THE AFTERMATH OF CRITICAL LIFE EVENTS: PARENTAL DEATH, PARENTAL SEPARATION, AND FORCED MIGRATION

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CHAPTER 1
INTRODUCTION

1.1. Background and aim of the dissertation

Over the course of life, individuals experience various critical life events. A critical life event is defined as a turning point that involves significant changes in an individual's life course and requires adaptation of life plans and routines (Comolli et al., 2024; Filipp, 2001; Rosenberg & Hof, 2021). Such events are also widely referred to in the literature as major (Luhmann et al., 2020) or stressful (Pearlin, 2010; Dohrenwend, 1973). They often involve the changes in roles, status, and identity (Comolli et al., 2024). They may be positively anticipated (e.g., childbirth, transition to employment) or mostly negatively experienced (e.g., parental death, parental separation, forced migration), yet both may involve significant disruptions and require coping decisions. This dissertation focuses on the disruptions within the mostly negatively experienced critical life events and the adaptation processes they entail.

Individuals do not choose to experience negative critical life events, yet they have no choice but to deal with the consequences. These consequences depend on the nature of the event and may include implications for health, as well as the disruption and reconstruction of individual and wider social systems (Elder, 1994, 2000). Given the constraints, individuals, as human agents, learn to make decisions that enable them to cope with and recover from critical events, while also guiding their subsequent actions and plans within the new environment (Bernardi et al., 2019; Elder, 1994).

Since critical life events develop within social contexts, an expanding body of sociological research has focused on them (e.g., Luhmann et al., 2012). This dissertation is structured in *two parts*, focusing on the aftermath of *two distinct types* of critical life events. First, I examine disruptions in individuals' life course within the *family context*—specifically, disruptions in adult children's mental health caused by *parental death* (critical event 1) and in extended family

relations associated with *parental separation* (critical event 2). Second, I investigate disruptions and adaptation within the context of *forced migration* (critical event 3)—specifically, how refugees' integration and settlement intentions evolve over time, and how their social networks and potential romantic aspirations may be interrupted. Both types of life events are connected to individuals' "home"—whether the family of origin or the country of origin—contexts where people are expected to feel safe and find comfort in times of need. Disruptions within these domains can therefore be particularly critical and distressing for individuals.

The family-related life events examined in this dissertation (Part 1)—*parental death* and *parental separation*—have received attention from family sociologists. For *parental death*, sociological and psychological researchers have increasingly focused on loss in adulthood, as parents now typically die at very old ages due to rising life expectancy and advances in health care (United Nations, 2024). Because parental death is a critical and life-altering event (Umberson, 2003), it can negatively affect individuals' mental health (Bowlby, 1980), with consequences documented for depressive symptoms (e.g. Kamis et al., 2022), cognitive impairment (e.g. Liu et al., 2022), mental health disorders (Böckerman et al., 2023) and life satisfaction (Leopold & Lechner, 2015). However, most of these studies rely on the yearly effects of parental death, which overlook the most critical period for coping and recovery—the first year after loss, as suggested by theories of grief and coping (Bonanno et al., 2002; Bowlby, 1980; DeVaul et al., 1979; Shuchter & Zisook, 1993). The depth of the negative consequences may therefore be greater during the first year after loss, with subsequent recovery unfolding faster than previous research has documented, warranting further investigation.

Parental separation, which can cause emotional strain for both parents and children (Amato, 2000; Furstenberg, 1990), has been studied for its impact on the immediate "nuclear kin", such as parent-child or sibling relationships. Studies show that children of separated

parents often report weaker emotional closeness in adulthood (Amato & Sobolewski, 2001; Scott et al., 2007) and less frequent contact with both parents (Albertini & Garriga, 2011; de Graaf & Fokkema, 2007; Hetherington et al., 2019; Kalmijn, 2008, 2013; Köppen et al., 2018) and siblings (Steinbach & Hank, 2018). Research on parental separation has recently been redirected toward its effects on the wider family network. This change was driven by new theoretical perspectives on kinship, data availability, and demographic shifts, such as the "divorce revolution" and population ageing. *First*, a new perspective on kinship emphasizes extended and complex family ties rather than focusing solely on nuclear relations (Furstenberg, 2020). These ties function as a "kinship reservoir" that can be activated in times of need for support and exchange and were often overlooked in prior research (Cullati et al., 2018). *Second*, kinship research has been enriched by advances in formal methods (Caswell, 2024) and availability of register data (Alburez-Gutierrez et al., 2023; de Bel et al., 2025; Kolk et al., 2023). *Third*, "divorce revolution", characterized by rising divorce rates in Western societies and framed within the Second Demographic Transition (Sobotka, 2008; Van De Kaa, 1987), has increased the complexity of family structures and kinship ties. Population ageing, in turn, has reshaped families "from pyramids to beanpoles", resulting in more vertically shared lives among children, parents, and grandparents (Bengtson, 2001). The opportunity of multiple generations to exist in one family—"beyond the nuclear family" (Bengtson, 2001)—has opened new potential for research on life events. For parental separation, this implies the presence of a broader network of extended kin—such as grandparents, aunts, uncles, and cousins—whose relationships with the adult children of the separated parents may be affected by the event. Family systems (Cox & Paley, 1997; Hetherington et al., 1992) and social network theories (Burt, 2005) suggest that if the nuclear relations are disrupted, ties with the periphery, such as extended kin, are also expected to weaken as a byproduct. Yet, prior research has rarely examined these peripheral ties beyond occasional consideration of grandparents or in-laws (e.g.

Albertini & Tosi, 2018; de Bel, 2023; Jappens & Van Bavel, 2016; Westphal et al., 2015). A comprehensive analysis therefore requires data covering the full family network, including distinctions between maternal and paternal kin lines.

The *forced migration* event examined in this dissertation (Part 2) has received attention from scholars in the sociology of migration. The global population of refugees continues to grow, with a considerable share originating from Ukraine, Syria, and Afghanistan (UNHCR, 2024). Forced migration is more than just a displacement from the country of origin to the host country. It has implications for entire social systems of refugees and entails complex adaptation processes. It can disrupt the existing social ties, including those with family, partners, friends, and acquaintances. Their interconnection and embeddedness within one another as "linked lives" may be interrupted, complicating the formation of new ties (Elder, 1994; Elder et al., 2003; Elder & Shanahan, 2007). These disruptions, in turn, may alter refugees' decisions to settle or integrate in the host country. Migration scholars emphasize that settlement intentions and integration are not predetermined and can change dynamically due to evolving personal and structural circumstances (Bilgili et al., 2022). This means that these processes can be interdependent and mutually reinforcing. For instance, if refugees decide to settle in the host society within the opportunities and constraints of the environment (Elder et al., 2003), this decision may influence their subsequent action and desire to integrate, as also outlined in the theory of intergenerational migration by Esser (2004). And the other way around, better prior levels of integration or decisions to integrate may influence subsequent decisions to settle in the host country as assumed by the neoclassical migration and human capital theory (De Haas et al., 2019). Previous studies have predominantly examined unidirectional relationships between cultural (e.g. Haas & Fokkema, 2011; Wachter & Fleischmann, 2018), social (e.g. de Vroome & Tubergen, 2014; Martinovic et al., 2015), and structural integration (Constant & Massey, 2002; Dustmann, 1997) and migrants' settlement intentions, typically using between-

individual comparisons and cross-sectional data. The ways in which integration experiences and settlement intentions influence each other over time for refugees, particularly among the relatively understudied group of Ukrainian refugees following the Russian full-scale invasion of Ukraine, remain largely unexplored.

Because forced migration may disrupt social ties, it can additionally complicate refugees' partnership formation plans—particularly for young refugees who are expected to follow the "social clock"—culturally normative timeline of life events, such as marriage and union formation (Neugarten et al., 1965). For refugees from Syria and Afghanistan—primarily young Muslim men at an active partnership-forming age with strong religiosity profiles, whose largest influx into Europe occurred between 2014 and 2018 (Eurostat, 2019)—such partnership formation plans can be disrupted. However, migration research remains scarce on how male refugees navigate their romantic aspirations within the opportunities and constraints of the partnership market at the initial stages, before any partnerships are formed. Because homogamous unions—those within the same ethnic and religious group—remain more common in diverse societies (e.g. Adserà & Ferrer, 2014; Dederichs & van Tubergen, 2025) and individuals tend to seek similarity, or homophily—also known as "positive assortative mating" (Becker, 1974; Buss, 1985)—the availability of culturally homophilous women within the networks of male refugees may be of particular importance. Prior studies have demonstrated the importance of homophily in the partner preferences for Syrian and Afghan refugees in hypothetical scenarios (e.g. Heyne et al., 2025). However, their partnership aspirations within their existing networks remain unknown.

This dissertation aims to investigate the depth, scope, and reciprocity of the processes associated with the described critical life events and has *four goals*. For *parental death*, the aim is to examine whether the impact of this event on mental health is deeper than previously documented in the German context *(Study 1)*. Specifically, I examine the effects of both the

first and second parental deaths on adult mental health using more fine-grained monthly timescales, focusing on the first year after the loss, which represents the most critical period for coping and recovery. For *parental separation*, the goal is to identify whether this event permeates deeper and broader into the entire extended family network than previously observed *(Study 2)*. Thomas Leopold and I investigate whether parental separation is associated with an erosion of extended family relationships, beyond the disruption observed within the nuclear family using the US context. For the event of *forced migration*, two aims address the adaptation processes of two distinct groups of refugees in Germany: Ukrainian refugees and refugees from Syria and Afghanistan. *The first* goal is to examine how Ukrainian refugees navigate their settlement intentions and integration prospects and whether these processes are reciprocal *(Study 3)*. Leona Przechomski, Andreas Ette, Eldad Davidov, and I investigate whether a better integration increases the intention to settle in the host society or vice versa, or whether they both reinforce each other. *The second* goal addresses the adaptation for young male refugees from Syria and Afghanistan on the partnership market. Irena Kogan, Thomas Leopold, and I examine the currently unknown availability of social networks with romantic potential for male refugees, and assess whether romantic aspirations within these networks are associated with cultural homophily *(Study 4)*.

Given that the study of critical life events spans multiple subfields of sociology, this dissertation lies at the intersection of health sociology, family sociology, and the sociology of migration. Beyond this, it also draws upon the fields of demography and life course research. To address the four main objectives of this dissertation, the following longitudinal and cross-sectional datasets are employed in this dissertation: German Socio-Economic Panel (GSOEP), KINMATRIX cross-sectional survey, IAB-BiB-FReDA-BAMF-SOEP panel study, and PARFORM cross-sectional survey.

In the following sections, I *first* define the dimensions covered for the critical life events discussed in this dissertation and describe how they compare with one another. *Second*, I outline the core assumptions of the life course framework, which brings together parental death, parental separation, and forced migration under a single umbrella. Given the heterogeneity of my four studies, I briefly mention the specific theories and frameworks that help me tackle the four main goals of this dissertation with reference to the specific chapters. *Third*, I provide a summary of each study included in this dissertation. *Fourth*, I draw conclusions and discuss limitations. *Finally*, I highlight implications for future research and policy.

1.2. Critical life events in this dissertation: Dimensions and comparisons

The critical life events examined in this dissertation cover different dimensions and the approaches employed to study them. The following dimensions are defined for clarification: negative versus positive expectations and outcomes, alleviators and intensifiers, timing of the event—before-after or only "aftermath", and comparison groups.

Regarding expectations and outcomes, parental death, parental separation, and forced migration are often considered as negatively experienced events. However, the dimensions studied within these events can be both negative and positive. While critical life events introduce disruptions and negative implications for health and social networks, they may also bring relief from strained relationships, involve resilience, compensation through new networks, and successful adaptation. The primary focus of studies within the *family context*—parental death and parental separation—lies on the adverse outcomes, while also discussing the dimensions of adaptation and compensation. For instance, I expect adverse short-term effects of parental death on mental health (Study 1). However, I also expect relatively fast adaptation within the first year after parental loss. I hypothesize the erosion of extended kin relations for younger adults who experienced parental separation in terms of contact, closeness,

importance of, and reliance on kin (Study 2), but I also discuss the alternative hypothesis that extended kin may serve as a source of compensation for the loss of parental support. The data used in Studies 1 and 2 allow a focus on factors that alleviate or intensify disrupted effects, for example, intensified mental health declines after parental death among daughters in the case of a mother's death (Study 1), reduced erosion of relations with extended kin under joint post-separation physical custody arrangements, or intensified erosion in the paternal kin line (Study 2). The primary focus of studies within the *forced migration context* is on dimensions of adaptation following displacement. For instance, I focus on Ukrainian refugees' decisions to settle and integrate in Germany as part of the processes that occur after displacement (Study 3). Similarly, I discuss the availability of female networks for Syrian and Afghan refugees and their romantic aspirations after their arrived in Germany (Study 4).

The approaches I use to study the discussed events differ in terms of timing. For parental death (Study 1), I employ close prospective observation—stages before, during, and after parental loss, capturing both anticipation and its aftermath. In contrast, for parental separation (Study 2) and forced migration (Studies 3 and 4), I use data that allow the observation of events after a substantial interval between the event of interest and the measurement of outcomes. Study 2 focuses on younger adults aged 25–35 who experienced parental separation before reaching adulthood and examines their current relationship with extended kin. For Ukrainian refugees, the first interview wave took place shortly after the Russian full-scale invasion and their displacement—between August and October 2022 (Study 3). For Syrian and Afghan refugees, interviews occurred a longer time after migration—on average, seven years following displacement (Study 4).

Additionally, the studies differ in their means of comparison. The data used in Study 1 allows for a within-individual comparison of mental health before and after parental death. Study 2 relies on a between-individual estimation, comparing younger adults who experienced

parental separation with those who did not. Studies 3 and 4 do not include a comparison group—refugees versus the majority population, and rather focus on adaptation dimensions within the refugee group. Study 3 employs within-estimation to examine changes in settlement intention and integration over time among Ukrainian refugees, while Study 4 relies on total- and within-comparisons of female contacts with romantic potential among Syrian and Afghan refugees.

The different approaches and dimensions considered in this dissertation to study the critical events of parental death, parental separation, and forced migration reflect both their heterogeneity and the challenges involved in studying them. These challenges are discussed in the limitations section.

1.3. Theoretical Background: Life course framework

The life course framework is an approach that explains how critical life events, such as parental death, parental separation, and forced migration, can shape or be shaped by individuals' life courses. The idea is that an individual's life course trajectory is embedded within broader social contexts and is shaped by the timing, sequencing, and historical context of life events across the lifespan (Alwin et al., 2018; Bernardi et al., 2019; Elder, 1994, 2000; Mayer, 2003). Life events examined in this dissertation—parental death, parental separation, and forced migration—reflect the four concepts of the life course paradigm outlined by Glen H. Elder Jr. (1994, 2000): (1) historical time and place, (2) personal timing, (3) the principle of "linked lives", and (4) agency (see also Carr, 2018).

First, historical time and place shape responses to critical life events and influence life courses (Elder, 1994; Elder et al., 2003). For instance, losing a parent in one's 30s, with a life expectancy of approximately 80 years in Germany (Federal Statistical Office of Germany, 2025), differs from experiencing the same loss in contexts of low life expectancy, economic

hardship, or war. Experiencing parental separation in a context where divorce is socially accepted may affect the life course of those involved with less detrimental impact compared to more traditional contexts. External political contexts can trigger forced displacement. Changes in these contexts, such as the course of a war, may alter the actions and plans of refugees over time.

Second, each life event has its own timing in relation to the natural progression of the life course. While not all critical life events are predetermined, some occur as part of the expected order of life and are experienced universally. Transitions can take place "on-time"—in line with the natural order of timing or the "social clock" (Neugarten et al., 1965), which reflects age norms and expectations regarding "readiness" for transitions between social roles—or "off-time", when they take place outside the expected sequence of the life course. For instance, if parental death, which is a universal life experience, occurs "off-time" from the naturally expected transition, it may intensify the negative implications for mental health (discussed in *Study 1*). Moreover, the order and sequence of parental deaths, that is, whether the first or the second parent is lost, may influence grief reactions and the reevaluation of one's identity and new role within the family system. For example, the death of the first parent may be a shocking experience that intensifies grief and emotion (Marshall, 2004). The death of the second parent, by contrast, may be less shocking but often brings a profound realization of oneself as part of the next generation destined to pass away in the natural progression of the life course (Neugarten, 1969). In the case of parental separation, personal timing also plays a significant role. When separation occurs earlier in childhood, children are more vulnerable and dependent on their parents' decisions as mediators and enablers than at later life stages (Seltzer, 1991; Woodward et al., 2000). If the ties with one side of the family are cut—often the father and paternal extended kin—the child has fewer opportunities to build independent relationships with extended kin, leading to greater erosion of ties (discussed in *Study 2*). Forced migration

is a life event that occurs at the intersection of personal and historical time and place, and is often unpredictable. Refugees whose life plans are interrupted by forced migration navigate integration and settlement prospects according to the life stage at which displacement occurs—for example, whether they are in a partnership, have children, or have partners who remain in the country of origin (as in the case of many Ukrainian men who cannot leave the country due to martial law (Andrews et al., 2023)) (factors controlled by design in *Study 3*). If displacement occurs at an active partnership-forming age, as in the case for many refugees from Syria and Afghanistan, forced migration may disrupt and reshape their plans and romantic aspirations according to the constraints and opportunities within the host society (discussed in *Study 4*).

Third, critical life events may affect another concept of the life course—"linked lives", or established social relationships maintained through social exchange and contact (Elder, 1994). For an adult child, the death of a parent disrupts a lifelong embedded relationship, creating emotional turmoil that can negatively affect mental health and well-being *(Study 1)*, regardless of whether the relationship is classified as socially positive (high contact and quality), socially negative (high contact and low quality), or estranged (low contact and quality) (Hank, 2024; Reczek et al., 2025). Parental separation may affect relationships within the larger network of family ties. Thus, it is not only immediate or "nuclear" kin who are impacted, but also the broader family network as a byproduct. For instance, the established "linked lives" with extended kin, such as grandparents, aunts, uncles, or cousins, to whom children are primarily tied through their parents, may be disrupted *(Study 2)*. Forced migration may interrupt refugees' social networks and complicate the formation of new ones. Within these constraints, refugees' integration indicators and intentions to settle may change over time *(Study 3)*, as well as their romantic aspirations and prospects on the partnership market *(Study 4)*.

Finally, the principle of agency suggests that individuals construct their life course through actions they take within the constraints and opportunities of social circumstance (Elder, 1994;

Elder et al., 2003). They are not merely passive recipients of critical life events but active agents in shaping their personal life courses. One cannot avoid parental loss. However, one can take actions to cope and recover, as well as reevaluate their identity, new role, and relations within the family system, and purpose of life. Parental separation and the associated disruptions in nuclear and extended kin relations go beyond the child's control, but in adulthood, individuals can invest in extended kin ties relying on prior knowledge and experiences, or the "shadows of the past" (Bernardi et al., 2019). Forced displacement is not a choice, but refugees who migrate determine their intentions to settle, integrate, or move elsewhere. They also navigate their partnership aspirations within existing, yet restricted, social networks.

