision to abort (Broen et al. 2005, Kero et al. 2001). Having children reduces the risk of union dissolution (Brüderl 2000, Brüderl & Kalter 2001), although romantic partnerships without children report greater levels of relationship satisfaction compared to those with children (Meyer et al. 2016). The number of living children (categories: *0, 1, 2, 3 or more children*) is therefore also included as a control variable.

Relationship institutionalization: Unmarried partnerships are more inclined to both abort a pregnancy (Biggs et al. 2013, Rossier et al. 2007, Sihvo et al. 2003, Skjeldestad et al. 1994) and show higher levels of relationship dissatisfaction and breakups (Brown 2004, Poortman & Lyngstad 2007, Wiik et al. 2012) as compared to marriages.

Labour force status and education: Individuals in education or precarious working situations are more likely to have an abortion (Finer et al. 2005, Sihvo et al. 2003), while full-time employment of the male partner has a positive effect on relationship stability (Karney & Bradbury 1995, Killewald 2016). Women's employment status, on the other hand, is not related to relationship stability in Germany according to recent literature (e.g., Killewald 2016). Therefore, only male partner full-time and self-employment, compared to part-time employment and unemployment, is controlled for. Women with a basic education have a higher likelihood of abortion (Väisänen 2015) and are more prone to relationship dissatisfaction and union dissolution (van Damme 2020, van Damme & Dykstra 2018) than women with higher levels of education. Therefore, this analysis distinguishes between "*lower secondary education*," "*higher secondary education*," "*post-secondary/tertiary education,*" and "*no degree/currently enrolled*."

Female partner's age at start of relationship: The likelihood of union dissolution decreases with age at the start of a relationship (Brüderl 2000), and most women who report having had an abortion are between the ages of 20 and 29 (Jones & Jerman 2017).

Gender (main respondent): The gender of the main respondent is controlled for as well, as men tend to report higher levels of marital satisfaction (Skolnick 1986). Moreover, men can only report abortions they are aware of.

Information on age at the start of the relationship, employment status, and education level were derived from generated variables provided by the *pairfam* project team, generated from the anchor respondent as well as the partner survey (Brüderl et al. 2020b).

4.5 Analysis of having an abortion

4.5.1 Sample description and methods

First, I investigated the likelihood of having an abortion depending on relationship satisfaction. Do couples with different levels of relationship satisfaction have differing likelihoods of having an abortion? Most abortions are of unintended pregnancies (Henshaw 1998, Torres & Forrest 1988). The few women who abort planned pregnancies normally do so due to risks to their own health or foetal anomalies (Major et al. 2009). It is not recorded in the *pairfam* data whether the pregnancies of women who decide to have an abortion were planned or unplanned. However, less than four percent of abortions in Germany are due to health issues or foetal anomalies (Federal Statistical Office of Germany 2020). Therefore, it is assumed that

the vast majority of the reported abortions in the *pairfam* data stem from unplanned pregnancies. As the circumstances of planned pregnancies are in many aspects vastly different to those that are unplanned, the reference group for the following analysis consists of unwanted/unexpected pregnancies that were carried to term. The analysis sample is defined as follows: Heterosexual couples who reported an abortion are compared to couples who experienced an unwanted/unexpected pregnancy and decided not to terminate. In waves 2 and 3, respondents who gave birth were asked whether the pregnancy was not wanted at all or whether the timing of the pregnancy was inconvenient. In the following waves, the question was formulated differently, asking whether the pregnancy was "unexpected." Births included in the analysis sample were therefore either unwanted (waves 2 and 3) or unexpected (waves 4-11).

A total of 2,116 planned births were excluded from the sample. Two observations indicating having had an abortion as well as given birth in the same year were omitted. Furthermore, 112 respondents without a partner and 3 respondents in homosexual partnerships have been excluded. The control variables of wave t-1 are merged with the indication of a birth or an abortion of the following wave t, and respondents who separate from their partners between these two waves were also excluded (50 cases). Unfortunately, the exact month an abortion took place is not collected in the *pairfam* data. As relationship satisfaction is the explanatory variable, it must be ensured that the decision to have an abortion happened in the context of a romantic relationship. Therefore, it is pivotal that the partnership did not end before the pregnancy occurred or before the female partner was aware of the pregnancy. After dropping 17 cases with missing values on the included variables, the final sample consists of 279 births and 254 abortions, for a total of 533 observations.

Table 10 lists the unweighted percentage of observations for the included categorical variables as well as mean values and standard deviations for metric variables. Mean relationship satisfaction for the analysis sample is 8.0 if the couple had an unexpected child and 7.6 if the couple decided to have an abortion. A t-test finds this difference to be statistically significant at the 5% level. In over 22% of all observations, respondents indicated that they are very satisfied with their relationship. The mean relationship duration of the sample is between 6 and 7 years, while in about thirty percent of observations couples have been together for two years or less (158 observations).

Table 10. *Descriptive statistics for the analysis of having an abortion*

	Mean (SD) / Percent		
Variable	**All**	**Unexpected childbirth**	**Abortion**
Metric variables:			
Relationship satisfaction (*scale: 0-10*)	7.8 (2.3)	8.0 (2.1)	7.6 (2.5)
Relationship duration in years	6.6 (5.5)	6.5 (5.4)	6.8 (5.7)
Female partner's age at start of relationship	22.9 (5.5)	22.8 (5.6)	23.0 (5.3)
Categorical variables:			
Number of living children			
No children	37.5	41.6	33.1
1 child	26.8	25.1	28.7
2 children	22.2	21.8	22.4
3 or more children	13.5	11.5	15.8
Relationship institutionalization			
Married	50.5	50.9	50.0
Cohabiting, unmarried	29.1	29.7	28.4
Non-cohabiting	20.4	19.4	21.6
Female partner's education level			
No degree/currently enrolled	13.1	11.8	14.6
Lower secondary education	13.7	12.2	15.4
Higher secondary education	46.9	46.2	47.6
Post-secondary/tertiary education	26.3	29.8	22.4
Male partner's employment status			
Part-time/unemployed	23.1	23.3	22.9
Full-time	68.1	68.8	67.3
Self-employed	8.8	7.9	9.8
Main respondent female (*ref.: main respondent male*)	54.2	56.6	51.6
N (observations)	533	279	254
N (couples)	475	255	220

Source: pairfam waves 1-11, Release 11.0 (own calculations)

For 90% of respondents, only one unwanted pregnancy or abortion was observed over eleven waves. For 10% of respondents, two or more observations are included in the following analysis. As within-panel analyses cannot be estimated, the following represents a cross-sectional analysis that compares relationships that experienced an abortion with relationships that experienced an unwanted/unexpected pregnancy that was carried to term. Pooled logistic regression models with lagged independent variables from the previous wave and cluster-robust standard errors are estimated.