Life course theory serves as the general theoretical framework (Elder, 1994, 2000) linking parental death, parental separation, and forced migration in this dissertation. This basic framework is supplemented by more specific theoretical approaches employed in this dissertation to address research questions related to each of these life events. Specifically, the following theories are discussed in more detail in the respective chapters: theory of grief and coping (Bowlby, 1980; Shuchter & Zisook, 1993) (Study 1 in Chapter 2), family systems theory and social network theory (Cox & Paley, 1997; Hetherington et al., 1992) (Study 2 in Chapter 3), theory of neoclassical migration (De Haas et al., 2019), theory of intergenerational integration (Esser, 2004) (Study 3 in Chapter 4), and the concept of cultural homophily in partner aspirations of refugees (Leszczensky & Pink, 2019; Lewis, 2015), based on marriage theories (Becker, 1974) (Study 4 in Chapter 5).

1.4. Summary of the four studies

I present the four studies that combine this dissertation, each addressing specific research questions related to the three main life events discussed—parental death, parental separation, and forced migration. Table 1.1 provides an overview of the four studies and their current status.

1.4.1. Study 1: Zooming into the first year after parental death: Loss and recovery in adult mental health

The aim of the first study is to examine the impact of the first and second parent's death on adult mental health using more fine-grained monthly timescales (Chapter 2). The first year after parental death is characterized by the grief stages of shock, denial, mourning, gradual recovery, and acknowledgement of death (Anderson, 2010; Bowlby, 1980; DeVaul et al., 1979; Shuchter & Zisook, 1993). These stages may therefore involve relatively fast fluctuations and declines in mental health. Previous studies, however, have examined impacts over annual or broader timescales. They overlooked the process of short-term declines in mental health and instead documented the result, that is, recovery evident already one year after the death (Kamis et al., 2022; Leopold & Lechner, 2015; Liu et al., 2022). However, the typical course of grief may unfold recovery already within the first year following a loss.

To capture the immediate reactions to loss, I use up to 12 waves of the German Socio-Economic Panel Study (SOEP-Core v37, 2022) and fixed-effects models (FE) using the yearly and monthly impact functions to evaluate the short-term impact of the first and second parent's death on adult mental health (ages 18-85). Additionally, I explore heterogeneity by adult child's and parent's gender, and age at parental death. I calculated Century Month Codes (CMC) (Rutstein & Rojas, 2006) using data on the month of parental death and the month of the interview to assess mental health effects at more fine-grained monthly timescales (for a related study on childbirth and partner bereavement, see Hudde & Jacob, 2023). Mental health is measured using the widely used SF-12v2 mental scale, which consists of four dimensions: Vitality, Role Emotional, Mental Health, and Social Functioning. The main analysis includes 2,106 individuals who lost their first parent and 1,338 respondents who experienced the loss of their second parent.

The results from the fixed-effects models with annual and monthly impact functions show that negative mental health responses are deeper, specifically, twice as large, when observed on a monthly compared to an annual timescale. Additionally, recovery occurs faster during the first year after loss, with adaptation already observed during the first two months after the loss. The depth of responses on a monthly timescale is stronger for adult daughters than sons, particularly when the mother dies first. However, the differences in the sequence of death or the age at loss are minimal. Overall, this study suggests that the mental health responses to parental death are deeper, and recovery occurs faster than previously documented.

Table 1.1. Overview of dissertation papers

	Study 1	Study 2	Study 3	Study 4
Title	Zooming into the first year after parental death: Loss and recovery in adult mental health	Parental separation and the quality of extended kin relations	The interplay between settlement intentions and integration among Ukrainian refugees in Germany	Romantic potential and homophily in ego-centric female networks of male refugees in Germany
Research questions(s)	What is the impact of the first and second parent's death on adult mental health on more fine-grained monthly timescales?	How do younger adults from separated and non-separated families differ in their relationships with extended family?	Do initial settlement intentions shape the subsequent integration of Ukrainian refugees in Germany? Does initial integration shape the settlement intentions of Ukrainian refugees in Germany?	Are women present in the networks of young male Syrian and Afghan refugees in Germany? Do male refugees prefer co-religious or co-origin women in their networks as potential romantic partners over inter-religious or inter-origin ones?
Dependent variable(s)	Mental health (SF-12v2)	(1) Contact, (2) Closeness, (3) Importance of, (4) Reliance on maternal & paternal grandparents, aunts, uncles, cousins	(1) Settlement intentions: temporary vs permanent (2) Integration: - Cultural - Social - Structural	Romantic aspiration for a relationship with a woman
Independent variable(s)	Parental death status: (1) First parental death (2) Second parental death	Parental separation status		Cultural homophily: (1) Woman is co-religious (2) Woman is co-origin with a refugee
Moderators	(1) Gender of a parent (2) Gender of an adult child (3) Adult child's age	(1) Kinship line (2) Post-separation physical custody arrangement (3) Age at separation	-	Parental preference for cultural homophily
Data	German Socio-Economic Panel (GSOEP) 1984–2020	KINMATRIX Survey 2022-24	IAB-BiB/FReDA-BAMF-SOEP Survey 2022-24	PARFORM Survey 2022-23
Method	Fixed-effects regression models (FE)	OLS and linear probability models with clustered SEs	Random intercept cross-lagged panel models (RI-CLPM)	POLS and FE regression models with clustered SEs
Authorship	Single authorship	With Thomas Leopold	With Leona Przechomski, Andreas Ette, and Eldad Davidov	With Thomas Leopold and Irena Kogan
Publication status	Published in *SSM: Mental Health* (2024, 10.1016/j.ssmmh.2024.100317)	Accepted in *Demography*	Revise & Resubmit in *European Sociological Review*	Submitted to the *European Journal of Population*

I conclude that mental health responses to parental death are best captured on fine-grained monthly rather than annual timescales. Considering these results and the nature of grief, I highlight the importance of providing mental health support to bereaved adult children, particularly during the first year after the loss.

1.4.2. Study 2: Parental separation and the quality of extended kin relations

The second study aims to examine how younger adults from separated and non-separated families differed in their relationships with extended family members (Chapter 3). Based on theories of family systems (Cox & Paley, 1997; Hetherington et al., 1992) and social network (Burt, 2005), Thomas Leopold and I investigate if separation in the nuclear family, that is between parents, permeates into the surrounding network of extended family members, such as maternal and paternal grandparents, aunts, uncles, and cousins. Although parental separation may be associated with the erosion of relationships in the wider family system, previous research has primarily focused on the effects of parental separation on the "nuclear" kin, such as relationships with parents (Kalmijn, 2015; Spaan et al., 2022; Swiss & Le Bourdais, 2009) or full siblings (Poortman & Voorpostel, 2009; Steinbach & Hank, 2018; van Dijk et al., 2022).

We use the large-scale, ego-centric, cross-sectional, and web-based KINMATRIX data (Leopold, Becker, et al., 2024; Leopold, Raab, et al., 2024), collected between 2022 and 2024, to cover the full array of extended kin relations from both maternal and paternal sides of the family. Using the U.S. sample of the KINMATRIX data, we employ Ordinary Least Squares (OLS) regression and linear probability models for four relational outcomes: frequency of current contact with kin, current closeness to kin, future reliance on kin, and retrospective importance of kin. In addition to examining the association between parental separation and extended kin relations, we also explore heterogeneity by kinship line, post-separation physical custody arrangement, and the adult child's age at separation. Our final sample consists of 3,664

adult children (egos) aged 25-35, 1,141 of whom are from separated families, and 83,098 ego-kin dyads.

Our results suggest that, for younger adults from separated families, extended kin relations erode more strongly compared to those from non-separated families for the relational outcomes of closeness, contact, and reliance on kin, with greater disruptions in the paternal than in the maternal kin line. The disruptions are also found to be stronger in the line of a non-resident parent. We find no substantive differences in extended kin relations among adults who experienced parental separation earlier compared to later in life. However, erosions associated with earlier separation are evident within the nuclear kin. Additionally, the importance of kin is not weaker for younger adults from separated families compared to non-separated.

We conclude that relationships within the family nucleus serve a gatekeeping role for the surrounding family network. When the nuclear ties between parents, or between parents and children, are disrupted, the entire extended kin network can be affected as a byproduct. We further highlight the importance of investment opportunities in relationships with each parent, particularly through effective physical custody arrangements or the preservation of a "good breakup", which can help maintain ties to both mothers and fathers after separation and prevent disruptions in extended kin relations.

1.4.3. Study 3: The interplay between settlement intentions and integration among Ukrainian refugees in Germany

The aim of the third study is to examine the interplay between intentions to settle and integration dimensions among Ukrainian refugees in Germany (Chapter 4). Relying upon neoclassical migration and human capital theories, which explain how integration shapes future settlement intentions (De Haas et al., 2019; Haas & Fokkema, 2011), the theory of intergenerational integration, which highlights how prior settlement intentions influence future integration in the host society (Esser, 2004), and the longitudinal and transnational framework

that summarizes how both reinforce each other (Bilgili et al., 2022), Leona Przechomski, Andreas Ette, Eldad Davidov, and I use the register-based probability IAB-BiB-FReDA-BAMF-SOEP panel survey (Brücker et al., 2023; IAB-BiB FReDA BAMF SOEP, 2022), collected every six months on Ukrainian refugees who arrived in Germany after the Russian full-scale invasion in February 2022. Using four waves of this dataset collected between 2022 and 2024, we employ random intercept cross-lagged panel models (RI-CLPMs) (Hamaker et al., 2015) to analyze the dynamic relationship between permanent intentions to settle and four dimensions of integration over time: German language proficiency, contact with Germans, feeling welcome in Germany, and employment status in Germany. Our main analysis included 3,918 Ukrainian refugees.

Our results are in line with theoretical expectations that settlement intentions and integration reinforce each other. However, we find support only for some dimensions of integration. Reciprocal within-person effects are found between settlement intentions and cultural and social integration outcomes, but not for structural integration, measured by employment status. For instance, Ukrainian refugees in Germany who initially reported higher German language proficiency, more frequent contact with Germans, and felt more welcome in Germany were more likely to subsequently change their intention to settle from temporary to permanent. Conversely, those who initially expressed temporary intentions to settle but later adopted permanent ones demonstrated improvements in German language skills, increased contact with Germans, and felt more welcome in Germany in the subsequent waves. However, we find no evidence that settlement intentions influence or are influenced by transitions from non-employment to employment in Germany.

We conclude that settlement intentions and integration influence each other bidirectionally. Our study further highlights the importance of refugees' agency, as they navigate the

constraints imposed by forced migration and actively adjust their decisions to settle and integrate in the host country.

1.4.4. Study 4: Romantic potential and homophily in ego-centric female networks of male refugees in Germany

The fourth study aims to examine the availability of female social network among young male refugees from Syria and Afghanistan and the romantic potential behind this network (Chapter 5). Thomas Leopold, Irena Kogan, and I use the marriage theory (Becker, 1974) and the concept of cultural homophily (Leszczensky & Pink, 2019; Lewis, 2015) to test our expectations about imagining a relationship with the reported female contacts among refugees. Individuals tend to prefer culturally homophilous partners because similarities can help preserve a group's distinct cultural identity (Tajfel, 1981), increase mutual understanding and empathy (DiMaggio & Mohr, 1985; Kalmijn, 1994), and promote marital stability and satisfaction (Clarkwest, 2007; Schwartz, 2013). These individual preferences can be further reinforced by perceived parental preference for homophily through the transmission of norms and culture during primary socialization (Berry & Georgas, 2009; Maddox, 2019). Therefore, we expect that cultural homophily predicts a greater likelihood of imagining a relationship with women.

We use ego-centric female network data from the cross-sectional CAPI-based PARFORM survey (for technical reports see Kogan et al., 2025), which captures up to three women reported in the networks of young male refugees (aged 20-39) from Syria and Afghanistan in Germany. The reported women exclude family members and current partners. First, we provide a descriptive overview of the availability of female networks among young male refugees from Syria and Afghanistan. The sample for this part of the analysis consists of 1,139 refugees (egos) and 1,655 ego-female dyads. Second, we use Pooled Ordinary Least Squares (POLS) regressions to examine cultural homophily across different network structures—both culturally diverse and homogeneous female networks. Specifically, we investigate whether male

refugees, given the available networks, are more likely to imagine a relationship with women who share their religion or country of origin compared to women of a different religion or country of origin. In addition, we use Fixed-Effects (FE) models to explore cultural homophily within culturally diverse networks of refugees. For instance, if male refugees know both culturally similar and different women, we examine whether they are more likely to imagine a relationship with women who share their religion or country of origin than with women who do not. This approach helps separate individual aspirations from structural selection into culturally similar networks. Our sample size for this part of the analysis comprises 654 refugees (egos) and 1,183 ego-female dyads.

Our results reveal that both groups of refugees—those who reported women in their networks and those who did not—score high on religiosity profiles. However, almost 42% of our sample did not report any women in their social networks, 23% of whom are single respondents. The non-reporting group scores even stronger on religiosity compared to a reporting group, has lower integration and socio-economic indicators, such as German language skills and educational level. These descriptive results may suggest a potential sign of social network disruption and disadvantage in the partnership market, which warrants investigation in future research.

Among refugees who reported at least one woman in their network, we find evidence for the importance of religious homophily in its association with the romantic aspirations of young male refugees. Specifically, independent of women's origin and other potential confounders, male refugees are more likely to imagine a relationship with women who share the same religion. Similarly, when a male refugee has both a co-religious and an inter-religious female contact, he is more likely to imagine a relationship with the co-religious one. The effect of women's origin, controlling for religiosity, is minimal, and we find no variation by parental preference for cultural homophily.

Through our study, we highlight the importance of access to a religiously homophilous network for young male refugees from Syria and Afghanistan. We emphasize that refugees who report female contacts may realize their aspiration for a religiously homogamous partner. In contrast, for those who report no female contacts—who tend to have even stronger religiosity and lower integration profiles—aspiring toward religiously homophilous partners may be constraining and represent limited prospects in the partnership market. For future research, we recommend a more detailed investigation of this potentially disadvantaged group and their romantic aspirations.

1.5. Conclusions

1.5.1. Key findings and contributions

This dissertation focuses on the aftermath of *two types* of negative critical life events: 1) parental death and parental separation within the *family context*, and 2) within the context of *forced migration*. The life course framework (Elder, 1994, 2000) offers a comprehensive understanding of how these critical life events are shaped by historical context and timing, may disrupt social and family networks, can adversely affect well-being and health, and place human agency at the core of constructing one's life within the constraints and opportunities each event entails. Overall, the results from the studies comprising this dissertation demonstrate that the post-effects associated with these critical life events are: 1) *deeper and faster* in mental health responses and recovery after parental death, 2) *deeper and broader in scope* in the family ties of adults from separated families and the social ties of refugees than previously documented, and 3) *reciprocal* in the dynamic interplay between settlement intentions and integration after forced migration. These results demonstrate potential disruptions within the contexts of family and country of origin, which for many serve as key sources of safety and comfort. In the following, I outline each of the three main conclusions in more detail.

First, I demonstrate that the *deepest* declines and *fastest* adaptations occur within the first months following parental loss (Study 1). Additionally, I show that the sharpest declines on a monthly timescale are observed for adult daughters who lose their mother first. These results are in line with theoretical considerations outlined in theories of grief and coping (Bowlby, 1980; Shuchter & Zisook, 1993). The rapid adaptation observed around four months after the event is notable, as it also reflects high resilience among bereaved adults. For the research on critical life events and their aftermath, this finding has broader implications, demonstrating a speed of adaptation that could not be captured using annual timescales.

Second, erosions associated with parental separation in the nuclear family extend into the *broader* network of extended kin for younger adults in reported closeness, contact frequency, and reliance on kin (Study 2), supporting theoretical assumptions of family systems and social network theories (Burt, 2005; Cox & Paley, 1997; Hetherington et al., 1992). The remarkable finding is that, despite relationships being more undermined in the paternal kin line and in the line of a non-resident parent, extended kin ties remained just as important to younger adults from separated families as to those from non-separated families. For research on critical life events, it highlights the importance of preserving ties to both extended kin lines for children of separation.

For young male refugees from Syria and Afghanistan who experienced the third critical life event of forced migration, Study 4 may signal the *broader* disruption of social ties. As men in an active partnership-forming age, a substantial share of single respondents reported no female contacts in their current networks. Since refugees could also report women living outside Germany, this absence highlights that even culturally homophilous contacts may be lost. Among those who did report women in their networks, male refugees expressed stronger romantic aspirations toward religiously homophilous women compared to inter-religious ones, in line with the theoretical concept of preference for homophily (Becker, 1974; Buss, 1985).

While this group demonstrates high religiosity, those who did not report female contacts scored even higher, suggesting that refugees without female contacts may potentially hold even stronger preferences for religious homophily but remain constrained on the partnership market. However, these speculations should be investigated in future research.

Third, among Ukrainian refugees who arrived in Germany after the Russian full-scale invasion in 2022, settlement intentions and integration prospects are *reciprocal* and mutually reinforce one another over time (Study 3). In line with the emerging transnational longitudinal perspective (Bilgili et al., 2022), these processes intersect bidirectionally and require a longitudinal approach, which we employed in this study. These findings challenge earlier approaches that conceptualized integration and settlement intentions as unidirectional and predetermined, showing instead that they are interdependent and subject to change over time.

1.5.2. Limitations and future research

Despite valuable contributions, this dissertation is not without limitations. The primary limitation is related to the *distinct approaches* taken to investigate the critical life events of parental death, parental separation, and forced migration. Several dimensions of these events could not be conceptually addressed because the necessary constructs were not available in the data, for example, potential *alleviators* of the negative effects of life events within the family context. A strained relationship with a parent before a loss (Study 1) or higher parental conflict before a separation (Study 2) may provide relative relief and alleviate the negative outcomes for mental health or erosions in the family network. Future studies could expand the coverage of these dimensions of critical life events.

Several constraints in the *data structure* limited a comprehensive analysis of the *timing* and *comparison* dimensions of critical life events. Two of the four studies—Study 2 on parental separation and Study 4 on ego-centric female networks of young male refugees from Syria and

Afghanistan—relied on cross-sectional data due to the unavailability of longitudinal surveys covering the required depth of extended kin lines (Study 2) or actual female networks of young male refugees (Study 4). Therefore, Studies 2 and 4 relied on the between-individual comparisons, controlling for a comprehensive set of confounders. Future research could consider examining the *timing dimension* by collecting longitudinal data, which would allow for evaluating within-individual effects of parental separation on extended kin relations before and after the separation, as well as the dynamics of romantic aspirations within refugees' existing networks at different stages of forced migration. Further studies may consider expanding the *comparison dimension* and explore romantic aspirations within the existing networks for refugees and the majority population.

The other two studies—Study 1 on the impact of parental death on adult mental health and Study 3 on the interplay between settlement intentions and integration among Ukrainian refugees—relied on panel survey data from the GSOEP and IAB-BiB/FReDA-BAMF-SOEP. However, these datasets also presented challenges related to their *structure* and *design*. GSOEP data on mental health were collected biannually from 2002 to 2016 and annually from 2016 to 2020 (Study 1). Extracting death months from the annual dataset meant that monthly assessments of mental health changes reflected within-individual comparisons only when compared to the reference category (>2 years before loss) and represented between-individual estimates when comparing month categories (adaptation processes). This methodological compromise allowed for fine-grained estimations given the available data. Future studies might consider collecting data within shorter intervals, measured monthly, or at least quarterly, to better capture immediate reactions to loss. IAB-BiB/FReDA-BAMF-SOEP data collection, in contrast, occurs every six months. Although this collaborative survey responded quickly to the influx of Ukrainian refugees in 2022, longer panels may be beneficial for examining the long-term interplay between settlement intentions and integration.