4.5.2 Results

Logistic regression analyses find a negative effect of relationship satisfaction on the likelihood of having an abortion (see average marginal effects in Model 1, Table A.17 in the appendix). Figure 4 shows the predicted probabilities of having an abortion depending on

relationship satisfaction with 95% confidence intervals, generated by the *margins* Stata command. Couples with a relationship satisfaction of 5 on a scale of 10 have a predicted abortion probability of 51%, while couples with a relationship satisfaction of 9 have a predicted abortion probability of 46%. However, this relationship is not significant at the 5% level.

Figure 4. *Conditional predicted probabilities of having an abortion depending on relationship satisfaction including 95% confidence intervals*
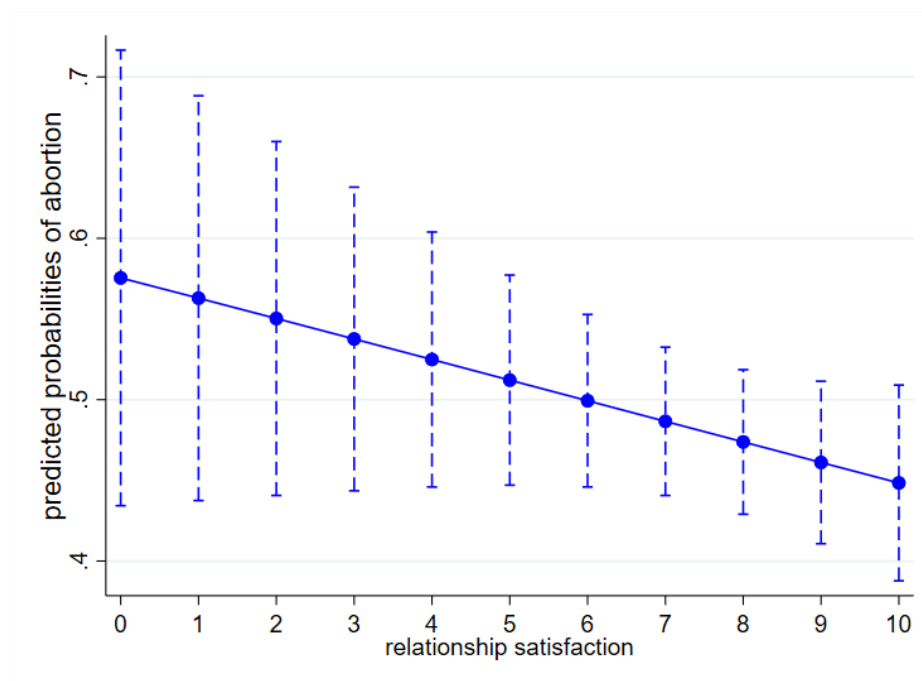
Notes:	*Based on logistic regression Model 1, Table A.17. Controlling for relationship institutionalization, number of living children, female partner's age at start of relationship and education level, male partners' employment status, and gender of main respondent.*
Source:	*pairfam waves 1-11, Release 11.0 (own calculations)*

4.6 Analysis of union dissolution

4.6.1 Sample description and methods

To study the risk of union dissolution (separations and divorces) over relationship duration, a discrete-time event history model (Allison 1982, Singer & Willett 1993) is estimated. The survey waves define the discrete measurement points, and the main interest is the effect of the time-varying variable *abortion* on the risk of separation. Discrete-time event history models can be estimated in the same fashion as logistic regression models (Best & Wolf 2010). To account for duration dependency, a quadratic relationship duration term is included (Box-Steffensmeier & Jones 2004).

The dissolution of a union is recorded in wave t, although it happened between waves t-1 and t. In the case of a reported union dissolution, respondents are asked in which month it occurred. Similarly, if an abortion took place between waves t-1 and t it is recorded in wave t. Unfortunately, the month in which an abortion occurred was not asked. Therefore, it is not known whether a separation reported in the same wave of having an abortion happened before or after the abortion. Nevertheless, it is assumed that it was the abortion that affected the dissolution (eventually by an anticipation effect), and not vice versa. Information on dissolution and abortion is copied to wave t-1, as information on the control variables was recorded the last time in wave t-1, before a dissolution occurred.

The unit of analysis is a romantic union. If a union lasted more than one wave, several observations of the same union are in the analysis sample. The analysis sample includes all unions in *pairfam*. If a respondent changes partners during the panel frame, this respondent can be part of the sample in different unions. The dependent variable *dissolution* is coded 1 if a dissolution occurred before the next wave and 0 if the union continued or if the union is censored (last observation in *pairfam*).

All men and women in heterosexual partnerships were included in the analysis. First, 21,549 observations of respondents without a partner and 452 observations of respondents in homosexual relationships were excluded. Next, 126 unions were deleted because their relationship started before they were 12 years old. To clearly distinguish between the effects of giving birth and having an abortion, 23 observations of couples who indicate that a child was born and that they also experienced an abortion in the same wave were removed. Then, 1,308 observations with missing values on any of the variables of interest were excluded. After eliminating 48 observations with identical values on the time variable (*relationship duration*) and 280 observations that began on or after the (first) separation (resulting from temporary breakups), the final sample includes 40,810 observations from 10,833 respondents. This sample includes 398 couples (with 1,300 observations) who report having, or their partner having had an abortion, and 318 couples (with 1,100 observations), that carried an unwanted/unexpected pregnancy to term. Almost eleven percent of observations in the final sample ended in separation.

To allow for a time-varying effect of abortion, four dummy variables were generated: *wave of abortion* (meaning: the interview was at most 12 months after abortion)*, one wave after abortion, two waves after abortion*, and *three or more waves after abortion*. The variable *wave of abortion* is coded 1 if an abortion took place since the last wave, and 0 otherwise. The latter

variables are coded 1 one/two/three or more waves after an abortion was reported, respectively, and 0 otherwise.

The number of living children is a time-varying variable that increases by 1 if a child is born to the respective couple. In addition, four dummy variables indicating the waves after an unexpected/unwanted birth, constructed analogously to the dummy variables of having an abortion (*wave of unexpected childbirth*, *one wave after unexpected childbirth*, *two waves after unexpected childbirth*, and *three or more waves after unexpected childbirth*) are included.

Table 11 reports the unweighted percentage of observations for the included categorical variables as well as mean values and standard deviations for metric variables. Relationship duration is lower for observations of couples that decided to terminate a pregnancy. Furthermore, they were older at the start of the relationship and more often are in unmarried relationships.

***Table 11.** Descriptive statistics for the analysis of union dissolution*

	Mean (SD) / Percent		
Variable	**All**	**Unexpected childbirth**	**Abortion**
Metric variables:			
Relationship satisfaction (*scale: 0-10*)	7.9 (2.2)	7.6 (2.2)	7.3 (2.4)
Relationship duration in years	9.0 (7.3)	8.2 (6.1)	8.2 (7.0)
Female partner's age at start of relationship	22.7 (6.1)	22.9 (5.6)	23.9 (6.0)
Categorical variables:			
Number of living children			
No children	41.3	11.2	28.9
1 child	20.3	31.8	27.4
2 children	26.2	28.6	25.2
3 or more children	12.2	28.4	18.5
Relationship institutionalization			
Married	51.9	57.7	50.1
Cohabiting, unmarried	23.4	30.9	27.8
Non-cohabiting	24.7	11.4	22.1
Female partner's education level			
No degree/currently enrolled	17.3	8.7	13.2
Lower secondary education	6.3	15.3	14.4
Higher secondary education	48.7	48.8	49.0
Post-secondary/tertiary education	27.7	27.2	23.4
Male partner's employment status			
Part-time/unemployed	25.8	20.2	23.5
Full-time	66.4	71.2	67.0
Self-employed	7.8	8.6	9.5
Main respondent female (*ref.: main respondent male*)	57.9	59.5	56.6
N (observations)	40,810	1,100	1,300
N (couples)	10,833	318	398

Source: pairfam waves 1-11, Release 11.0 (own calculations)

4.6.2. Results

The average marginal effects estimated by the event history models are presented in Table A.18 in the appendix. Both models control for relationship duration, relationship institutionalization, the number of living children, the female partner's education level and age at start of relationship, the male partners' employment status, and the gender of the main respondent. No significant effect on union dissolution is visible after having an abortion. Additionally, Model 3 controls for relationship satisfaction, which has a strong effect on union dissolution: The higher the respondent's relationship satisfaction, the lower the risk of union dissolution. However, the effect of having an abortion on union dissolution decreases only slightly (see Model 3, Table A.18). Figure 5 depicts the predicted probabilities of union dissolution over relationship duration from Model 2 generated through the *margins* Stata command.

Figure 5. *Conditional predicted probabilities of union dissolution depending on relationship duration*
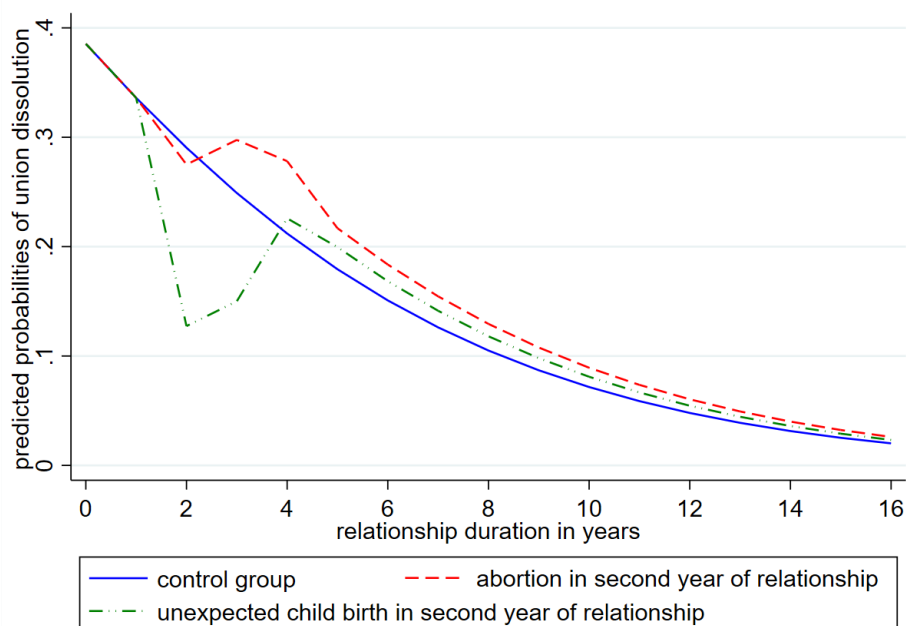
Notes:	*Based on discrete-time event history Model 2, Table A.18. Controlling for relationship institutionalization, number of living children, female partner's education level and age at start of relationship, male partner's employment status, and gender of main respondent.*
Source:	*pairfam waves 1-11, Release 11.0 (own calculations)*

The reference group is comprised of all heterosexual couples who did not experience an abortion or an unwanted/unexpected childbirth (blue line). These observations show a reduction in predicted probabilities of union dissolution with an increase in relationship duration that are

in line with recent research (Jalovaara & Kulu 2018). Furthermore, Figure 5 depicts predicted probabilities of union dissolution for couples that experience an abortion in the second year of their relationship (red line) and couples that experience an unwanted/unexpected birth in the second year of their relationship (green line). In the wave of abortion, the predicted probability of union dissolution decreases slightly. In the following two waves, the likelihood of separation increases; thereafter, probabilities realign with the reference group. However, the effects are rather small and not significant. Giving birth to an unexpected/unwanted child, on the other hand, decreases the likelihood for union dissolution significantly in the first two waves. Afterwards, predicted probabilities realign. Introducing a third-order time variable as well as including the logarithm of relationship duration yielded similar results to those presented.

4.7 Analysis of relationship satisfaction

4.7.1 Sample description and methods

Next, I examined relationship satisfaction after having an abortion. Again, all heterosexual partnerships were included in the analysis sample. Control variables from one wave were merged with the indication of an abortion and relationship satisfaction from the next wave. First, 21,290 observations of respondents without a partner and 4,844 observations with a change in partner between the merged waves were excluded. Second, 363 observations of respondents in homosexual relationships were deleted and 113 unions eliminated because their relationship started before they were 12 years old. Furthermore, 21 observations of couples who had an abortion and also reported the birth of a child in the same wave were removed. Then, 1,245 observations with missing values on any of the included variables were dropped. Next, only couples who did not have an abortion or unexpected birth in the first wave of panel participation were included in order to have a baseline measurement of relationship satisfaction (592 observations dropped). Moreover, in order to conduct a panel analysis, respondents with less than two observations were excluded (2,272 observations). The final sample consists of 32,683 observations from 5,901 couples, 140 of which who reported having an abortion (935 observations) and 202 of which who reported having an unexpected/unwanted birth (781 observations).