Another issue related to the panels employed in Studies 1 and 3 is *attrition* and *potential selection bias*. Long-running panels carry an unavoidable risk of positive selection bias: individuals with better mental health, greater resilience, and the ability to participate over an extended period are more likely to have their parental death experience captured in the data (Study 1). This attrition may have led to an underestimation of the drops in mental health. Similarly, Ukrainian refugees with non-permanent settlement intentions were more likely to drop out of the panel (Study 3), resulting in a sample positively selected toward those intending to settle permanently.

Another key block of limitations concerns the *validity of measurements* across Studies 1 and 3. Future studies might consider employing more fine-grained measures of mental health instead of a shortened but reliable SF-12v2 scale (Study 1) for better construct validity. Additionally, they may consider exploring the reasons behind temporary or permanent settlement intentions of Ukrainian refugees (Study 3). Given that Ukrainian refugees are flexible in their cross-border movements and the war is ongoing, an intention to settle may indicate uncertainty rather than a desire to stay permanently in Germany.

The final set of limitations concerns the *generalizability* of the findings to other cultural contexts and population groups. Generalizing the results on the experience of grief and associated mental health declines (Study 1), the reciprocity between settlement intentions and integration (Study 3), and romantic aspirations (Study 4) to broader cultural contexts, other geographical regions, and refugee populations beyond the studied groups (Studies 1, 3, 4) remains to be addressed in future research. Similarly, limitations in the available data complicate extrapolating conclusions about parental separation to other life stages and cultures, e.g., to populations younger than 25, older than 35, or outside the United States (Study 2).

1.5.3. Implications for practitioners and policymakers

Practitioners and policymakers may benefit from this dissertation's findings. *First*, the finding that the first year after the loss of a parent is the most critical period for coping and recovery in mental health can guide policymakers to continue implementing programs that target the immediate aftermath of loss, providing equal access to bereavement counseling, supportive social environments, and employer assistance during this period. Although grief is a universal human experience (Stroebe & Schut, 1998), the ways in which it is expressed, and how social norms regulate its expression, may vary even within the same social context, shaped by factors of an individual's social identity, such as gender or religiosity. For instance, men are often expected to grieve privately (Stroebe, 2001), which may suppress their emotional expression and reduce their use of bereavement counseling. Women, by contrast, are more often encouraged to share emotions publicly (Stroebe, 2001). However, women are also more likely to have served as primary caregivers for their parents prior to loss (Umberson, 2003) and, as our findings indicate, experience the deepest declines in mental health when their mother dies first, compared to men. This mental burden, therefore, may indicate that women are a potentially vulnerable group. Another example is that within the religiously diverse German context (BAMF, 2024), distinct religious norms may still influence how openly grief is expressed and socially normalized. Therefore, differences in how grief is expressed may prevent some groups from receiving the benefits of counseling and support programs. Additionally, bereavement leave has become more widely supported in the workplace, yet it remains less institutionalized and regulated in the German context, leaving minimum leave durations relatively unstandardized. Regulation of bereavement leave may help preserve security for bereaved adults.

Second, the erosion of extended kin ties associated with parental separation highlights the underestimated importance of relationship gatekeeping within family networks (Study 2). In

the current policy context, many Western countries have shifted their focus toward joint custody arrangements that may help preserve ties to both parents after separation. Policies should continue moving in this direction, particularly targeting the areas within the U.S. context where parents may resist cooperation and "good" breakups due to cultural norms. For instance, although divorces are less common in rural U.S. contexts than in urban areas due in part to the stigmatization of divorce and traditional gender and religious norms (Reynolds & Walther, 2020), when they do occur, prevailing norms around parenting and care expectations may hinder joint custody arrangements. The takeaway of the current research is that the joint custody policy may extend beyond its effect on the preservation of the parent-child relationship. The finding that it can also serve as an important indicator for securing a wider extended family network may help guide future policy interventions.

Third, the potentially disrupted social ties of male refugees from Syria and Afghanistan, particularly those who report no non-family female contacts in their networks and score lower on integration indicators, warrant closer attention from researchers and policymakers (Study 3). Investigating this group and implementing strategies to address their potential disadvantages in integration and in the partnership market may be beneficial. The study on male refugees from Syria and Afghanistan further highlights the importance of individual aspiration to connect with religiously homophilous contacts for potential romantic partnerships. While similarity attracts at the individual level and promotes marital stability (Kalmijn, 1998), heterogeneous social contacts may remain beneficial for developing inter-group connections by providing opportunities for exchange, reducing inter-group prejudice, anxiety, or avoidance, and increasing social cohesion at the macro level (Zhou et al., 2019). The finding that homophily is important for refugees when considering potential partnerships may introduce a challenge for policy and society, as it highlights the potential ambiguity between individual preferences and societal benefits.

Finally, the study on Ukrainian refugees highlights that refugee integration and settlement intentions should be viewed as interacting outcomes within a reciprocal, dynamic relationship (Study 4). Current policy discussions often view refugees' successful integration as a prerequisite for their positive intentions to settle (Bilgili et al., 2022). Future policy interventions can be guided by the finding that integration may also result from the agency of refugees and their evolving settlement intentions.

1.6. Status of the studies and contribution of co-authors

The first study, titled "Zooming into the first year after parental death: Loss and recovery in adult mental health", is published in the journal *Social Science & Medicine: Mental Health* (2024, 10.1016/j.ssmmh.2024.100317). As the sole author, I was responsible for all stages related to this study. Additionally, I received extensive feedback and editorial support from my supervisors, Thomas Leopold and Karsten Hank, as well as from several colleagues.

The second study, titled "Parental separation and the quality of extended kin relations", is under revise and resubmit in *Demography*. Thomas Leopold and I co-developed a research question. As the lead author, I was responsible for data preparation, data analysis, drafting the initial manuscript, preparing replication files and appendices, and submitting the manuscript to the journal. The co-author, Thomas Leopold (University of Cologne), contributed at every stage of manuscript development. He provided comprehensive edits and revisions, advised on the strategy and presentation of results and figures, and, as a principal investigator of the KINMATRIX data, added a detailed description of the dataset. He also helped conceptualize the study and situate it within a broader research context.

The third study, titled "The interplay between settlement intentions and integration among Ukrainian refugees in Germany", is ready for submission to the *European Sociological Review*. Leona Przechomski (University of Cologne) and I co-developed a research question and

conceptualization of the study. Leona Przechomski, as the lead author, developed an analysis strategy, was responsible for the data analysis in R, second round of Stata analysis, report and interpretation of the main results from the RI-CLPM models, the first draft of the manuscript, as well as improving the manuscript in response to revisions suggested by me, Eldad Davidov (University of Cologne), and Andreas Ette (Federal Institute for Population Research). I was responsible for the theoretical background, the context of Ukrainian refugees, the descriptive results, and parts of the analyses conducted in Stata. I further revised the introduction and discussion in alternating drafts. Andreas Ette provided feedback on the manuscript and, as an expert on the dataset, provided us with the initially prepared dataset, contributed to the data description, and advised on data details. Eldad Davidov, as an expert in method, provided us with extensive feedback and editorial input at every stage of this manuscript development.

The fourth study, titled "Romantic potential and homophily in ego-centric female networks of male refugees in Germany", is submitted to *Social Networks*. Irena Kogan and I co-developed the research question. As the lead author, I was responsible for the analysis strategy, preparation of the initial manuscript, theoretical conceptualization, data preparation, data analysis, and the preparation of replication files and robustness checks. The co-authors, Irena Kogan (University of Mannheim) and Thomas Leopold (University of Cologne), provided comprehensive feedback and edits on all parts of the manuscript. Irena Kogan, as an expert in partnership preferences and the PARFORM dataset, additionally contributed contextual information on Syrian and Afghan refugees in Germany, literature on cultural homophily, and a detailed dataset description. Thomas Leopold, as an expert on family formation, provided an extensive editorial input, helped conceptualize the selectivity issue in refugees' social networks, and provided a broader perspective on our study.

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CHAPTER 2

ZOOMING INTO THE FIRST YEAR AFTER PARENTAL DEATH: LOSS AND RECOVERY IN ADULT MENTAL HEALTH

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Abstract

The initial year after parental death is a critical period for grief and coping. Despite its significance for declines in and recovery of adult mental health, this initial period is not sufficiently captured in existing research following changes across annual or even broader intervals. This paper assesses the impact of the first and second parent's death on adult mental health on more fine-grained monthly timescales. Using data from up to 12 waves of the German Socio-Economic Panel Study (GSOEP) and fixed-effects models with yearly and monthly impact functions, the analysis yielded two main findings. First, mental health declines were much deeper when measured on a monthly scale. The magnitude of drops recorded within the first two months following parental death approximately doubled those measured at an annual scale. Second, recovery occurred much faster when recorded on a monthly timescale and was evident already a few months after the loss of a parent. Overall, this study suggests that reaction and adaptation to parental death are stronger and faster than previously documented. The study identified variations in mental health responses. Those who lost their first parent had worse mental health a year after the event compared to those who lost their second parent. The most significant decline in mental health, around 10 points, occurred among daughters one to two

months after their mother's death. When the mother died first, the impact was more severe on mental health, especially among younger daughters and sons.

2.1. Introduction

Today, the vast majority of people experience the death of their parents as adults, and for many, this is the first major experience of loss and grief (Umberson, 2003). It is a stressor and emotional turmoil, even for well-functioning and healthy adults. It is widely recognized in the literature that parental death can have severe implications for mental health (Bowlby, 1980; Leopold & Lechner, 2015; Umberson, 2003).

According to theories of grief and coping, many of the emotional responses to parental death occur over a relatively short period of time (Bonanno et al., 2002). This initial period is particularly critical for assessing the magnitude of its impact on mental health as well as the speed of subsequent recovery and adaptation throughout the mourning phase.

In research on parental bereavement, however, this initial period has remained a black box. Previous studies have examined the impact of parental loss on, for example, life satisfaction, depressive symptoms, and cognitive impairment, usually suggesting drops of moderate size followed by a relatively swift recovery (Kamis et al., 2022; Leopold & Lechner, 2015; Liu et al., 2022). However, timescales employed in prior research were not sensitive to the initial period following parental loss, as death events and changes in the outcomes of interest were recorded across consecutive panel waves spaced at annual or even larger intervals (for a related discussion, focusing on childbirth and partner bereavement, see Hudde & Jacob, 2023).

The present study aims to illuminate this black box. Exploiting up to 12 waves of the German Socio-Economic Panel Study (SOEP-Core, v37 2022) collected biannually from 2002 to 2016 and annually from 2016 through 2020, we estimate fixed-effects (FE) models to assess short-term losses and recovery in adult children's mental health following their first and second

parent's death. Data on the month of parental death and on the month of the interview allowed us to assess the magnitude of its impact as well as subsequent recovery on a monthly timescale and hence provide an exceptionally fine-grained picture of the dynamics that occur during this critical period.

2.2. Background

2.2.1. Parental death and mental health responses

Parental death might negatively influence an adult's mental well-being, at least temporarily (Bowlby, 1980; Marks et al., 2007; Umberson, 2003). Parents are no longer expected to pass away until they reach old age, except the rare cases of unexpected mortality (Umberson, 2003). The death of a parent in adulthood is a life-altering event, introducing upheaval into various facets of an adult's existence, including emotional well-being, personal life, and social involvement (Umberson, 2003). An adult's emotional well-being can be affected even before parent's death, especially if the parent has been dealing with a long-term illness that makes death inevitable (Marshall, 2004; Moss & Moss, 1985). Anticipatory grief, which can begin months or even years before an actual loss, can assist adults in building coping mechanisms for the upcoming loss. However, no preparation can be comparable to the reality of the death experience (Marshall, 2004; Moss & Moss, 1985). Once the death comes, bereaved adult children first experience grief and then initiate a process of reassessment of their life's purpose, mental health, interpersonal relationships, and identity (Bowlby, 1980; Leopold & Lechner, 2015; Petersen & Rafuls, 1998; Umberson, 2003). The complexity of these transformations places a significant psychological burden on adults, leading to negative effects on their mental health (Bowlby, 1980; Umberson, 2003).

2.2.2. The role of grief theory and time in mental health responses to parental death

Grief is identified as a key explanatory mechanism of the negative mental health responses around parental death event (Anderson, 2010; Shuchter & Zisook, 1993). However, there is a number of unresolved questions with respect to the nature of loss, coping, and grief process in the existing data. Grief develops fast on a fine-grained timescale, varies between normal and complicated processes, with immediate reactions playing a crucial role in long-term coping mechanisms (Bowlby, 1980).

Typically, grief starts shortly after the loss, with individuals taking hours to several months to acknowledge and grieve the event (Bowlby, 1980; DeVaul et al., 1979; Shuchter & Zisook, 1993). Using the shortest usually available, that is, annual timescale, previous research has indicated the rapid adaptation line from parental death one year after the event (Leopold & Lechner, 2015). However, it is during the initial year after the loss that the most challenging stages of adaptation unfold, which require closer examination: 1) shock, denial, 2) mourning, and 3) steady recognition of death (Bowlby, 1980; DeVaul et al., 1979). The first stage of shock and denial lasts from hours to weeks. The second phase extends over several months and involves the cognitive and emotional acknowledgment of death. The final restitution stage entails the recognition of the loss and a gradual recovery that can last up to several years (Shuchter & Zisook, 1993). In simpler terms, the grief outcome, not the process itself, was declared earlier using an annual approach.

Prior studies have also shown that parental death in adulthood predicts heightened depressive symptoms (Kamis et al., 2022), a decrease in overall life satisfaction (Leopold & Lechner, 2015), and an increased risk of cognitive impairment in later life, as stress can accelerate cognitive decline (Liu et al., 2022). A recent Nordic study on the mental health consequences of parental death for children revealed that the effects were most severe in same-sex constellations of parents and children (Böckerman et al., 2023)

These findings successfully established the effects of parental death on different mental outcomes for bereaved children along the lines of the child's age, gender of a parent and child. Table 2.1 additionally summarizes the key details of the prior research. To the best of our knowledge, no quantitative study to date has examined mental health responses to parental death with a detailed monthly timeline, specifically focusing on the initial year after the loss as the period of most adaptation. Moreover, the most pronounced negative mental health responses tend to occur already in the month of loss (Bonanno et al., 2002). It means that the yearly data is not granular enough to capture the mental health response phases within the first year. The current study aims to address this gap and zoom into the first year after parental death by utilizing the same annual data structure.

Table 2.1. Parental death and outcomes: main prior research.

Authors	Data	Design	Dependent variable	Waves covered
Böckerman et al. 2023	Nordic register data	Family fixed effects, event study analysis	Hospitalization spell due to mental health	1970-2016
Kamis et al. 2021	National Longitudinal Study of Adolescent to Adult Health, USA	OLS	Depressive symptoms: Center for Epidemiological Studies-Depression scale (CES-D; Radloff 1977)	4 waves (1996, 2001-2002, 2008-2009, 2016-2018)
Liu et al. 2022	Health and Retirement Study, USA	Discrete-time hazard regression models	Cognitive status: cognitive impairment (0-11), no cognitive impairment (12-27)	2000-2016
Leopold& Lechner 2015	German Socio-economic Panel (GSOEP)	FE models	Life satisfaction (0-10)	1984-2012

Note: OLS = Ordinary Least Squares, FE = fixed effects.

Thus, the following responses are expected within the first post-loss year:

Hypothesis 1: The mental health decline after parental death is deeper when assessed on a monthly compared to a yearly timescale.

Hypothesis 2: The speed of adaptation in mental health is faster when assessed on a monthly compared to a yearly timescale.

In another scenario, if the initial phases of adjustment do not progress naturally, and those who are grieving fail to fully address their grief in the early months, there is a chance of grief complications arising, which might potentially result in significant mental health challenges (Granek, 2010). Scholars introduced the concept of "complicated" or "prolonged grief" to articulate extended mourning periods that last longer than expected (Bonanno et al., 2002; Shear, 2015; Shuchter & Zisook, 1993). Furthermore, prolonged grief disorder has recently gained recognition in both the International Classification of Diseases (ICD-11) and the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), each outlining specific criteria (Bonanno & Malgaroli, 2020; Eisma et al., 2020). For instance, according to ICD-11, individuals must endure persistent preoccupation with the deceased along with emotional distress for a minimum of six months following the loss (Eisma et al., 2020). Simply put, every additional month of grieving beyond the initial phases adds to the risk of future mental health complications.

Given that some population groups exhibit healthier coping strategies than others, a key task for scholars is to ensure that groups more prone to suppressing their grief do not experience long-term complications and ongoing psychological distress. The coping strategies can differ along the lines of first or second parent's death, gender of the child and parent, and adult's age at the parent's death (Bowlby, 1980; Kamis et al., 2022; Leopold & Lechner, 2015; Liu et al., 2022; Marshall, 2004). This heterogeneity is addressed in our analysis complementary to the main hypotheses.

2.2.3. Heterogeneity in the immediate mental health responses to parental death

2.2.3.1. First and second parental death

Quantitative studies offer limited understanding of the impacts of the first versus the second parental death. However, qualitative research propose that grief reactions can differ

significantly between these events (Marshall, 2004). Grief associated with the loss of the first parent encompasses multiple dimensions, potentially involving a sense of responsibility for the surviving parent. The necessity to appear resilient, provide care, and comfort the surviving parent can suppress the immediate emotions of grief. Concurrently, witnessing the grief of a surviving parent involves sympathy and can intensify grief, particularly among adult daughters (Marshall, 2004).

Nevertheless, the death of the first parent is a shocking experience that involves a realization of parental mortality. The loss of the second parent might involve less shock but can resurface the grief for both parents, especially if it is suppressed for the first (Marshall, 2004). Both the first and second death facilitate a reevaluation of the adult's family role, acquisition of new responsibilities and awareness of self being the next generation that will pass away as a natural process of the life course (Neugarten, 1969).

2.2.3.2. Adult child's gender

Parental death is a gendered experience, with variations observed between the genders of children (Marshall, 2004; Moss & Moss, 1985). Following the loss, adult daughters tend to express more sadness and emotions towards the deceased parent, while sons are less inclined to openly share their deep thoughts and immediate reactions (Lundorff et al., 2020; Marshall, 2004; Stroebe et al., 2001). Daughters usually act as primary caregivers in case of long-term illness of a parent (Umberson, 2003). This way, they might feel a sense of relief by alleviating the responsibility strain. However, they simultaneously lose the much closer relationship built with a parent during the caregiving process (Umberson, 2003). It means that intensified grief from a parent's death can be a higher emotional price daughters pay for a closer relationship with a parent compared to sons.

Additionally, previous studies revealed that sons are more likely to express prolonged grief than daughters (Lundorff et al., 2020) and use avoidance strategies to cope with negative feelings, such as working more than usual, exercising a lot, and drinking alcohol (Umberson, 2003). Daughters also can use avoidance strategies but are more likely to choose the coping mechanisms that help to express their emotions (Umberson, 2003).