Again, four dummy variables were generated to indicate the effect of having an abortion over time: *wave of abortion* (meaning: the interview took place at most 12 months after the abortion)*, one wave after abortion, two waves after abortion*, and *three or more waves after abortion*. A summary of the variables used for the following analysis, separated in control group

and couples that experienced an abortion, is presented in Table 12. The first column shows the unweighted percentage of observations for dichotomous variables, and mean values with standard deviation in brackets for metric variables. The second column indicates the unweighted percentage of respondents who changed their status regarding each variable between waves. Relationship satisfaction is slightly lower if the couple experienced an abortion (7.3 vs. 7.8) and relationship satisfaction of 93.6% of couples who experienced an abortion ever changed between waves.

Table 12. *Descriptive statistics for the analysis of relationship satisfaction*

Variable	All		Abortion	
	Mean (SD) / Percent	**Percent of couples with change between waves**	**Mean (SD) / Percent**	**Percent of couples with change between waves**
Metric variables:				
Relationship satisfaction (*scale: 0-10*)	7.8 (2.1)	86.6	7.3 (2.4)	93.6
Relationship duration in years	10.1 (7.2)	100.0	8.9 (5.9)	100.0
Categorical variables:				
Number of living children				
No children	35.7	14.3	25.3	27.9
1 child	21.6	21.3	25.4	39.3
2 children	29.1	17.1	30.5	34.3
3 or more children	13.6	5.8	18.8	16.4
Relationship institutionalization				
Married	59.0	16.5	60.3	27.9
Cohabiting, unmarried	23.9	28.8	29.1	42.1
Non-cohabiting	17.1	21.0	10.6	30.0
Female partner's education level				
No degree/currently enrolled	12.5	13.1	8.6	10.7
Lower secondary education	5.8	3.1	10.6	5.7
Higher secondary education	50.8	10.8	49.4	10.7
Post-secondary/tertiary education	30.9	6.2	31.4	7.9
Male partner's employment status				
Part-time/unemployed	20.7	25.4	17.3	32.1
Full-time	70.9	29.7	69.2	39.3
Self-employed	8.4	8.8	13.5	15.0
N (observations)	32,683	32,683	935	935
N (couples)	5,901	5,901	140	140

Source: pairfam waves 1-11, Release 11.0 (own calculations)

First, a pooled linear regression model (POLS) was conducted, followed by an estimation with fixed effects (FE) regression models with cluster-robust standard errors. Compared to pooled regression models, results of the FE models can be based on a within-person comparison while controlling for time-constant variables (Brüderl & Ludwig 2015).
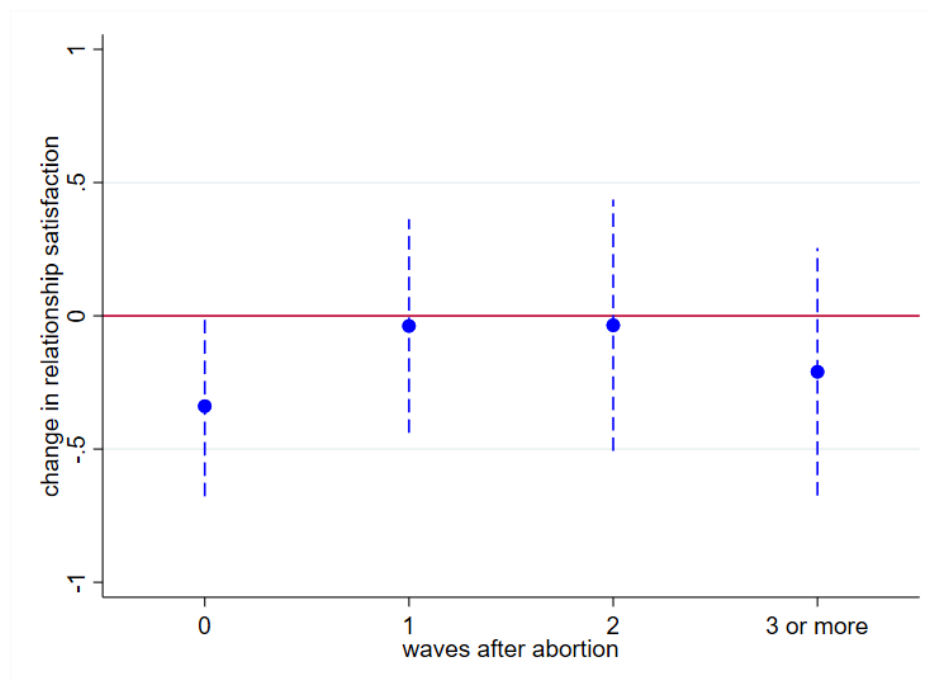
Therefore, the time-stable control variables *female partner's age at start of relationship* and *gender of main respondent* need not to be included in the model as they are automatically controlled for. Unobserved heterogeneity caused by time-constant variables does not bias the estimation, as only information on intra-individual changes over time is used and need not be accounted for in the model (Wooldridge 2010). In FE models, only respondents that reported experiencing an abortion are relevant to the estimation of the effect of having an abortion on relationship satisfaction. However, the control group remains in the analysis sample in order to provide reliable estimations for the control variables.

4.7.2. Results

Table A.19 in the appendix presents the main coefficients from POLS and FE regression models predicting levels of relationship satisfaction. The pooled linear regression shows a statistically significant decrease of roughly 0.5 to 0.7 points in relationship satisfaction in the waves following an abortion (Model 4). In the fixed effects model, the effect is considerably smaller (see Table A.19, Model 5). Figure 6 shows the change in relationship satisfaction after having an abortion including 95% confidence intervals as estimated by the FE model (Model 5). Immediately after an abortion, relationship satisfaction decreases 0.3 points, just reaching significance at the 5% level. In the next two waves, the effect is almost zero. Three or more waves after having an abortion the effect is again larger, but not statistically significant.