2.2.3.3. Other heterogeneity

The gender of a parent and the adult's age at the time of parental death are additional dominant moderators of interest in the parent death outcomes on mental health. Mother's loss might have greater negative impact due to closer attachment in childhood compared to fathers (Bowlby, 1980; Leopold & Lechner, 2015; Umberson, 2003). The immediate responses to parental loss can be more pronounced at younger ages when the loss happens "off-time" the expectable schedule and natural order of timing in the social structure (Elder, 1977; Leopold & Lechner, 2015).

Further characteristics that have been shown to matter in parental death experiences include preceding relationship qualities with parents, the child's sociodemographic characteristics and social support (Neugarten, 1969). This differentiation makes a response to the loss both less predictable and more complicated since hypothetical scenarios are diverse. For example, negative or silent relationships can serve as a relief for a bereaved adult and evolve less distress (Rossi & Rossi, 2018; Umberson, 1992; Umberson & Chen, 1994). At the same time, unresolved conflict with a deceased parent can increase the psychological distress of a child (Steffen et al., 2022).

2.3. Method

2.3.1. Data

We based the empirical analysis on data from German Socio-Economic Panel (GSOEP) 1984-2020, exploiting up to 12 measurements of mental health (from 2002 to 2016 biannually, from 2016 through 2020 annually). The GSOEP is one of the longest representative annual longitudinal studies of private households in Germany for social, behavioral, and economic research (SOEP-Core, v37 2022). Although the GSOEP is conducted annually, it includes additional information on the interview month and the month of a parent's death.

2.3.2. Sample selection

We defined two separate analytical samples for the first and the second parent's death. The inclusion criteria for the first parental death sample were: 1) both parents were alive at the initial observation (those whose parents died before the first observation/at first observation were excluded); 2) the first parent died along the observation period of a respondent; 3) the person was observed at least once before the death of the first parent (individuals who were not followed after the death event were included in the sample); 4) the death month was known for the respondent to depict better comparability between the yearly and monthly analyses. In total, after all sample restrictions, 2,106 respondents who experienced their first parent's death met these criteria. We additionally included in the analysis those whose both parents remained alive along the panel to better estimate contemporaneous effects. Altogether, 43,636 persons comprised the analysis of the first parental death (see Appendix A2, Figures A2.1 for a detailed sample selection flow chart).

The inclusion criteria for the second parental death sample were: 1) at least one parent was alive at the first observation; 2) the second parent died across the observation period; 3) the person was observed at least once before the death of the second parent (individuals who were

not interviewed after the death event were included in the sample); 4) the death month was known for the respondent to depict better comparability between the yearly and monthly analyses. In total, after all sample restrictions, 1,338 respondents met these criteria. For this sample, we also considered those who did not lose their second parent. Altogether, 58,644 persons were included in the second parent's death analysis (see Appendix A2, Figure A2.2 for a detailed sample selection flow chart). The samples of first and second parental death slightly overlapped. Only 182 persons lost their first and second parent along the observation window. We excluded the unusual instances in which 93 individuals lost both parents in the same year in the first parental death sample and 71 individuals experienced the same situation in the second parental death sample. Overall, the analysis covered up to 12 annual measurements. We restricted the respondent's age to individuals aged 18 to 85 to ensure that individuals have reached adulthood and are still at risk of experiencing parental loss.

Tables 2.2 and 2.3 provide a descriptive overview of the first and second parental death samples, along with the samples that did not encounter these events (see Appendix B2 for the samples by gender). Overall, the sample of those who experienced the death of a first parent was notably larger (2,106 individuals) than those who lost their second parent (1,338 individuals). Both first and second parental death samples were balanced enough in general, including the distribution by child's gender within the samples. The mean adult child's age at the first parent's death was logically a bit lower (46.8) than the age at the second parent's death (55.1) and almost identical for adult daughters and sons. However, the second parental death sample was somewhat limited in terms of the parent's gender (30% of father's deaths versus 70% of mother's deaths), which may be attributed to the typical tendency of fathers to pass away first (Crimmins et al., 2021). For the first parental death sample, the gender distribution of the parent still maintained satisfactory balance (60% of father's deaths versus 40% of mother's deaths), making it possible to observe differences in gender dyads: mother first -

daughter, father first - son. As a result, all analyses of parent-child gender dyads were confined to the first parental death sample.

Individuals who experienced a parental death (either first or second) exhibit mean mental health similar to those who have not encountered this event. Despite the similarity in mean values between these groups, the range (min/max) was wider for individuals who did not experience parental death, with notably poorer mental health at the lower bound. Moreover, the attrition rate was higher among individuals who experienced parental loss. There is an unavoidable risk of positive selection bias in long-running panels, as those with superior mental health, greater resilience, and the capacity to participate in the panel for an extended period are more likely to have their experience of parental death captured.

2.3.3. Measures

2.3.3.1. Dependent variable

The outcome variable, mental health, is measured by the mental health component scale in the GSOEP. This scale, based on the SF-12v2 questionnaire, includes four dimensions: Vitality, Role Emotional, Mental Health, and Social Functioning. Each dimension is scored on a scale from 0 to 100, with a mean of 50 and a standard deviation of 10 (Andersen et al., 2007). This variable has been measured since 2002: every second year from 2002 to 2016 and every year from 2016 to 2020, providing up to 12 measurements per individual for the analysis.

Table 2.2. First parent death sample and those who did not lose the first parent

	Lost their first parent					Did not lose their first parent					
Variable	M	SD	min	max	*N*	M	SD	min	max	*N*	Variable description
Mental Health	49.2	9.8	10.2	75.5	2106	49.7	10.0	0.6	79.6	41530	Mcs. Measured biannually 2002-2014. Then annually 2016-2020. Based on SF-12v2
Age	40.6	10.2	18	73	2106	33.1	12.7	18	85	41530	Age of a respondent
Year of First Parent Death	2012.2	5.5	2003	2020	2106						Survey year when the first parent death occurred
Child's age at First Parent Death	46.8	10.8	19	81	2106						Age of a respondent at first parent death
Year of Panel Entry	2006.0	5.5	2002	2018	2106	2011.7	6.6	2002	2020	41530	First year in which a respondent was interviewed in the mcs first parent death sample
Years observed	6.5	2.8	2	10	2106	2.6	2.2	1	10	41530	Number of unique years observed in the mcs first parent death sample
Attrition	.4				2106	.6				41530	Respondent dropped out of the panel before the most recent wave of 2020
Father's age at Death	75.9	10.2	41	99	1189						Age of the father if died first
Mother's age at Death	75.8	11.6	41	102	704						Age of the mother if died first

Note: All statistics for time-changing variables are calculated for respondents' first observation in the panel. *Source:* SOEP, v37, release 2022.

Table 2.3. Second parent death sample and those who did not lose the second parent

	Lost their second parent					Did not lose their second parent					
Variable	M	SD	min	max	*N*	M	SD	min	max	*N*	Variable description
Mental Health	49.9	9.8	8.8	73.9	1338	49.7	10.0	0.6	79.6	57306	Mcs. Measured biannually 2002-2014. Then annually 2016-2020. Based on SF-12v2
Age	48.6	9.6	18	73	1338	36.1	13.6	18	85	57306	Age of a respondent
Year of Second Parent Death	2012.4	5.4	2003	2020	1338						Survey year when the first parent death occurred
Child's age at Second Parent Death	55.1	9.5	22	81	1338						Age of a respondent at first parent death
Year of Panel Entry	2005.9	5.4	2002	2018	1338	2011.1	6.7	2002	2020	57306	First year in which a respondent was interviewed in the mcs second parent death sample
Years observed	6.7	2.7	2	10	1338	3.0	2.5	1	10	57306	Number of unique years observed in the mcs second parent death sample
Attrition	.4				1338	.6				57306	Respondent dropped out of the panel before the most recent wave of 2020
Father's age at Death	77.8	8.8	53	104	343						Age of the father if died second
Mother's age at Death	75.3	8.7	55	107	895						Age of the mother if died second

Note: All statistics for time-changing variables are calculated for respondents' first observation in the panel. *Source:* SOEP, v37, release 2022.

2.3.3.2. Independent variable

We generated the yearly and monthly dummy impact functions to track changes in mental health following parental death. First, to identify the death year, we combined the reported year information from 1) prospective survey question about the current status (dead or alive) of the mother or father ("Has your family situation changed since the last interview?" Yes/No) and 2) retrospective biographical questionnaire that pinpointed the actual calendar year of death ("What year did your mother/father die?"). The design required a combined measure of the death year because not all respondents received both prospective (death year at the moment of interview) and retrospective (calendar year of death) information. However, the rule was to trust the real calendar year of death when possible. The calendar death values from the retrospective survey in the GSOEP always preceded the reported death years at the moment of the interview. This way, for instance, if both prospective and retrospective measures were available, we depicted the calendar year from the retrospective (biographical) questionnaire. In case only the death year from the prospective survey was known, it remained in the analysis as the closest available documentation of death.

Finally, we defined the parental death index for the estimation of the yearly impact function:

1—">2 years before"

2—"1 year before"

3—"death year"

4—"1 year after"

5—">2 years after"

Second, the question about the month of parental death was included exclusively in the prospective survey. We subsequently merged it with the newly generated death year measure. To calculate the months before, at, and after the death, we employed the Century Month Codes

(CMC) methodology (Rutstein & Rojas, 2006). We calculated the difference between the century code for the survey month-year and the century code for the month-year of the parent's death. Given the GSOEP annual data structure, every respondent was not interviewed on a monthly basis. It means that any given person was not going to have mental health measurements for every month before and after the death event. Each monthly time measure corresponded to the mental health score from the survey wave closest to death instead. As an illustration, in case a respondent, whose parent died in December 2017, participated in the survey conducted in December 2016, January 2018, and February 2019, then for this individual, the monthly measurement included the mental health scores for three time periods: 12 months before the death, one month after the death and 14 months after the death.

This way, we defined the parental death index for the estimation of monthly impact function:

1—“>2 years before”
2—“1-2 years before”
3—“9-11 months before”
4—“6-8 months before”
5—“3-5 months before”
6—“1-2 month before”
7—“death month”
8—“1-2 months after”
9—“3-5 months after”
10—“6-8 months after”
11—“9-11 months after”
12—“1-2 years after”
13—“>2 years after”

Given that not every respondent received the month category, the monthly variable comprised up to 350 observations per scale point which was sufficient to observe the monthly changes in mental health. The numbers of observations seemed to be at their lowest at death month and 1-2 months prior to the event. This can be partially attributed to the interviews being delayed around the time of the death experience (for a detailed distribution of observations per month see Appendix A2, Figures A2.3 and A2.4).

2.3.3.3. Controls

Each model, similar to the yearly study by Leopold and Lechner (2015) examining the impact of parental death on life satisfaction, controlled for age, period, marital status, and employment status. Both age (with the reference "aged 46 to 50 years old") and period (with the reference "1999-2003") as time-varying characteristics were estimated as categorical variables to minimize the collinearity with yearly and monthly time dummies.

Given that single individuals in education are more likely to not achieve the "on-time" age for the parent's death and can have selectively better mental health as compared with widowed or full-time workers, this study controlled for both marital and employment statuses. The marital status included categories for married, divorced, and widowed respondents, using "single" as the reference group. Employment status comprised part-time, in education, not employed, registered as unemployed categories, with "full-time employed" as the reference group. Within-person variation accounted for 14% of total variation in marital status and 35% of total variation in employment status. Finally, time dummies for the first or second parent were included to control for changes associated with both considering a little overlap between the samples of the first and second parental deaths.

2.3.3.4. Analytic strategy

We estimated FE regression models for both yearly and monthly analyses of the impact of parental death on adult children's mental health (Brüderl & Ludwig, 2014; Ludwig & Brüderl, 2021). FE effectively eliminates all time-invariant unobserved heterogeneity, yielding estimates that are closer to the "pure within-person comparison". This advantage of FE was beneficial when evaluating the yearly-scale impacts and the initial monthly effect compared to >2 years before the event. The estimated monthly-scale effects when compared to each other, though, reflected the between-person differences in mental health given the annual structure of

the data and that every respondent did not receive the mental health measurement for every month category.

The main time effects were estimated only for people who experienced the parental death event during the observation period. However, those who did not lose their parents contributed to the estimation of contemporaneous effects and were retained to serve as a control group for estimating the common age effect (Brüderl & Ludwig, 2014).

In line with the successful application of FE models with yearly and monthly dummy impact functions in the analysis conducted by Hudde & Jacob, 2023 that enables a more granular view on an annual scale, we employed yearly and monthly FE models in this study (see Appendix A2 for the detailed equations and description of the estimates) that cover the whole phase of the parental death experience: pre-event levels and anticipation, death event, and adaptation periods.

2.4. Results

2.4.1. Yearly and monthly parental death effects on mental health

Figure 2.1 demonstrates the yearly and monthly changes in mental health for the samples of respondents who lost their first and second parent. The left-side graph presents yearly within-person estimates of mental health, illustrating changes in individual mental health over time. Conversely, the right-side graph shows monthly between-person changes in mental health at different time points. The monthly graph underscores variations in mental health across different individuals and therefore does not represent the lines connecting the monthly measurement points compared to the yearly graph. For the interpretation, however, the monthly estimates represent a within-person change when compared to the reference category (>2 years before) because almost every person from each month category was observed >2 years before the event. When the monthly effect is compared to the other month category, it demonstrates

the estimation between different individuals. Tables 2.4 and 2.5 represent the estimates of the FE regression models, forming the basis for the constructed figures.

First, the deeper drops in mental health were evident on a monthly compared to the annual timescale for both first and second parent's deaths (Hypothesis 1 is supported). Additionally, the harshest period of adaptation was found to occur within the initial two months following the loss, displaying a slight delay rather than an immediate onset during the initial weeks of loss, as proposed in the theoretical framework (Bowlby, 1980; Shuchter & Zisook, 1993; Umberson, 2003). Compared with the average mental health prior to the event (>2 years before), the initial two months after the death decreased the mental health of adult children by 4.24 points for the first and 3.77 points for the second parent, holding other covariates constant. This was almost two times the negative effect of death year/death month for the first parent (-2.41) and more than four times the negative effect of death month for the second parent (-0.87). Both yearly and monthly "at death" effects were, however, moderate in size, accounting for 0.25 *SD* and 0.15 *SD* of the overall variation for the first and second parent's death respectively, when monthly "1-2 months after" effects were stronger and accounted for 0.42 *SD* and 0.38 *SD* of the overall variation for the first and second parent's death respectively (*SD* (mcs) = 10). Second, the most recovery was evident within the first year, precisely in the first half a year after loss, meaning the recovery was occurring faster than seen on the annual timescale (Hypothesis 2 is supported). Hence, the substantial recovery was noticed four months following the event, with an effect that was twice less negative than during the "1-2 months after" the loss of the first parent and more than six times less negative following the loss of the second parent.

2.4.2. First and second parent's death

Overall, adult children who experienced the loss of their first parent demonstrated lower levels of mental health "1 year after" compared to those who lost their second parent (see Figure 2.1,

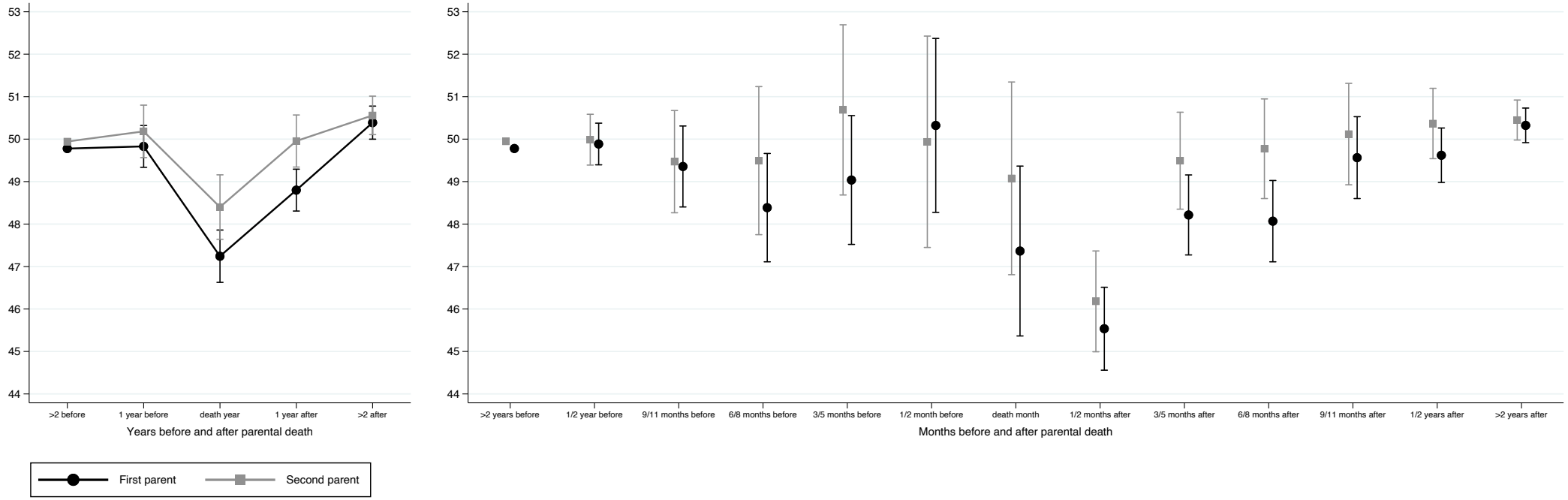

Figure 2.1. Parent's death and change in mental health: Yearly and monthly. Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Sample 1 (death of first parent): *n*=2,106 individuals (who lost the first parent), *n*=41,530 individuals (who do not experience the death of the first parent). Sample 2 (death of second parent): *n*=1,338 individuals (who lost the second parent), *n*=57,306 observations (who do not experience the death of the second parent). The *y*-axis shows mental health scores (range: 0 to 100, Mean = 50, SD = 10). Bars represent 95% confidence intervals. Yearly estimates are presented in Model 1 (first parent death) and Model 2 (second parent death) (see Table 2.4). Monthly estimates are presented in Model 3 (first parent death) and Model 4 (second parent death) (see Table 2.5). The overall sample of respondents who lost their first and second parent additionally includes adult children who are at risk of losing their first and second parent, but do not experience this event along the observation period in the SOEP (v37).