Either couples' satisfaction rises again one wave after having an abortion, or less satisfied couples separate and are not observed a second time after having an abortion. Bivariate analyses reveal that about 66% of couples whose relationship satisfaction is lower in the wave of an abortion are interviewed at least once more, while 75% of couples whose relationship satisfaction is the same or increased in the wave of abortion are interviewed at least one more time. Therefore, the alignment in relationship satisfaction one wave after abortion may be partly due to less satisfied relationships separating. However, the 66% of couples that have been interviewed a second time after having an abortion show, on average, a rise in relationship satisfaction after the initial drop in the wave of the abortion. Thus, it seems that the vanishing effect of an abortion on relationship satisfaction is not solely due to selection by union dissolution.

Figure 6. *Change in relationship satisfaction after having an abortion including 95% confidence intervals*

4.8 Discussion

This study sought to investigate the association between relationship satisfaction, experiencing an abortion, and union dissolution. The experience of an abortion can be regarded as a stressful life event that could potentially lead to partnership dissatisfaction and union dissolution. However, relationship satisfaction could also be a confounding factor, influencing both union dissolution and the likelihood of having an abortion. Few studies have addressed this association and no measure of relationship satisfaction pre-pregnancy has thus far been included in analyses. Using data from the German Family Panel *pairfam*, I was able to compare relationship satisfaction several years pre- and post-abortion to more accurately examine its interplay with union dissolution. The chosen panel data allow for the consideration of the temporal order of events, which helps identify causal mechanisms and sheds light on the associations between relationship satisfaction, having an abortion and union dissolution.

Results show a higher likelihood to abort a pregnancy with lower relationship satisfaction which is in line with previous research (Kero et al. 2001, Biggs et al. 2013). Couples that are more satisfied with their relationship are less likely to experience an abortion. However, the effect is not significant at the 5% level. The likelihood of union dissolution is slightly higher

after an abortion was recorded compared to couples who neither experienced an abortion nor an unwanted/unexpected birth (statistically not significant). This supports previous research that found no significant impact of having an abortion on separation rates (e.g., Barnett et al. 1992). Carrying an unwanted/unexpected pregnancy to term, on the other hand, seems to decrease the likelihood for union dissolution in the following two waves, which explains why previous studies found higher separation rates for couples who had an abortion compared to couples who carried an unwanted pregnancy to term (e.g., Mauldon et al. 2015).

After having an abortion, relationship satisfaction decreases slightly, but only in the wave the abortion took place. In the following waves, no lasting effect of having an abortion on relationship satisfaction is visible. Furthermore, the effect on relationship satisfaction is smaller in the fixed effects models compared to pooled regression models, suggesting that couples who experience an abortion differ in their pre-pregnancy relationship satisfaction or other unobserved indicators from couples who do not terminate their unwanted pregnancy.

Therefore, these results can neither confirm that relationship satisfaction acts as a confounding factor that influences both the likelihood of terminating a pregnancy and union dissolution, nor as a mediating factor between having an abortion and union dissolution. The effect of relationship satisfaction on the likelihood of having an abortion is not significant. Moreover, the negative effects on relationship satisfaction appear to be only temporary and the increase in probabilities for union dissolution after having an abortion is so small that it is not statistically significant. These results are therefore in line with studies that found no major effects of having an abortion on relationship quality (e.g., Barnett et al. 1992, Kero & Lalos 2005, Miller 1992).

The study also has some limitations:

1) Abortion is still a taboo topic in Germany (Busch 2015), which might lead to underreporting. The *pairfam* data shows a higher prevalence of abortion compared to German Abortion Statistics (Federal Statistical Office of Germany 2020); however, this might be due to *pairfam*'s young sample.

2) The stress of having an abortion might also lead to panel attrition or union dissolution. Changes in relationship satisfaction can only be analysed if the couple is still together in the wave following an abortion. Immediate breakups after having an abortion might not be included in the analysis. However, the event-history analysis found no association between having an abortion and union dissolution in the wave an abortion was reported. Therefore, those couples were still integrated in the analysis on relationship satisfaction in the wave of abortion. In the

following waves, the effect of having an abortion on union dissolution was positive, but not statistically significant. Furthermore, 66% of respondents who reported a decrease in relationship satisfaction in the wave of an abortion are interviewed at least once more. For these respondents, no lasting change in relationship satisfaction was observed in the following waves.

3) Unfortunately, no indication was given in *pairfam* data whether the couple agreed on the decision of whether or not to terminate the pregnancy. A disagreement at this stage might also have consequences on relationship satisfaction and union dissolution.

4) Furthermore, depending on the analysis, only 140 to 398 couples (with 254-1,300 observations) that experienced an abortion were able to be included in the models. These results must therefore be interpreted with care. Future research should strive to replicate these results with more observations and analyse whether couples who agree on the decision to have a child or an abortion differ from couples who disagree.

4.9 Conclusion

By using data from the German Family Panel *pairfam*, a more accurate temporal order in which the events surrounding an abortion unfold could be established. Separate regression models for each step could be estimated and the association between the three main variables *relationship satisfaction*, *having an abortion* and *union dissolution* could be tested while controlling for confounding variables. This approach can help to identify causal mechanisms behind this association and examine whether relationship satisfaction changes after having an abortion, leading to union dissolution, or whether couples have an abortion and separate because they are less satisfied with their relationship.

Results support neither hypothesis. Neither relationship satisfaction before having an abortion nor union dissolution after having an abortion are significantly different from the control group. The only statistically significant effect is found for relationship satisfaction after having an abortion: Couples who experienced an abortion also experience a temporary drop in relationship satisfaction. The cause of this decrease in relationship satisfaction is not certain – it could be attributed to the abortion itself, or also to problems arising from the social stigma surrounding abortion, or even to the disagreement on whether to terminate the pregnancy. Data on whether the couples agree on the decision to have a child, attitudes towards having an abortion, and the perceived social stigma of having an abortion would help to identify the mechanisms behind this temporary decrease in relationship satisfaction. However, relationship

satisfaction and union dissolution do not seem to change drastically from pre-abortion values after having an abortion.

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APPENDIX

Table A.1 *Summary of pooled OLS (POLS), random (RE), and fixed effects (FE) Poisson regression analyses estimating the frequency of sexual intercourse*

Variable	POLS	RE	FE
Distribution of core housework	-0.022	-0.044	-0.045
Distribution of non-core housework	0.037	0.005	-0.028
Relationship duration (ref.: more than 16 years)			
0-1 years	0.996***	1.011***	1.125***
1-2 years	0.618***	0.668***	0.767**
2-3 years	0.431***	0.352**	0.448
3-5 years	0.184*	0.117	0.208
5-7 years	0.012	0.024	0.135
7-10 years	0.020	0.005	0.102
10-13 years	0.005	0.013	0.096
13-16 years	-0.089	-0.081	-0.029
Married	0.150*	0.116	0.091
Age of youngest child in the household			
(ref.: no children)			
0-2 years old	-0.320***	-0.399***	-0.513***
2-6 years old	-0.068	-0.155*	-0.315**
6-13 years old	0.105	-0.022	-0.245*
13-25 years old	0.222**	-0.018	-0.320*
Health status male partner	0.046*	0.041*	0.036
Health status female partner	0.059**	0.056**	0.052**
Male partner's paid working hours	0.001	0.000	0.000
Female partner's paid working hours	-0.000	0.001	0.002
Female partner's age	-0.019***	-0.016**	-0.010
Wave (ref.: Wave 3)			
Wave 5	-0.062	-0.059*	-0.041
Wave 7	-0.105*	-0.096**	-0.061
N (observations)	3,192	3,192	3,126
N (couples)	1,315	1,315	1,286

Notes: Coefficients from Poisson regression models. In the FE model, 29 couples (66 observations) were dropped due to all-zero outcomes.
$*p<.05, **p<.01, ***p<.001$
Source: pairfam waves 3, 5, 7, Release 7.0 (own calculations)

Table A.2 *Summary of pooled OLS (POLS), random (RE), and fixed effects (FE) Poisson regression analyses estimating the frequency of sexual intercourse*

Variable	POLS	RE	FE
Distribution of household tasks perceived as fair	0.078*	0.015	-0.016
Relationship duration (ref.: more than 16 years)			
0-1 years	0.974***	0.998***	1.120**
1-2 years	0.614***	0.655***	0.750**
2-3 years	0.429***	0.350**	0.437
3-5 years	0.178	0.113	0.201
5-7 years	0.003	0.016	0.125
7-10 years	0.016	0.002	0.095
10-13 years	0.003	0.011	0.091
13-16 years	-0.087	-0.082	-0.034
Married	0.150*	0.117	0.091
Age of youngest child in the household			
(ref.: no children)			
0-2 years old	-0.306***	-0.394***	-0.512***
2-6 years old	-0.050	-0.146*	-0.312**
6-13 years old	0.118*	-0.014	-0.241*
13-25 years old	0.233**	-0.007	-0.309*
Health status male partner	0.046*	0.040*	0.035
Health status female partner	0.058**	0.055**	0.052**
Male partner's paid working hours	0.001	0.001	0.001
Female partner's paid working hours	-0.000	0.000	0.001
Female partner's age	-0.020***	-0.016**	-0.010
Wave (ref.: Wave 3)			
Wave 5	-0.063	-0.059*	-0.040
Wave 7	-0.105*	-0.095**	-0.059
N (observations)	3,192	3,192	3,126
N (couples)	1,315	1,315	1,286

Notes: *Coefficients from Poisson regression models. In the FE model, 29 couples (66 observations) were dropped due to all-zero outcomes.*
  *p<.05, **p<.01, ***p<.001
Source: *pairfam waves 3, 5, 7, Release 7.0 (own calculations)*

Table A.3 *Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction including a quadratic term of housework distribution*

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework	-0.143	0.042
Distribution of core housework squared	0.021	-0.028
Distribution of non-core housework	-0.260	-0.453
Distribution of non-core housework squared	0.029	0.067
N (observations)	3,126	3,192
N (couples)	1,286	1,315

Notes: *Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 29 couples (66 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables.*
*$p<.05$, **$p<.01$, ***$p<.001$
Source: *pairfam waves 3, 5, 7, Release 7.0 (own calculations)*

Table A.4 *Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction with ordinal variable housework distribution*

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework		
(ref.: housework is distributed equally)		
Female partner does all of the housework	0.089	-0.058
Female partner does most part of the housework	0.014	-0.142
Male partner does most part of the housework	0.071	-0.036
Male partner does all of the housework	-0.120	-1.154
Distribution of non-core housework		
(ref.: housework is distributed equally)		
Female partner does all of the housework	0.415	-0.204
Female partner does most part of the housework	-0.039	0.173
Male partner does most part of the housework	-0.061	-0.003
Male partner does all of the housework	-0.053	0.134
N (observations)	3,126	3,192
N (couples)	1,286	1,315

Notes: *Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 29 couples (66 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables.*
*$p<.05$, **$p<.01$, ***$p<.001$
Source: *pairfam waves 3, 5, 7, Release 7.0 (own calculations)*

Table A.5 *Summary of multinomial logit fixed effects regression analyses estimating the frequency of sexual intercourse*

Variable	Frequency of sexual intercourse	Frequency of sexual intercourse
No sexual intercourse in the last 3 months		
Distribution of core housework	0.471	-
Distribution of non-core housework	-0.161	-
Perceived fairness of distribution of household tasks *(ref.: not fair)*	-	-0.416
Once a month or less frequently		
Distribution of core housework	0.225	-
Distribution of non-core housework	-0.107	-
Perceived fairness of distribution of household tasks *(ref.: not fair)*	-	-0.130
Reference: Two or three times a month		
Once a week		
Distribution of core housework	-0.026	-
Distribution of non-core housework	0.056	-
Perceived fairness of distribution of household tasks *(ref.: not fair)*	-	-0.087
Two or three times a week		
Distribution of core housework	-0.164	-
Distribution of non-core housework	-0.341	-
Perceived fairness of distribution of household tasks *(ref.: not fair)*	-	-0.099
More than three times a week		
Distribution of core housework	0.090	-
Distribution of non-core housework	-0.511	-
Perceived fairness of distribution of household tasks *(ref.: not fair)*	-	-0.638
N (observations)	2,129	2,129
N (couples)	848	848

Notes: *Coefficients from multinomial logit regression models. 467 couples (1063 observations) were dropped due to all-positive or all-negative outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables.*
           $*p<.05, **p<.01, ***p<.001$
Source: *pairfam waves 3, 5, 7, Release 7.0 (own calculations)*

Table A.6 *Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction with different sample sizes*

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework	-0.014	0.044
Distribution of non-core housework	-0.012	0.067
N (observations)	8,633	11,034
N (couples)	2,237	2,726