Table 2.4. Fixed effects models for mental health change around parental death: Yearly

	Model 1: First parent		Model 2: Second parent	
	Coefficient	*SE*	Coefficient	*SE*
Parent's death (ref.: >2 years before)				
1 year before	0.051	0.257	0.238	0.318
death year	–2.535**	0.317	–1.543**	0.389
1 year after	–0.979**	0.257	0.012	0.316
>2 years after	0.610**	0.208	0.615**	0.236
Age (ref.: 46-50)				
18-30	–0.291	0.285	–0.351	0.242
31-35	–0.341	0.221	–0.388*	0.186
36-40	–0.337*	0.170	–0.334*	0.141
41-45	–0.160	0.125	–0.187†	0.101
51-55	0.230†	0.138	0.200†	0.105
56-60	0.209	0.202	0.228	0.152
61-65	1.478**	0.281	1.676**	0.207
66-70	2.281**	0.371	2.288**	0.266
71-80	2.005**	0.476	1.658**	0.334
81-85	–0.284	0.786	–0.202	0.520
Period (ref.: 1999-2003)				
2004-08	0.146	0.104	0.204*	0.084
2009-12	–0.560**	0.146	–0.456**	0.119
2013-15	–0.061	0.180	–0.023	0.147
2016-18	0.304	0.201	0.371*	0.166
2019-20	–0.399†	0.235	–0.372†	0.194
Marital status (ref.: single)				
Married	0.240	0.162	0.306*	0.147
Divorced	0.756**	0.260	1.036**	0.220
Widowed	–2.436**	0.486	–2.082**	0.336
Employment status (ref.: full time)				
Part time	0.369**	0.108	0.294**	0.091
In education	0.203	0.168	0.012	0.156
Not employed	–0.025	0.108	–0.131	0.091
Unemployed	–0.440**	0.135	–0.700**	0.112
Constant	49.599**	0.631	50.203**	0.287
N	124888		181134	

Note: Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Model 1 additionally controls for the second parent death time dummies. Model 2 controls for the first parent death time dummies. *N* represents the person-years. ref. = reference category, † p<0.10, * p<0.05, ** p<0.01.

Table 2.5. Fixed effects models for mental health change around parental death: Monthly

	Model 3: First parent		Model 4: Second parent	
	Coefficient	*SE*	Coefficient	*SE*
Parent's death (ref.: >2 years before)				
1/2 years before	0.106	0.255	0.039	0.312
9/11 months before	–0.423	0.499	–0.478	0.664
6/8 months before	–1.393*	0.709	–0.454	0.899
3/5 months before	–0.742	0.841	0.741	0.936
1/2 month before	0.543	1.011	–0.009	1.128
death month	–2.414**	0.926	–0.871	1.162
1/2 months after	–4.244**	0.610	–3.767**	0.623
3/5 months after	–1.565**	0.537	–0.455	0.553
6/8 months after	–1.711**	0.514	–0.173	0.543
9/11 months after	–0.215	0.560	0.172	0.612
1/2 years after	–0.159	0.360	0.421	0.415
>2 years after	0.545*	0.254	0.503†	0.272
Age (ref.: 46-50)				
18-30	–0.297	0.299	–0.359	0.256
31-35	–0.347	0.238	–0.395*	0.201
36-40	–0.338†	0.182	–0.338*	0.151
41-45	–0.159	0.130	–0.189†	0.105
51-55	0.227	0.146	0.201†	0.111
56-60	0.200	0.222	0.230	0.165
61-65	1.468**	0.307	1.681**	0.225
66-70	2.262**	0.408	2.294**	0.289
71-80	1.984**	0.515	1.659**	0.355
81-85	–0.308	0.890	–0.198	0.591
Period (ref.: 1999-2003)				
2004-08	0.149	0.103	0.208*	0.083
2009-12	–0.554**	0.149	–0.451**	0.121
2013-15	–0.050	0.185	–0.018	0.151
2016-18	0.311	0.209	0.379*	0.170
2019-20	–0.411†	0.244	–0.383†	0.199
Marital status (ref.: single)				
Married	0.233	0.181	0.303†	0.165
Divorced	0.750*	0.309	1.034**	0.257
Widowed	–2.437**	0.664	–2.091**	0.469
Employment status (ref.: full time)				
Part time	0.368**	0.117	0.295**	0.099
In education	0.204	0.175	0.017	0.165
Not employed	–0.025	0.123	–0.131	0.105
Unemployed	–0.442**	0.164	–0.704**	0.136
Constant	49.728**	0.732	50.140**	0.326
N	124888		181134	

Note: Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Model 3 additionally controls for the second parent death time dummies. Model 4 controls for the first parent death time dummies. *N* represents the person-years. ref. = reference category, † p<0.10, * p<0.05, ** p<0.01.

annual graph). The pattern of mental health change on a monthly timescale appeared similar for both events, however, with a slightly insignificant variation in the adaptation stage occurring "7 months after" the loss (see Figure 2.1, monthly graph). Adults grieving their first parent's death seemed to have a slower recovery compared to those mourning their second loss. Even though the pattern of mental health alterations was alike, the adaptation process was slower for those who undergo the loss of their first parent.

2.4.3. Gender of an adult child

Figures 2.2 and 2.3 show the overall annual and monthly changes in mental health of adult sons and daughters for the first and second parent's death. Overall, adult sons initially exhibited better mental health scores compared to adult daughters. In the initial two months, the most pronounced difference between adult sons and daughters was observed, with adult daughters experiencing the most decline in mental health after the death of the first parent. This decline accounted for 6.01 points drop in mental health compared with the reference period (>2 years before), holding other covariates constant (see Appendix C2 for the detailed estimates). This effect was three times as large the drop in the death month (2.07 points). In contrast, for adult sons a decrease comprised 2.83 points in the death month, with a slight increase in mental health occurring immediately after the death of the first parent (during the first two months following). Therefore, the declines in mental health when seen on a monthly timescale appeared to be deeper for adult daughters than sons.

In contrast to the first parent's death, adult sons experienced a more pronounced drop in mental health during the initial months following the second parent's loss, with a decrease of 3.12 points. In summary, the first few post-loss months appeared to be particularly challenging for adult daughters, with sons encountering a challenging stretch only after the second parent's loss. It took more than two years for both daughters and sons to reach their pre-event levels of mental health.

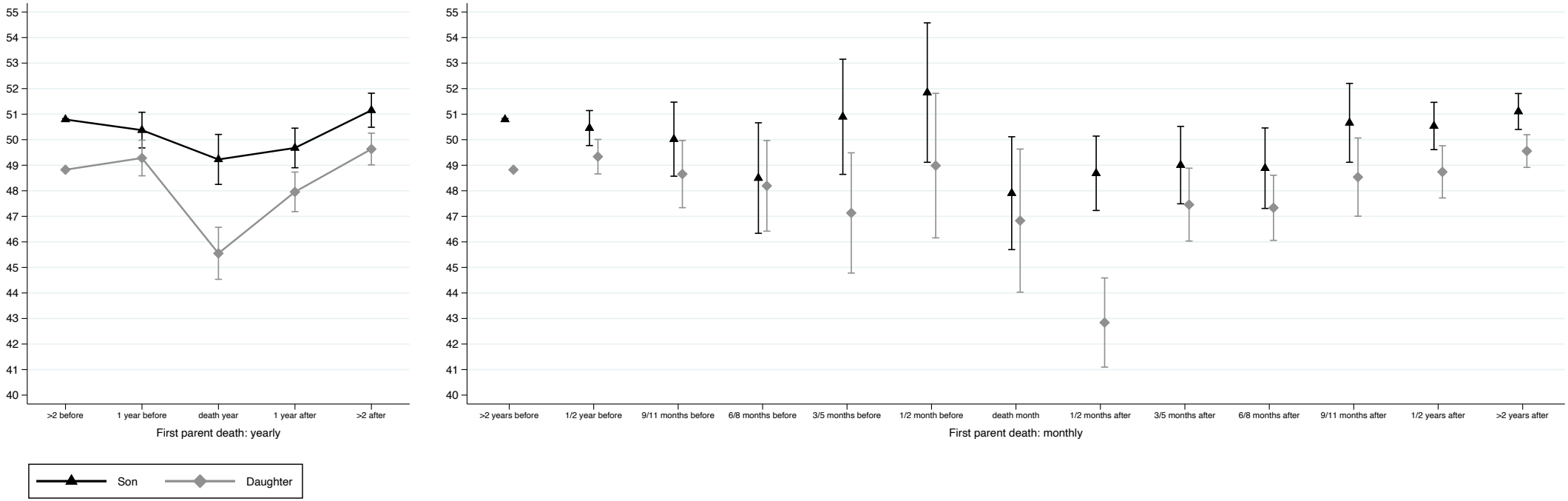

Figure 2.2. First parent death and change in mental health: By gender of an adult child yearly and monthly. Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Each model controls for age, period, marital status, employment status. The y-axis shows mental health scores (range: 0 to 100, Mean = 50, SD = 10). Bars represent 95% confidence intervals.

First parent death:
n=2,106 individuals who lost the first parent.
n=41,530 individuals who did not experience the death of the first parent.

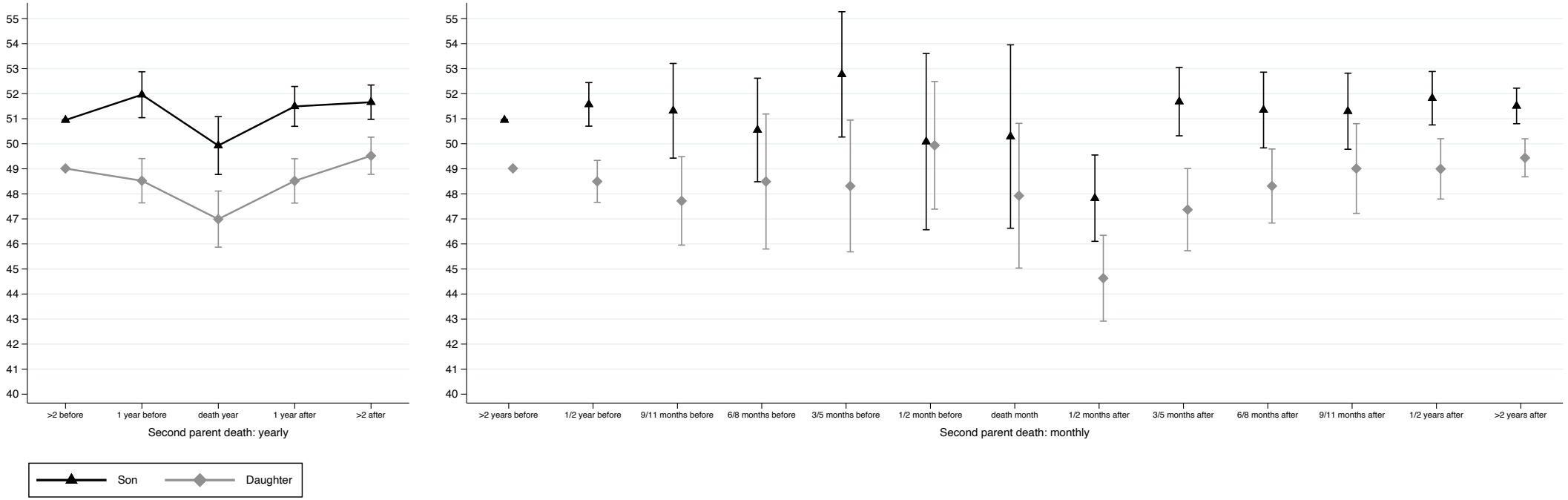

Figure 2.3. Second parent death and change in mental health: By gender of an adult child yearly and monthly. Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Each model controls for age, period, marital status, employment status. The y-axis shows mental health scores (range: 0 to 100, Mean = 50, SD = 10). Bars represent 95% confidence intervals.

Second parent death:
n=1,338 individuals who lost the second parent.
n=57,306 individuals who did not experience the death of the second parent.

2.4.4. Change in mental health by gender of a parent and age at parental death

2.4.4.1. Gender of a parent and child

Figure 2.4 demonstrates the mental health change by parent's gender. Overall, a mother's death being first for adult daughters and sons had the most severe negative effects on mental health than father's death. The negative effect at event was much stronger for adult daughters as compared with sons.

Notably, distinct patterns of anticipation and adaptation were observed for daughters and sons during the months leading up to and following the death of a mother. For anticipation, months before the mother's death, mental health fluctuated for both daughters and sons, however, demonstrated the peak(best) mental health of daughters four months before the event followed by the deepest decline of 8.33 points in the first months after the loss (for the detailed estimated see Appendix D2, Table D2.2). This most severe impact accounted for nearly one standard deviation (1*SD*=10 points), a pattern not evident among sons. Sons underwent a much more moderate decline in the initial months (1.93 points). Nevertheless, the sons' adaptation process occurred somewhat later than that of daughters', around six to eight months subsequent to the event. The notable finding was that despite the fluctuations in mental health during the first year, both adult sons and daughters managed to stabilize their mental health two years after the death of either parent. The dynamics of mental health varied for sons and daughters during the first year as the most critical period of adaptation process. Due to insufficient variation in parental gender within the sample, the analysis did not assess the impact of the death of a second parent by the parent's gender.

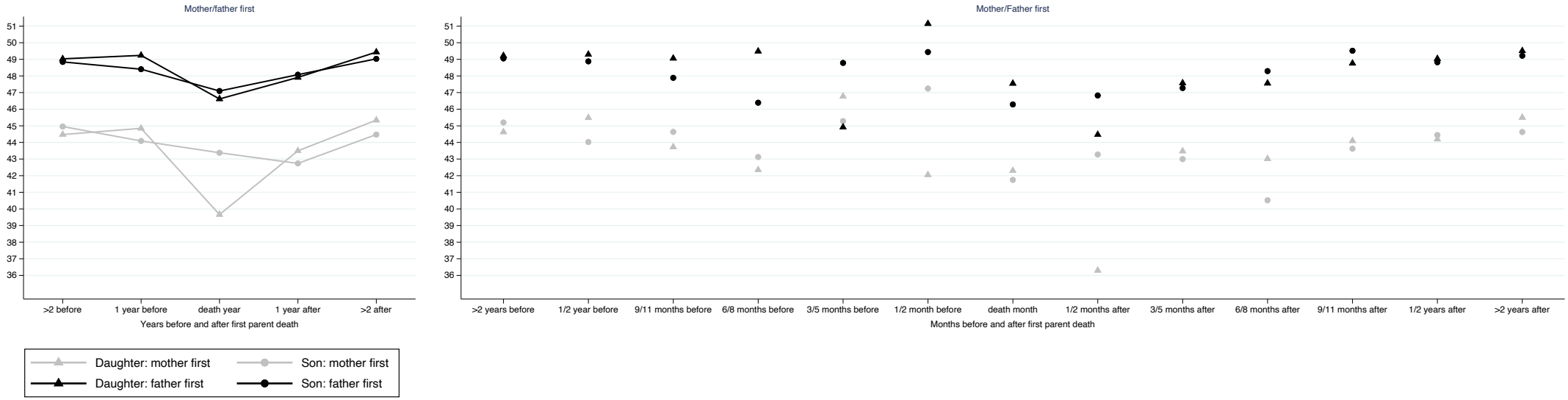

Figure 2.4. Change in mental health: By parent's and adult child's gender. Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Each model controls for age, period, marital status, employment status. Models 5, 6, 7, 8 additionally control for the second parent death time dummies. See Appendix E2, Tables E2.1 and E2.2 for the detailed estimates.

First parent death: mother first (n= 5,139), father first (n= 8,464).

2.4.4.2. Age at parental death

Regarding "off-time" and "on-time" parental death and unlike the study of Leopold & Lechner (2015) on life satisfaction, no substantial age differences were found in mental health change before, at, and after parental death. Overall, the effects were found to be small in size. The differences were almost not present for every gender combination but the "mother first–daughter". For instance, for the daughter who lost her mother first at 48 years (median age), the death year decreases her mental health by 4.90 points compared with the reference period (for the detailed estimates see Appendix E2, Tables E2.1 and E2.2). This drop was 1.3 times larger for the daughter's off-time loss at 25 years and comprised 6.48 (-4.896-23*0.0687) points. For sons, these negative effects at 48 and 25 years were expected to be 3.30 points lower (weaker) at the death year. However, the deepest negative adaptation for sons who lost their mother first at age 25 occurred six to eight months after the event (the effect by 3.44 points more negative compared to daughters at age 25). Taken together, for both adult daughters and sons, the effects were more pronounced at younger ages, however, exclusive to instances where the mother deceased first.

2.5. Discussion

This investigation's objective was to substantively evaluate the impact of parental death on adult mental health at two different timescales: yearly and monthly. Existing research in grief and coping studies suggested that the stress response, subsequent grief, and adaptation mechanisms in individuals coping with loss were often manifested within a relatively brief span (Bowlby, 1980; DeVaul et al., 1979; Shuchter & Zisook, 1993). Consequently, monthly timescales might provide a more accurate representation of these processes as compared to the traditionally employed yearly timescales. For the purpose of this comparison, we used detailed prospective data from the German Socio-Economic Panel (GSOEP).

FE models with monthly and yearly impact functions revealed two main findings. First, supporting our Hypothesis 1, drops in bereaved adult children's mental health were substantially deeper on a monthly than on an annual timescale. The average maximum drops measured on a monthly scale were approximately twice of the size measured at a yearly scale. This difference between monthly and annual timescales was more pronounced in women than in men. For example, the estimated maximum drop in mental health was almost a full standard deviation for daughters assessed one to two months after their mother's death. The corresponding estimate on an annual scale was less than half of this magnitude. This contrast demonstrates that annual timescales underestimate the severity of the impact of parental loss on adult mental health.

Second, supporting our Hypothesis 2, adaptation occurred much faster when measured on a monthly timescale. The most substantial recovery was completed already a few months after parental loss. More than half of the maximum loss recorded on a monthly scale had dissipated merely four months after a parent's death. This speed of mental health recovery was not evident on a yearly timescale. Hence, gender differences were most evident in the months surrounding a death event with the rapid adaptation process attenuating these differences in the succeeding months, especially if mother deceased first. This also implies something broader, suggesting that adaptation to loss events unfolds at a much faster pace than has been demonstrated by a large body of research using annual timescales (Leopold & Lechner, 2015; Kamis et al., 2022; Liu et al., 2022). Consequently, research into substantive processes of adaptation and heterogeneity therein—in this case by gender and death sequence—is better explored on monthly than on annual timescales (Hudde & Jacob, 2023; Marshall, 2004; Umberson, 2003).

Our study presented several challenges that warrant further exploration in future research. First, our study may not capture the full complexity of grief's impact on mental health. Moreover, although grief is considered a universal and natural experience, different cultural

norms may influence the expression of grief and its impact on mental well-being (M. Stroebe & Schut, 1998). Our study represents the German population and is not necessarily applicable to other cultures or regions. Second, the study design did not guarantee that a parent's death occurred prior to the interview month. A scenario in which an interview preceded the parent's death within the same month might clarify why the most substantial mental health declines did not occur at death month immediately, but rather with a slight delay at one to two months after the event. Third, it seemed plausible that those experiencing intense grief might opt to postpone or forgo the interview, which could provide another potential reason for the slightly delayed mental health responses in the initial months after the death.

Our monthly assessment of mental health changes reflected within-individual comparisons only when compared to the reference category (the initial drop compared to >2 years before) and represented between-individual estimations when compared between the month categories (adaptation processes). This was a methodological compromise we accepted to prioritize fine-grained estimations using the available data. Even the monthly data extracted from an annual panel was limited, and future research might profit from employing data measured monthly, or at least quarterly, to investigate immediate reactions to loss.