Notes: *Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 44 couples (139 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables.*
*$p<.05$, **$p<.01$, ***$p<.001$
 Source: *pairfam, Release 7.0 (own calculations)*

Table A.7 *Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction with same variables as Johnson and colleagues (2016)*

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework	-0.068	-0.058
N (observations)	3,155	3,219
N (couples)	1,300	1,328

Notes: *Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 28 couples (64 observations) were dropped due to all-zero outcomes. All models include relationship duration, age of the youngest child in the household, health status of both partners, female partner's age, relationship satisfaction, residence in former East Germany, and wave dummies as control variables.*
*$p<.05$, **$p<.01$, ***$p<.001$
 Source: *pairfam, waves 3, 5, 7, Release 7.0 (own calculations)*

Table A.8 *Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction with same variables as Johnson and colleagues (2016)*

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of household tasks perceived as fair	-0.028	-0.120
N (observations)	3,155	3,219
N (couples)	1,300	1,328

Notes: *Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 28 couples (64 observations) were dropped due to all-zero outcomes. All models include relationship duration, age of the youngest child in the household, health status of both partners, female partner's age, relationship satisfaction, residence in former East Germany, and wave dummies as control variables.*
*$p<.05$, **$p<.01$, ***$p<.001$
 Source: *pairfam, waves 3, 5, 7, Release 7.0 (own calculations)*

Table A.9 *Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction (only female partner's reports)*

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework	-0.017	-0.068
Distribution of non-core housework	-0.051	0.003
N (observations)	1,539	1,579
N (couples)	635	652

Notes: *Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 17 couples (40 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables.*
 *p<.05, **p<.01, ***p<.001
Source: *pairfam waves 3, 5, 7, Release 7.0 (own calculations)*

Table A.10 *Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction (only male partner's report)*

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of core housework	-0.077	-0.079
Distribution of non-core housework	-0.015	0.094
N (observations)	1,587	1,613
N (couples)	651	663

Notes: *Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 12 couples (26 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables.*
 *p<.05, **p<.01, ***p<.001
Source: *pairfam waves 3, 5, 7, Release 7.0 (own calculations)*

Table A.11 *Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction (only female partner's report)*

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of household tasks perceived as fair	-0.047	0.036
N (observations)	1,539	1,579
N (couples)	635	652

Notes: *Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 17 couples (40 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables.*
 *p<.05, **p<.01, ***p<.001
Source: *pairfam waves 3, 5, 7, Release 7.0 (own calculations)*

Table A.12 *Summary of fixed effects regression analyses estimating frequency of sexual intercourse and sexual satisfaction (only male partner's report)*

Variable	Frequency of sexual intercourse	Sexual satisfaction
Distribution of household tasks perceived as fair	0.017	0.014
N (observations)	1,587	1,613
N (couples)	651	663

Notes: *Coefficients from linear regression model for sexual satisfaction and Poisson regression model for frequency of sexual intercourse. In the latter, 12 couples (26 observations) were dropped due to all-zero outcomes. All models include relationship duration, marital status, age of the youngest child in the household, health status of both partners, paid working hours of both partners, female partner's age, and wave dummies as control variables. *p<.05, **p<.01, ***p<.001*

Source: *pairfam waves 3, 5, 7, Release 7.0 (own calculations)*

Table A.13 *Descriptive statistics (N = 284 women and 170 men)*

Variable	Women Mean (SD) / Percent	Men Mean (SD) / Percent
Metric variables:		
Depression *(range: 10-40)*	19.0 (5.8)	17.2 (4.4)
Age	28.1 (6.9)	30.9 (6.6)
Number of living children	1.0 (1.2)	0.9.(1.1)
Categorical variables:		
Abortion	52.1	50.0
Relationship status		
Single	20.8	0.0
Non-cohabiting	21.5	25.3
Cohabiting unmarried	25.0	22.4
Married	32.7	52.3
Wave		
Wave 2	20.4	23.5
Wave 3	20.1	12.4
Wave 4	15.5	19.4
Wave 5	16.5	13.0
Wave 6	16.9	18.2
Wave 7	10.6	13.5

Source: *pairfam waves 2-8, Release 8.0 (own calculations)*

Table A14. *Summary of pooled logistic regression analyses estimating the likelihood of having an abortion including employment status and household income*

Variable	Women	Men
Depression *(range: 10-40)*	0.080**	0.029
Pseudo R^2	0.158	0.097
N (observations)	254	152

Notes: Coefficients from pooled logistic regression models. All models include relationship status, age, age squared, number of living children, employment status, household income, and wave dummies.
* * p<0.05, ** p<0.01, *** p<0.001*
Source: *pairfam waves 2-8, Release 8.0 (own calculations)*

Table A.15 *Summary of FE regression analyses estimating levels of depression symptoms in men and women including missing categories*

Variable	Women	Men
Abortion		
One wave after abortion	1.124**	0.402
Two waves after abortion	0.104	-0.601
Three waves after abortion	0.292	0.270
Missing value for abortion	0.154	0.099
R^2	0.009	0.015
R^2 (between)	0.004	0.013
R^2 (within)	0.030	0.038
N (observations)	24,549	22,060
N (persons)	4,682	4,310

Notes: Coefficients from linear probability models. All models include relationship status, age, age squared, number of living children, and wave dummies.
* * p<.05, ** p<.01, *** p<.001*
Source: *pairfam waves 2-8, Release 8.0 (own calculations)*

Table A.16 *Summary of FE regression analyses estimating levels of depression symptoms in men and women including employment status and household income*

Variable	Women	Men
Abortion		
One wave after abortion	1.158*	0.285
Two waves after abortion	-0.082	-0.439
Three waves after abortion	0.102	0.353
R^2	0.006	0.014
R^2 (between)	0.002	0.014
R^2 (within)	0.032	0.041
N (observations)	20,405	18,291
N (persons)	4,305	3,972

Notes: Coefficients from linear probability models. All models include relationship status, age, age squared, number of living children, employment status, household income, and wave dummies.
* * p<.05, ** p<.01, *** p<.001*
Source: *pairfam waves 2-8, Release 8.0 (own calculations)*

Table A.17 *Summary of logistic regression analyses estimating the likelihood of having an abortion versus having an unexpected/unwanted child*