Additionally, our causal conclusions can be true only under the assumption that our controls capture all relevant time-varying characteristics. Some confounders, such as changes in the living situation of a child/parent, might have adverse effects on the mental health of adult children and were not accounted for. Our data did not allow investigating other potential moderating or mediating factors such as pre-death parent-child relationship quality (Umberson & Chen, 1994), sibling relationships before and after the event (Hank, 2021) as a proxy of family support, the role of the adult child as a caregiver before the parent's death (Umberson, 2003), accidental versus non-accidental death, or whether the parent suffered from long-term diseases prior to the death (Burton et al., 2006). Our study could not estimate the models for

the child-parent gender dyads due to an underrepresentation of fathers in the second parental death sample. This might be attributable to the longer life expectancy of women compared to men (Crimmins et al., 2021), as well as their increased likelihood of surviving long enough to be the second parent to pass away.

Lastly, exploring separate dimensions of the broad construct of mental health might help to capture the mental health responses more precisely (e.g. depression sub-scale, positive/negative affect scale, anxiety sub-scale). While SF-12v2 mental scale is a reliable and valid measure, its construct validity might be compromised due to the omission of some theoretical dimensions of mental health (Headey et al., 1993; Keyes, 2005; Massé et al., 1998; Veit & Ware, 1983; Zautra et al., 1988) (see Robustness checks, Appendix F2).

Taken together, our study demonstrated that the mental health impact of parental loss unfolds faster and steeper on a monthly compared to yearly timescales. Societies should pay attention to the finely grained nature of this event and moderating roles of the child-parent gender, first and second loss, age in the effects on adult mental health that might matter for future adaptation and well-being of those dealing with the universally inevitable experience of losing a parent. The insights derived from our study will hopefully contribute to further informing researchers as well as practitioners in counseling and therapy. In light of our findings, providing clinical support to bereaved children within the first six months post-event appears particularly important. We also recommend that policymakers devise strategies to ensure equal access to mental and financial support for individuals experiencing parental loss, particularly in the critical initial period following the event.

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2.7. Appendix

Appendix A2. Sample selection and analytical strategy

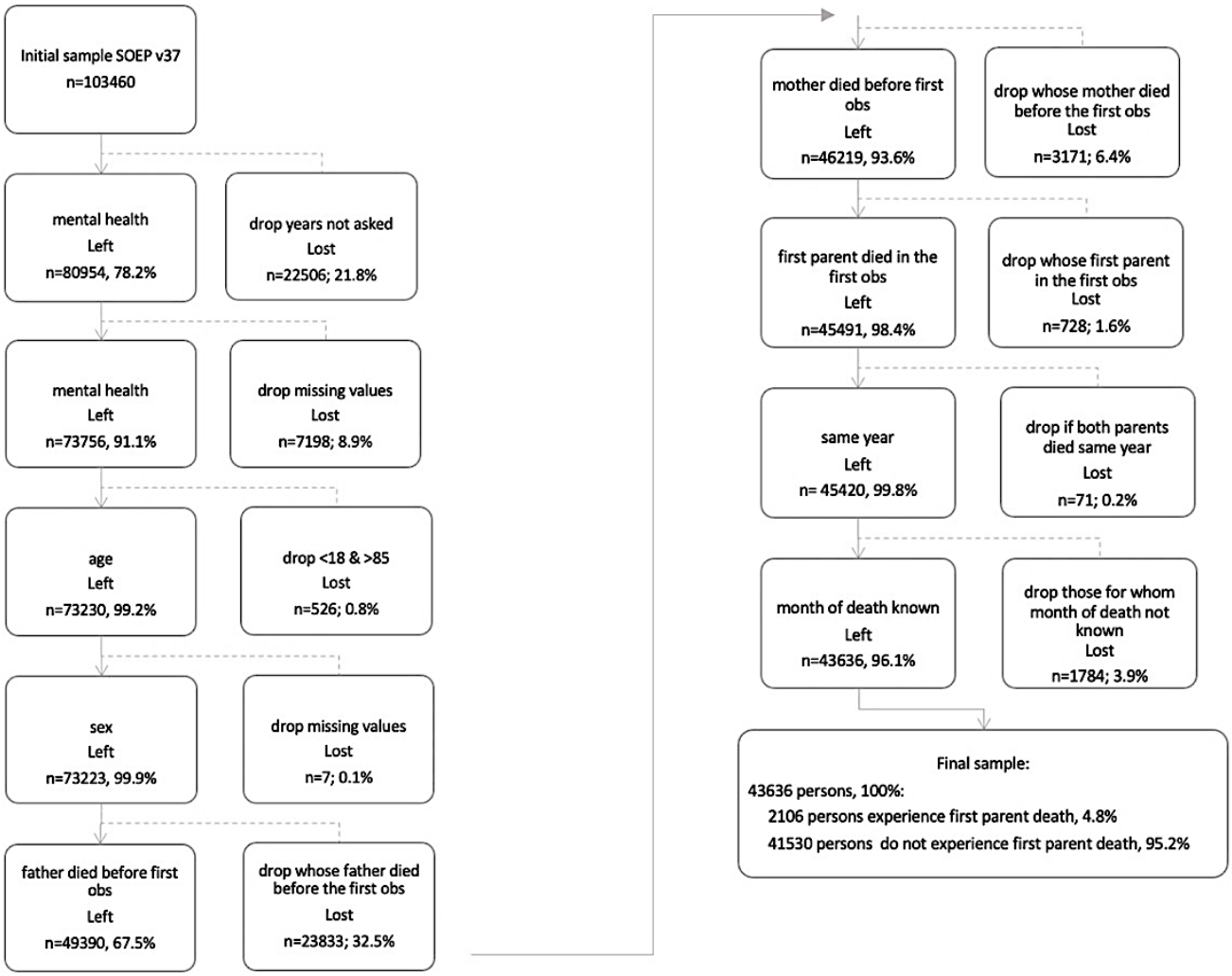


Figure A2.1. Sample selection flow chart: First parental death.

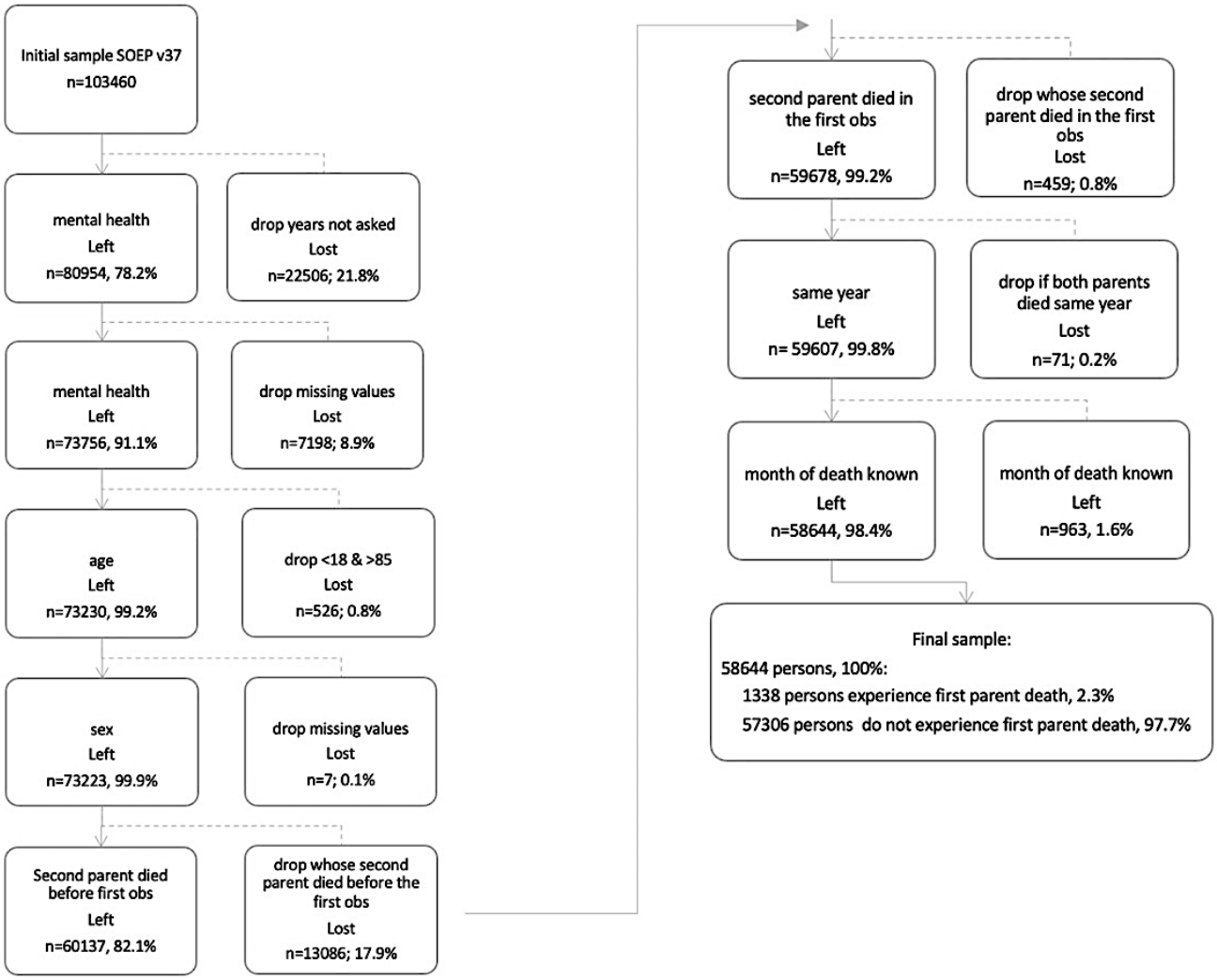


Figure A2.2. Sample selection flow chart: Second parental death.

Analytical strategy: Fixed effects equations

Yearly fixed effects model: Dummy impact function

$$mcs_{it} = \alpha + \beta 1_{1\ year\ before} + \beta 2_{death\ year} + \cdots + \beta 4_{2/\max years\ after} +$$
$$+ \beta 5_{age_{cat}(18-30)} + \cdots + \beta 14_{age_{cat}(81-85)} + \beta 15_{period(2004-2008)} + \cdots + \beta 19_{period(2019-2020)} +$$
$$+ \beta 20_{marital\ status(married)} + \cdots + \beta 22_{marital\ status(widowed)} +$$
$$+ \beta 23_{employment\ status(part-time)} + \cdots + \beta 26_{employment\ status(part-time)} +$$
$$+ \beta 27_{second/first\ parent\ death\ control(1\ year\ before)} + \cdots +$$
$$+ \beta 30_{second/first\ parent\ death\ control(2/\max years\ after)} + e_{it}$$

Monthly fixed effects model: Dummy impact function

$$mcs_{it} = \alpha + \beta 1_{24/12\ months\ before(1-2\ years\ before)} + \beta 2_{11/9\ months\ before} + \cdots + \beta 12_{25/\max months\ after} +$$
$$+ \beta 13_{age_{cat}(18-30)} + \cdots + \beta 22_{age_{cat}(81-85)} + \beta 23_{period(2004-2008)} + \cdots + \beta 27_{period(2019-2020)} +$$
$$+ \beta 28_{marital\ status(married)} + \cdots + \beta 30_{marital\ status(widowed)} +$$
$$+ \beta 31_{employment\ status(part-time)} + \cdots + \beta 34_{employment\ status(part-time)}$$
$$+ \beta 35_{second/first\ parent\ death\ control(1\ year\ before)} + \cdots +$$
$$+ \beta 46_{second/first\ parent\ death\ control(2/\max years\ after)} + e_{it}$$

Table A2.1. Variable description of the yearly and monthly model

Model	Variable	Variable description	Reference category
3A, 3B	mcs_{it}	GSOEP mental health component scale for person i at time point t	
3A, 3B	α	constant	
3A	$\beta 1 - \beta 4$	yearly time dummies	min/2 years before the event
3B	$\beta 1 - \beta 12$	monthly time dummies	min/25 months before the event (>2 years before)
3A, 3B	$\beta 5 - \beta 14$ / $\beta 14 - \beta 22$	age categorical	aged 46 to 50 years old
3A, 3B	$\beta 15 - \beta 19$ / $\beta 23 - \beta 27$	period categorical	1999 to 2003
3A, 3B	$\beta 20 - \beta 22$ / $\beta 28 - \beta 30$	marital status	single
3A, 3B	$\beta 23 - \beta 26$ / $\beta 31 - \beta 34$	employment status	full-time worker
3A, 3B	$\beta 27 - \beta 30$ / $\beta 35 - \beta 46$	second/first parent death control time dummies	2/max years before the event
3A, 3B	e_{it}	time-varying unobserved heterogeneity	

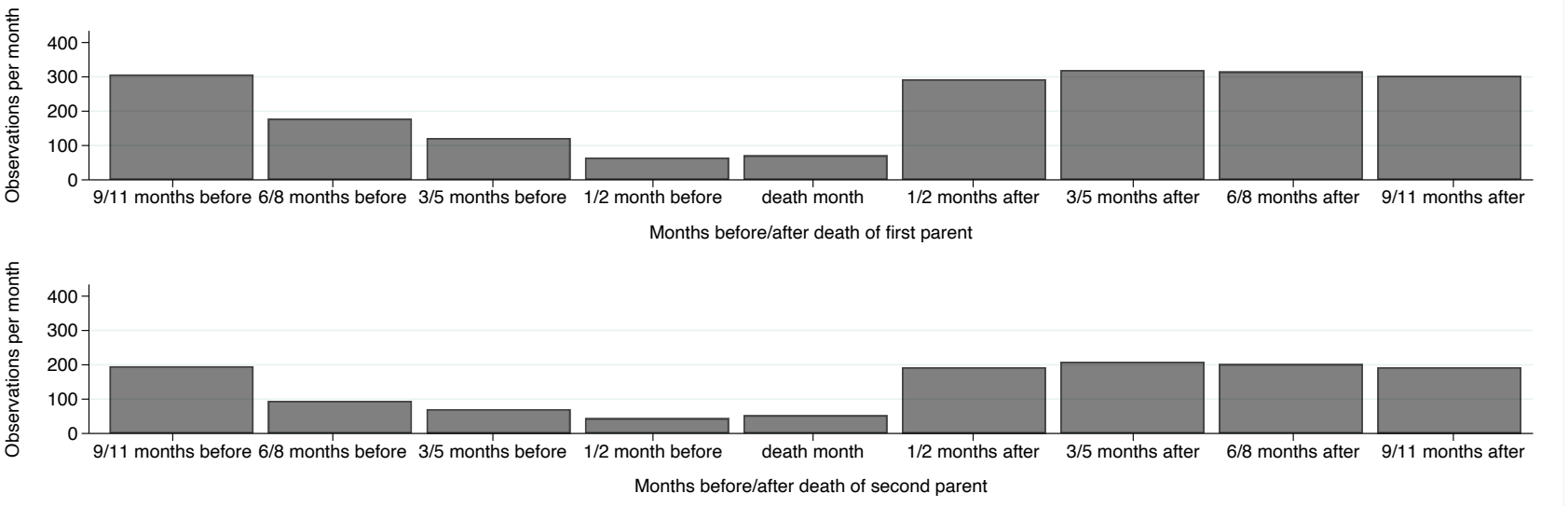


Figure A2.3. Observations in the monthly variable: first and second parental death.

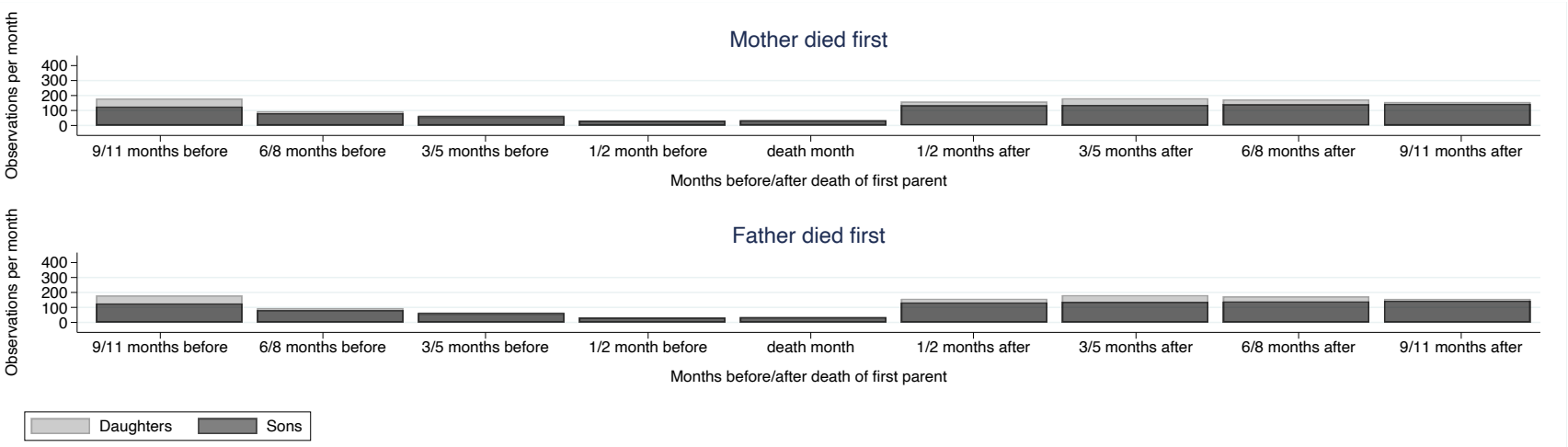


Figure A2.4. Observations in the monthly variable: first parental death mother/father first, daughters/sons.

Appendix B2. First and second parental death: samples by gender

Table B2.1. First parental death sample and those who did not lose the first parent: By gender

	Lost their first parent					Did not lose their first parent					
Variable	M	SD	min	max	*N*	M	SD	min	max	*N*	Variable description
Mental Health											Mcs. Measured biannually 2002-
Men	50.4	9.1	15.0	70.7	969	50.7	9.7	4.2	79.6	21015	2014. Then annually 2016-2020.
Women	48.2	10.2	10.2	75.5	1137	48.6	10.2	0.6	77.4	20515	Based on SF-12v2
Age											Age of a respondent
Men	40.8	10.3	18	67	969	33.0	12.7	18	85	21015	
Women	40.5	10.2	18	73	1137	33.2	12.6	18	85	20515	
Year of First Parent Death											Survey year when the first parent
Men	2012.0	5.6	2003	2020	969						death occurred
Women	2012.4	5.5	2003	2020	1137						
Child's age at First Parent Death											Age of a respondent when the
Men	46.9	10.8	19	74	969						first parent died
Women	46.8	10.7	19	81	1137						
Year of Panel Entry											First year in which a respondent
Men	2005.9	5.5	2002	2018	969	2011.9	6.7	2002	2020	21015	was interviewed in the mcs first
Women	2006.1	5.5	2002	2018	1137	2011.5	6.5	2002	2020	20515	parent death sample
Years observed											Number of unique years
Men	6.5	2.8	2	10	969	2.6	2.2	1	10	21015	observed in the mcs first parent
Women	6.5	2.8	2	10	1137	2.8	2.3	1	10	20515	death sample
Attrition											Respondent dropped out of the
Men	.4				969	.6				21015	panel before the most recent
Women	.4				1137	.6				20515	wave of 2020
Father's age at death											Age of the father if died first
Men	76.1	10.1	48	99	556						
Women	75.8	10.2	41	97	633						
Mother's age at death											Age of the mother if died first
Men	76.4	12.0	41	102	305						
Women	75.3	11.3	43	101	399						

Note: All statistics for time-changing variables are calculated for respondents' first observation in the panel. *Source:* SOEP, v37, release 2022.

Table B2.2. Second parental death sample and those who did not lose the second parent: By gender

	Lost their second parent					Did hot lose their second parent					
Variable	M	SD	min	max	*N*	M	SD	min	max	*N*	Variable description
Mental Health											Mcs. Measured biannually 2002-2014. Then annually 2016-2020. Based on SF-12v2
Men	51.1	9.4	12.3	73.3	638	50.8	9.7	4.2	79.6	28700	
Women	48.8	10.1	8.8	73.9	700	48.7	10.2	0.6	77.4	28606	
Age											Age of a respondent
Men	48.6	9.5	19	73	638	36.1	13.7	18	85	28700	
Women	48.7	9.7	18	73	700	36.2	13.5	18	85	28606	
Year of Second Parent Death											Survey year when the first parent death occurred
Men	2012.2	5.3	2003	2020	638						
Women	2012.6	5.5	2003	2020	700						
Age at Second Parent Death											Age of a respondent when the first parent died
Men	55.2	9.3	22	81	638						
Women	55.1	9.6	23	81	700						
Year of Panel Entry											First year in which a respondent was interviewed in the mcs second parent death sample
Men	2005.6	5.3	2002	2018	638	2011.4	6.7	2002	2020	28700	
Women	2006.2	5.5	2002	2018	700	2010.9	6.6	2002	2020	28606	
Years observed											Number of unique years observed in the mcs second parent death sample
Men	6.8	2.8	2	10	638	2.9	2.4	1	10	28700	
Women	6.7	2.7	2	10	700	3.1	2.5	1	10	28606	
Attrition											Respondent dropped out of the panel before the most recent wave of 2020
Men	.4				638	.6				28700	
Women	.4				700	.6				28606	
Father's age at death											Age of the father if died second
Men	82.8	8.5	58	103	164						
Women	81.7	9.1	53	104	179						
Mother's age at death											Age of the mother if died second
Men	85.4	8.6	55	107	420						
Women	84.9	8.7	56	106	475						

Note: All statistics for time-changing variables are calculated for respondents' first observation in the panel. Source: SOEP, v37, release 2022.

Appendix C2. Change in mental health: Estimates in differences by child's gender

Table C2.1. Change in mental health: Sons and daughters yearly

	M1.1: First parent[a]		M2.1: Second parent[b]	
	Coefficient	*SE*	Coefficient	*SE*
First parent death (ref.: >2 years before)				
1 year before	0.457	0.366	–0.484	0.456
death year	–3.301**	0.524	–1.996**	0.574
1 year after	–0.904*	0.405	–0.470	0.457
>2 after	0.861**	0.320	0.523	0.379
Gender interactions (ref.: daughters)				
1 year before # Sons	–0.870†	0.513	1.490*	0.656
death year # Sons	1.743*	0.723	0.967	0.821
1 year after # Sons	–-0.162	0.568	0.992	0.610
>2 after # Sons	–0.552	0.441	0.179	0.504
Constant	49.602**	0.712	50.203**	0.320

Note: Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. All models control for age, period, marital status, employment status and first/second parent death time dummies.
ref. = reference category. [a]n= 124888. [b]n= 181134. † p<0.10, * p<0.05, ** p<0.01.

Table C2.2. Change in mental health: Sons and daughters monthly

	M3.1: First parent[a]		M4.1: Second parent[b]	
	Coefficient	*SE*	Coefficient	*SE*
First parent death (ref.: >2 years before)				
1/2 year before	0.516	0.355	–0.515	0.432
9/11 months before	–0.171	0.676	–1.315	0.900
6/8 months before	–0.659	0.908	–0.525	1.372
3/5 months before	–1.732	1.211	–0.736	1.340
1/2 month before	0.087	1.448	0.944	1.312
death month	–2.074	1.436	–1.039	1.471
1/2 months after	–6.014**	0.892	–4.359**	0.876
3/5 months after	–1.398†	0.734	–1.613†	0.840
6/8 months after	–1.527*	0.657	–0.676	0.756
9/11 months after	–0.337	0.786	0.027	0.920
1/2 years after	–0.101	0.529	–0.011	0.618
>2 years after	0.775*	0.327	0.436	0.387
Gender interactions (ref.: daughters)				
1/2 year before # Sons	–0.861†	0.502	1.144†	0.621
9/11 months before # Sons	–0.583	0.998	1.696	1.323
6/8 months before # Sons	–1.620	1.430	0.133	1.734
3/5 months before # Sons	1.841	1.674	2.619	1.848
1/2 month before # Sons	0.957	2.001	–1.863	2.229
death month # Sons	–0.757	1.828	0.377	2.383
1/2 months after # Sons	3.963**	1.160	1.235	1.238
3/5 months after # Sons	–0.361	1.066	2.337*	1.091
6/8 months after # Sons	–0.383	1.038	1.068	1.079
9/11 months after # Sons	0.251	1.109	0.286	1.202
1/2 years after # Sons	–0.126	0.707	0.860	0.822
>2 years after # Sons	–0.505	0.453	0.116	0.518
Constant	49.725**	0.730	50.138**	0.326

Note: Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. All models control for age, period, marital status, employment status and first/second parent death time dummies.
ref. = reference category. [a]n= 124888. [b]n= 181134. † p<0.10, * p<0.05, ** p<0.01.

Appendix D2. Change in mental health: Estimates in differences by parent's and child's gender

Table D2.1. Change in mental health: mother/father first, sons and daughters yearly

	M5: Mother first[a]		M6: Father first[b]	
	Coefficient	*SE*	Coefficient	*SE*
First parent death (ref.: >2 years before)				
1 year before	0.375	0.574	0.208	0.463
death year	–4.814**	0.667	–2.412**	0.587
1 year after	–0.980†	0.591	–1.119*	0.480
>2 after	0.868	0.541	0.405	0.451
Gender interactions (ref.: daughters)				
1 year before # Sons	–1.241	0.822	–0.646	0.643
death year # Sons	3.237**	0.993	0.663	0.812
1 year after # Sons	–1.240	0.812	0.352	0.639
>2 after # Sons	–1.352*	0.593	–0.220	0.474
Constant	44.685**	1.352	48.944**	1.061

Note: Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. All models control for age, period, marital status, employment status and second (Models 5, 6 ,7, 8) parent death time dummies.

ref. = reference category. [a]n= 5139. [b]n= 8464. † p<0.10, * p<0.05, ** p<0.01.

Table D2.2. Change in mental health: mother/father first, sons and daughters monthly

	M7: Mother first[a]		M8: Father first[b]	
	Coefficient	*SE*	Coefficient	*SE*
First parent death (ref.: >2 years before)				
1/2 year before	0.856	0.561	0.075	0.465
9/11 months before	–0.900	1.047	–0.159	0.821
6/8 months before	–2.280†	1.321	0.269	1.188
3/5 months before	2.146	1.739	–4.301**	1.496
1/2 month before	–2.580	2.294	1.927	1.851
death month	–2.329	2.044	–1.668	1.933
1/2 months after	–8.331**	1.033	–4.749**	0.898
3/5 months after	–1.151	1.026	–1.644*	0.836
6/8 months after	–1.614	0.988	–1.661†	0.905
9/11 months after	–0.531	1.251	–0.459	0.842
1/2 years after	–0.432	0.739	–0.182	0.624
>2 years after	0.869	0.573	0.295	0.477
Gender interactions (ref.: daughters)				
1/2 year before # Sons	–2.033*	0.820	–0.252	0.642
9/11 months before # Sons	0.337	1.574	–1.009	1.249
6/8 months before # Sons	0.203	2.084	–2.933†	1.669
3/5 months before # Sons	–2.059	2.346	4.031*	2.030
1/2 month before # Sons	4.624	3.186	–1.543	2.730
death month # Sons	–1.123	3.118	–1.100	2.669
1/2 months after # Sons	6.406**	1.575	2.519*	1.284
3/5 months after # Sons	–1.048	1.680	–0.137	1.191
6/8 months after # Sons	–3.064*	1.513	0.899	1.278
9/11 months after # Sons	–1.043	1.662	0.922	1.208
1/2 years after # Sons	–0.324	1.047	–0.049	0.830
>2 years after # Sons	–1.439*	0.619	–0.132	0.492
Constant	44.878**	1.379	49.141**	1.081

Note: Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. All models control for age, period, marital status, employment status and second (Models 5, 6 ,7, 8) parent death time dummies.

ref. = reference category. [a]n= 5139. [b]n= 8464. † p<0.10, * p<0.05, ** p<0.01.

Appendix E2. Change in mental health: differences by age, gender of a parent and child

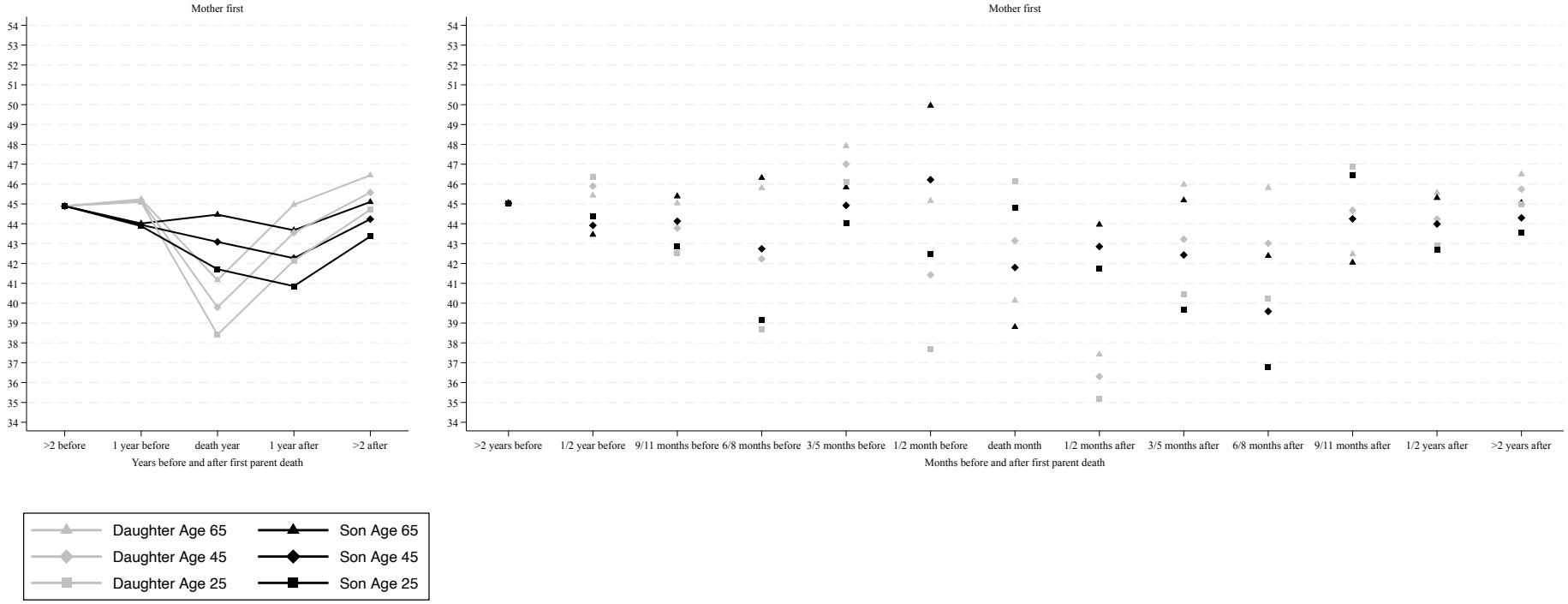


Figure E2.1. Mental health change by age, adult child's gender, mother first: yearly and monthly. Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Each model controls for age, period, marital status, employment status, and additionally for the second parent death time dummies. See Tables 1.1 and 1.2 for the detailed estimates.

First parent death: mother first (n= 5139)

Adult's age at parental death median centered (at 48 years old).

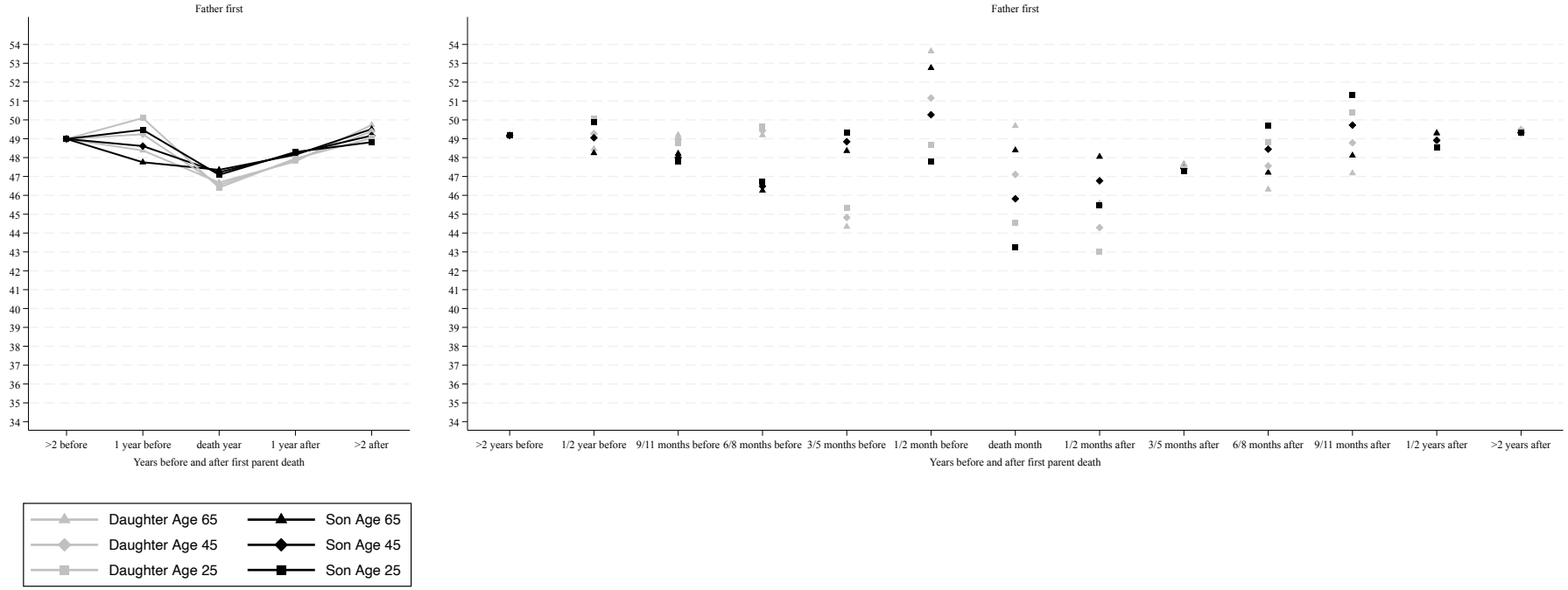


Figure E2.2. Mental health change by age, adult child's gender, father first: yearly and monthly. Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Each model controls for age, period, marital status, employment status, and additionally for the second parent death time dummies. See Tables 1.1 and 1.2 for the detailed estimates.

First parent death: father first (n= 8464)
Adult's age at parental death median centered (at 48 years old).

Table E2.1. Fixed effects models for mental health change of the parent's death: differences by age and gender yearly

	Model 9: Mother first[a]		Model 10: Father first[b]	
	Coefficient	*SE*	Coefficient	*SE*
First parent death (ref.: >2 years before)				
1 year before	0.285	0.582	0.122	0.467
death year	–4.896**	0.669	–2.422**	0.600
1 year after	–1.130†	0.600	–1.127*	0.483
>2 after	0.810	0.544	0.447	0.458
Age interactions[c]				
Age at first death # 1 year before	0.003	0.039	–0.043	0.035
Age at first death # death year	0.069	0.041	0.007	0.039
Age at first death # 1 year after	0.071†	0.040	–0.004	0.036
Age at first death # >2 after	0.043	0.037	0.017	0.033
Gender interactions (ref.: daughters)				
Sons # 1 year before	–1.219	0.823	–0.626	0.644
Sons # death year	3.295**	0.994	0.673	0.813
Sons # 1 year after	–1.285	0.813	0.351	0.639
Sons # >2 after	–1.342*	0.593	–0.216	0.474
Constant	44.894**	1.359	48.988**	1.063

Note: Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Both models control for age, period, marital status, employment status, and additionally control for the second parent death time dummies.

ref. = reference category
[a]n= 5139. [b]n= 8464. [a]Adult's age at parental death median centered (at 48 years old).
† p<0.10, * p<0.05, ** p<0.01

Table E2.2. Fixed effects models for mental health change of the parent's death: differences by age and gender monthly

	Model 11: Mother first[a]		Model 12: Father first[b]	
	Coefficient	*SE*	Coefficient	*SE*
First parent death (ref.: >2 years before)				
1/2 years before	0.783	0.570	–0.018	0.470
9/11 months before	–1.074	1.059	–0.159	0.822
6/8 months before	–2.277†	1.323	0.218	1.225
3/5 months before	2.101	1.809	–4.419**	1.548
1/2 month before	–3.060	2.320	2.360	1.892
death month	–2.349	2.043	–1.681	1.934
1/2 months after	–8.570**	1.072	–4.688**	0.902
3/5 months after	–1.409	1.034	–1.603†	0.858
6/8 months after	–1.602	0.990	–1.800*	0.918
9/11 months after	–0.696	1.254	–0.629	0.852
1/2 years after	–0.601	0.746	–0.155	0.633
>2 years after	0.811	0.578	0.298	0.483
Age interactions[c]				
Age at first death # 1/2 year before	–0.023	0.038	–0.041	0.035
Age at first death # 9/11 months before	0.063	0.076	0.011	0.064
Age at first death # 6/8 months before	0.179*	0.086	–0.012	0.076
Age at first death # 3/5 months before	0.046	0.094	–0.024	0.088
Age at first death # 1/2 month before	0.187	0.163	0.124	0.110
Age at first death # death month	–0.150	0.112	0.129	0.150
Age at first death # 1/2 months after	0.056	0.076	0.064	0.069
Age at first death # 3/5 months after	0.138†	0.074	0.006	0.059
Age at first death # 6/8 months after	0.140*	0.066	–0.062	0.071
Age at first death # 9/11 months after	–0.110	0.079	–0.081	0.067
Age at first death # 1/2 years after	0.066	0.048	0.019	0.042
Age at first death # >2 years after	0.038	0.039	0.002	0.035
Gender interactions (ref.: daughters)				
Sons # 1/2 year before	–1.979*	0.819	–0.224	0.643
Sons # 9/11 months before	0.350	1.576	–0.981	1.250
Sons # 6/8 months before	0.510	2.089	–2.941†	1.670
Sons # 3/5 months before	–2.082	2.382	4.019*	2.032
Sons # 1/2 month before	4.797	3.187	–0.886	2.791
Sons # death month	–1.346	3.122	–1.287	2.678
Sons # 1/2 months after	6.548**	1.590	2.478†	1.285
Sons # 3/5 months after	–0.793	1.683	–0.127	1.191
Sons # 6/8 months after	–3.435*	1.521	0.892	1.279
Sons # 9/11 months after	–0.428	1.696	0.938	1.208
Sons # 1/2 years after	–0.254	1.046	–0.0503	0.831
Sons # >2 years after	–1.439*	0.618	–0.130	0.493
Constant	45.043**	1.389	49.172**	1.085

Note is identical to Table E2.1.