Variable	Model 1	
	A.M.E.	**S.E.**
Relationship satisfaction (*scale: 0-10*)	-0.013	(0.009)
Relationship duration in years	0.006	(0.016)
Relationship duration in years squared	0.000	(0.001)
Number of living children (*ref.: no children*)		
1 child	0.120	(0.065)
2 children	0.076	(0.077)
3 or more children	0.117	(0.088)
Relationship institutionalization (*ref.: married*)		
Cohabiting, unmarried	0.051	(0.062)
Non-cohabiting	0.110	(0.077)
Female partner's age at start of relationship	0.005	(0.006)
Female partner's education level (*ref. no degree/currently enrolled*)		
Lower secondary education	-0.040	(0.085)
Higher secondary education	-0.115	(0.079)
Post-secondary/tertiary education	-0.206*	(0.090)
Male partner's employment status (*ref.: part-time/unemployed*)		
Full-time	0.038	(0.059)
Self-employed	0.075	(0.092)
Main respondent female (*ref. main respondent male*)	-0.062	(0.046)
Pseudo R^2	0.026	
N (observations)	533	
N (couples)	475	

Notes: *Average marginal effects with cluster-robust standard errors in parentheses. Variables were measured in the wave before an abortion/unexpected birth was reported.*
            * p<.05, ** p<.01, *** p<.001
Source: *pairfam waves 1-11, Release 11.0 (own calculations)*

Table A.18 *Summary of discrete-time event history models estimating the likelihood of union dissolution*

Variable	Model 2		Model 3	
	A.M.E.	**S.E.**	**A.M.E.**	**S.E.**
Abortion				
In the wave of abortion	-0.007	(0.015)	-0.015	(0.014)
One wave after abortion	0.026	(0.017)	0.016	(0.016)
Two waves after abortion	0.039	(0.022)	0.023	(0.020)
Three or more waves after abortion	0.025	(0.014)	0.018	(0.013)
Unexpected childbirth				
In the wave of unexpected childbirth	-0.071***	(0.011)	-0.071***	(0.010)
One wave after unexpected childbirth	-0.051**	(0.017)	-0.051**	(0.016)
Two waves after unexpected childbirth	0.008	(0.024)	-0.000	(0.022)
Three or more waves after unexpected childbirth	0.014	(0.018)	0.012	(0.017)
Relationship satisfaction (*scale: 0-10*)	-	-	-0.015***	(0.001)
Relationship duration in years	-0.021***	(0.001)	-0.023***	(0.001)
Relationship duration in years squared	0.001***	(0.000)	0.001***	(0.000)
Number of living children (*ref.: no children*)				
1 child	0.001	(0.005)	-0.004	(0.005)
2 children	0.009	(0.006)	0.005	(0.006)
3 or more children	0.009	(0.008)	0.005	(0.008)
Relationship institutionalization (*ref.: married*)				
Cohabiting, unmarried	0.031***	(0.004)	0.027***	(0.004)
Non-cohabiting	0.100***	(0.006)	0.091***	(0.006)
Female partner's age at start of relationship	-0.002***	(0.000)	-0.003***	(0.000)
Female partner's education level (*ref. no degree/currently enrolled*)				
Lower secondary education	0.009	(0.006)	0.004	(0.006)
Higher secondary education	-0.010*	(0.004)	-0.013**	(0.004)
Post-secondary/tertiary education	-0.030***	(0.005)	-0.030***	(0.005)
Male partner's employment status (*ref.: part-time/unemployed*)				
Full-time	-0.024***	(0.003)	-0.024***	(0.003)
Self-employed	-0.012	(0.007)	-0.014*	(0.007)
Main respondent female (*ref. main respondent male*)	0.002	(0.003)	0.001	(0.003)
Pseudo R²	0.242		0.265	
N (observations)	40,810		40,810	
N (couples)	10,833		10,833	

Notes: *Average marginal effects with cluster-robust standard errors in parentheses. Control variables were measured in the wave before an abortion/unexpected birth/union dissolution was reported.*
* p<.05, ** p<.01, *** p<.001
Source: *pairfam waves 1-11, Release 11.0 (own calculations)*

Table A.19 *Summary of linear regression models estimating relationship satisfaction*

Variable	Model 4		Model 5	
	POLS	**S.E.**	**FE**	**S.E.**
Abortion				
In the wave of abortion	-0.687**	(0.225)	-0.339*	(0.173)
One wave after abortion	-0.531*	(0.236)	-0.038	(0.205)
Two waves after abortion	-0.679*	(0.278)	-0.035	(0.241)
Three or more waves after abortion	-0.627*	(0.249)	-0.210	(0.237)
Unexpected childbirth				
In the wave of unexpected childbirth	-0.066	(0.130)	0.085	(0.135)
One wave after unexpected childbirth	-0.450*	(0.183)	-0.168	(0.184)
Two waves after unexpected childbirth	-0.530*	(0.230)	-0.247	(0.223)
Three or more waves after unexpected childbirth	-0.311	(0.173)	-0.038	(0.181)
Relationship duration in years	-0.031**	(0.011)	-0.072***	(0.013)
Relationship duration in years squared	0.001*	(0.000)	0.001**	(0.000)
Number of living children (*ref.: no children*)				
1 child	-0.482***	(0.057)	-0.314***	(0.062)
2 children	-0.558***	(0.061)	-0.468***	(0.082)
3 or more children	-0.513***	(0.080)	-0.568***	(0.119)
Relationship institutionalization (*ref.: married*)				
Cohabiting, unmarried	-0.354***	(0.057)	0.048	(0.057)
Non-cohabiting	-0.475***	(0.073)	0.098	(0.074)
Female partner's education level (*ref. no degree/currently enrolled*)				
Lower secondary education	-0.207	(0.109)	0.211	(0.156)
Higher secondary education	-0.323***	(0.061)	0.069	(0.059)
Post-secondary/tertiary education	-0.175**	(0.066)	-0.094	(0.077)
Male partner's employment status (*ref.: part-time/unemployed*)				
Full-time	0.017	(0.048)	-0.020	(0.043)
Self-employed	-0.067	(0.079)	-0.050	(0.081)
R^2	0.020			
R^2 (within)			0.013	
N (observations)	32,683		32,683	
N (couples)	5,901		5,901	

Notes: *Coefficients of pooled OLS (POLS) and fixed effects (FE) regression models with cluster-robust standard errors in parentheses. Control variables were measured in the wave before an abortion/relationship satisfaction was reported.*
* p<.05, ** p<.01, *** p<.001
Source: *pairfam waves 1-11, Release 11.0 (own calculations)*