Appendix F2. Robustness checks

1. Critical overview of the dependent variable (mcs)

Although the mental health scale (mcs) from the SOEP is a reliable and valid measure in terms of internal consistency of each dimension (Ware et al., 2002), invariant across time 2002-2020 (CFI = 0.951, RMSEA = 0.044) in our GSOEP sample (Davidov et al., 2014, 2018; Millsap, 2011) and demonstrates highly significant factor loadings for each dimension ($p<0.001$), it does not fully faithful to the concept's theory of mental health and might be a threat to the construct validity. Mental health is a multidimensional concept that covers the condition of psychological distress absence and the complete state of psychological well-being (Headey et al., 1993; Keyes, 2005; Massé et al., 1998; Veit & Ware, 1983; Zautra et al., 1988). Based on the overview of the mentioned authors, the psychological distress dimension covers a range of sub-dimensions: depression, anxiety, self-depreciation, and social disengagement. The psychological well-being dimension includes the presence of the following sub-dimensions: positive affect, satisfaction with life, self-esteem, and social involvement (see Figure 1 for a detailed overview of the theoretical concept).

In the SOEP, however, SF-12v2 is a widely used reliable and valid measure (Andersen et al., 2007; Leopold, 2019). Using the mcs variable just requires sacrificing the construct validity of the concept in favor of its reliability and internal validity.

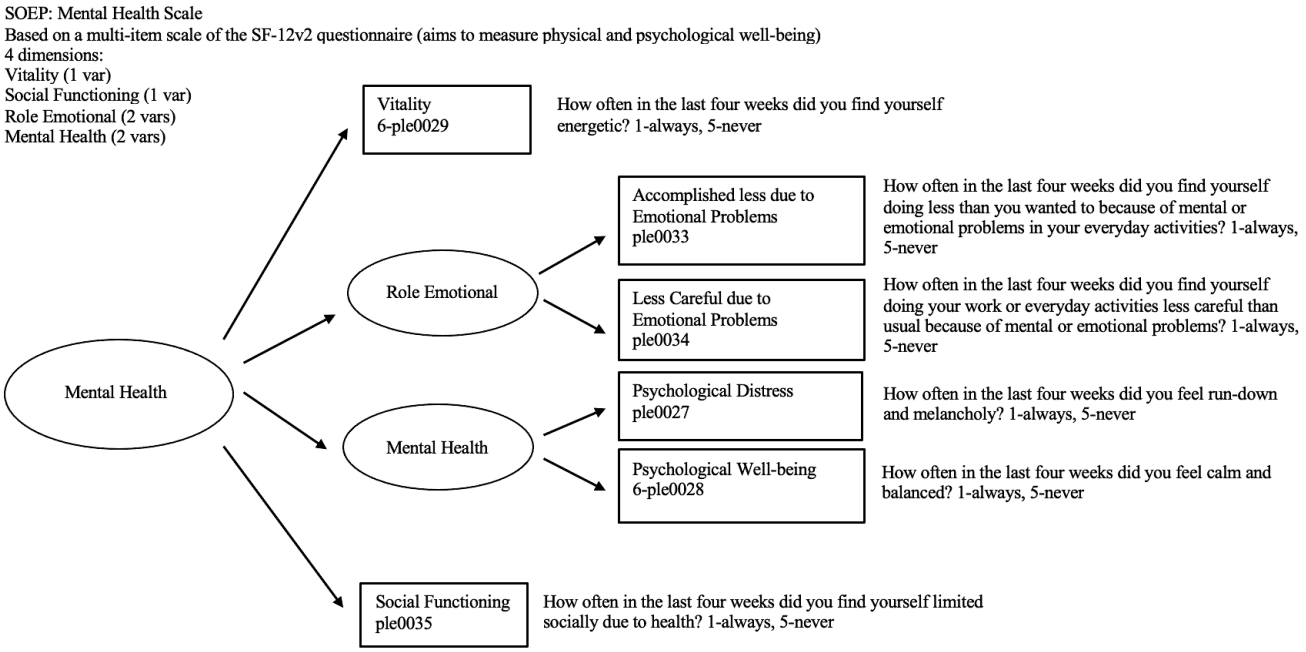


Figure F2.1. Mental health construct in the SOEP.

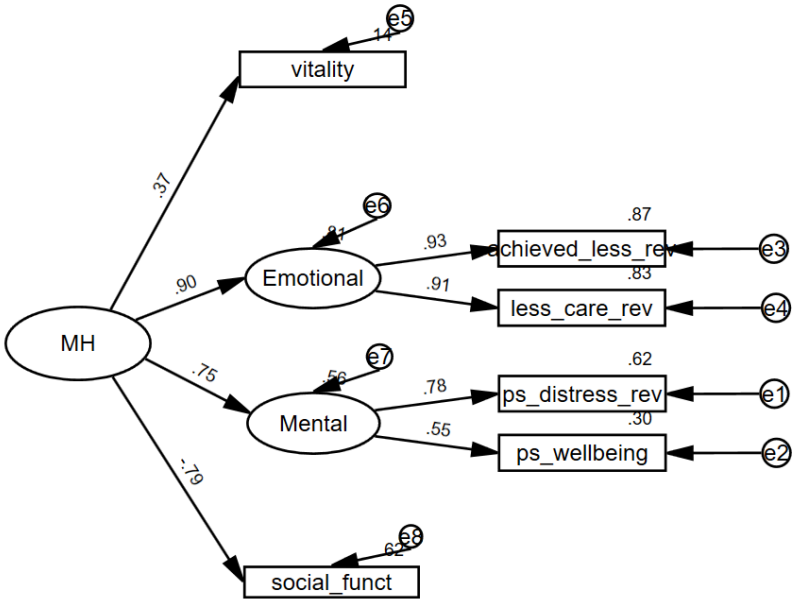
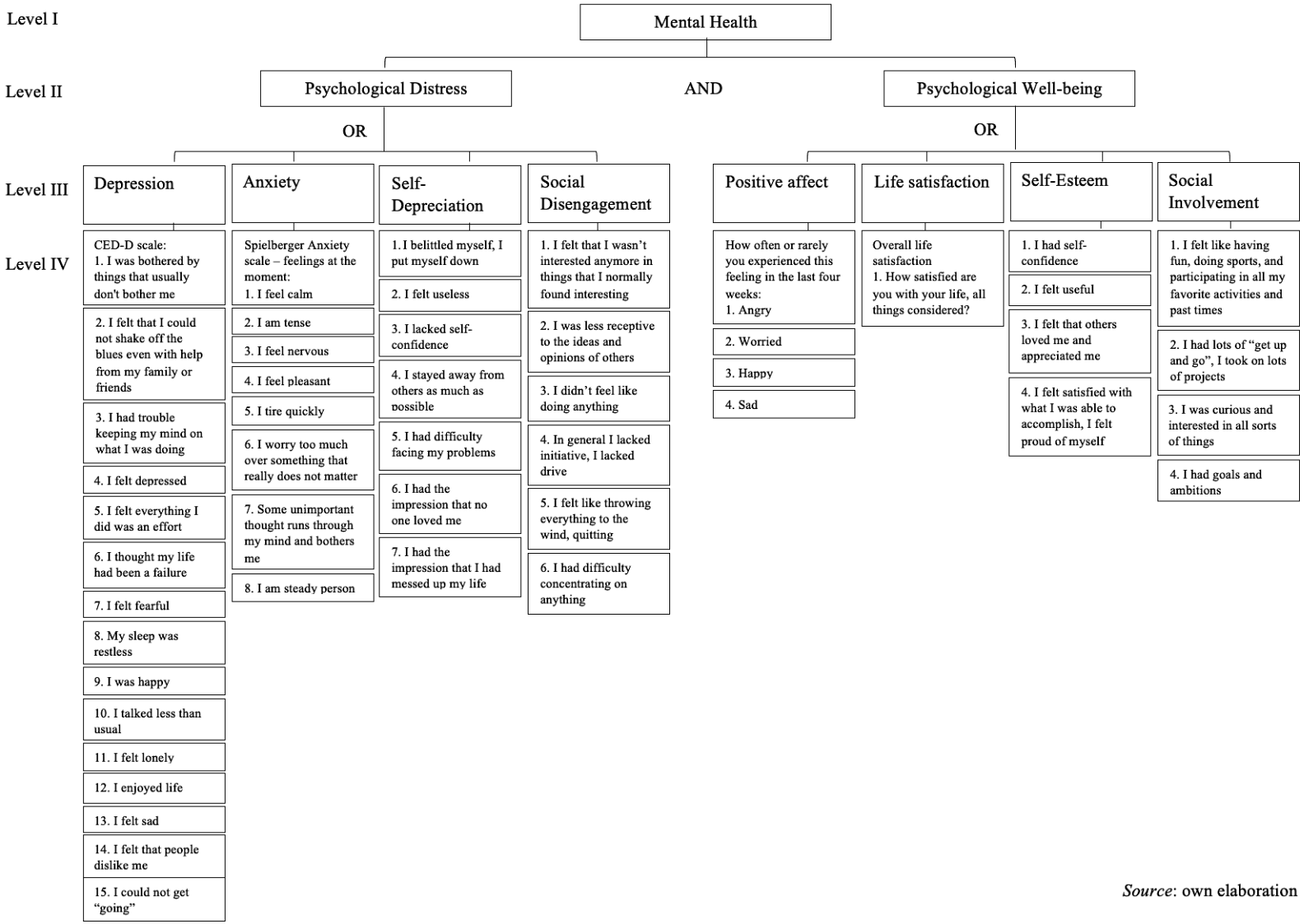


Figure F2.2. CFA and measurement invariance of mental health scale from the SOEP. Example for 2020. Unstandardized coefficients. CFI = 0.951 (>0.95, invariant across time 2002-2020), RMSEA = 0.044 (<0.06). All effects are statistically significant on a 1% level (p<0.001).



Source: own elaboration

Figure F2.3. Theoretical concept of mental heath

2. Life satisfaction outcome

For robustness of our results, the same analysis was run for one of the mental health sub-dimensions of the psychological well-being dimension—overall life satisfaction measured in GSOEP on an 11-point scale from 0—"completely dissatisfied" to 10—"completely satisfied". This outcome has an advantage in terms of more annual measurements available in the data – every year since 1984 until 2020 (36 years) and a higher number of parental death cases after all restrictions (3876 experienced the first parent's death, 2386—the second parent's death). Thus, it was useful to compare the results with biannual, although regular, measurements of mental health (see Figures 2.1, 2.2, 2.3, 2.4).

Alike the analysis of the mental health component scale (mcs), the second parent's death sample did not have enough variation by parent's gender for life satisfaction (26% of father's deaths over 74% of mother's deaths) although the first parent's death sample was still balanced enough (64% of father's deaths over 36% of mother's deaths). Overall, the results of parental death effects on life satisfaction demonstrate similar patterns as for the mental health outcome. The period of first months after the first and second parental deaths was found to be the most severe adaptation period followed by the deepest drops in life satisfaction, especially for women who experienced the mother's death first at the "off-time" age of 25 (see Figure F2.5). The two notable differences were found compared to mental health outcome. First, both daughters and sons that lost their mother first at the age of 25 do not reach their pre-event levels even two years after the event. Second, monthly analysis revealed a greater age variation in the first two months after the mother's and father's first parental death. For both sons and daughters at both mother's and father's deaths at an "off-time" age of 25, the mental health declines were the strongest as compared with other age categories (45 and 65) (see Figure F2.5).

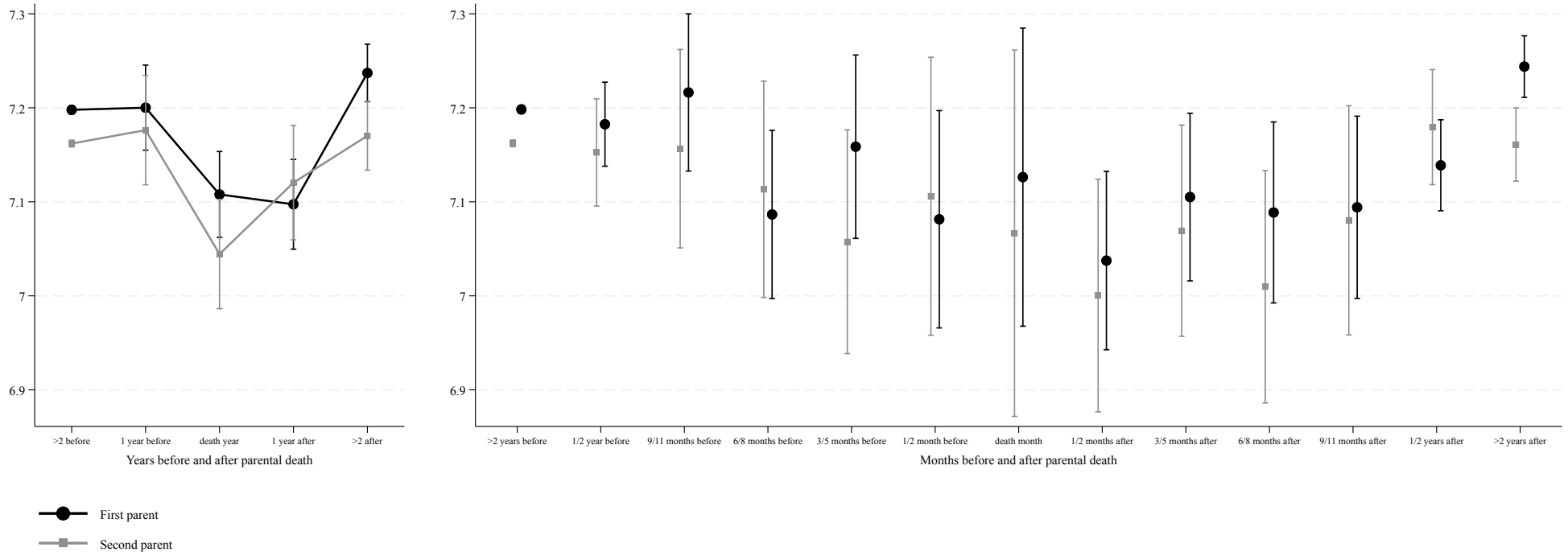


Figure F2.4. Parent's death and change in life satisfaction: yearly and monthly. Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Sample 1 (death of first parent): n=3,876 individuals (who lost the first parent), n=61,359 individuals (who do not experience the death of the first parent). Sample 2 (death of second parent): n=2,386 individuals (who lost the second parent), n=81,524 observations (who do not experience the death of the second parent). The y-axis shows life satisfaction scores (range: 0 to 10). Bars represent 95% confidence intervals.

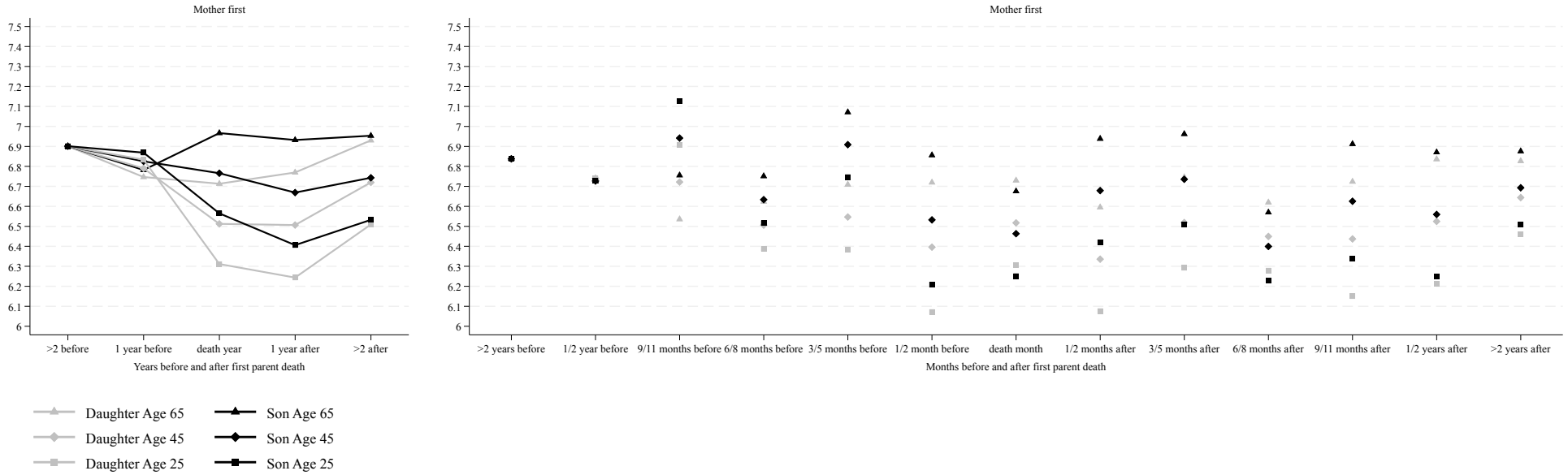


Figure F2.5. Life satisfaction change by age, gender, mother first: yearly and monthly. Note: Data are from the German Socio-Economic Panel Study, 2002-2020, v37, release 2022. Each model controls for age, period, marital status, employment status and the second parent death time dummies.

First parent death: mother first (n= 25361)
Adult's age at parental death median centered (at 47 years old).

CHAPTER 3
PARENTAL SEPARATION AND THE QUALITY OF EXTENDED KIN RELATIONS

by Kateryna Sytkina & Thomas Leopold, University of Cologne

Abstract

This study examined how younger adults from separated and non-separated families differed in their relationships with extended family. We used ego-centric data from the U.S. sample of the web-based KINMATRIX survey (2022-24), offering detailed information on the family networks of younger adults aged 25-35. The data covered various maternal and paternal extended kin, including all grandparents, aunts, uncles, and first-degree cousins (*N*=3,664 egos, *N*=83,098 ego-kin dyads). Using linear models, we examined differences by parental separation status for four outcomes: current contact with, current closeness to, future reliance on, and retrospective importance of extended kin. Additionally, we explored variation by kinship line, timing of separation, and post-separation physical custody arrangement. Three main findings emerged. First, relationships with extended kin eroded for younger adults from separated families, with stronger declines in the quality of ties to paternal than to maternal extended kin. Second, this erosion was stronger in the non-resident parent's line. Third, although earlier parental separations appeared more disruptive than later separations, this difference applied to nuclear rather than extended ties. We conclude that parental separation permeates deeply into the family networks of younger adults, with negative associations concentrated in the paternal line and moderated primarily by post-separation physical custody arrangements.

3.1. Introduction

Parental separation is emotionally challenging and may deprive children of regular parental support. The link between parental separation and relationships in the immediate or "nuclear" family—such as parent-child ties (Kalmijn, 2015b; Spaan et al., 2022; Swiss & Le Bourdais, 2009) and sibling ties (Poortman & Voorpostel, 2009; Steinbach & Hank, 2018; van Dijk et al., 2022) has been studied extensively. Yet, the potential consequences of parental separation extend beyond these nuclear ties and into the surrounding family network. Specifically, parental separation may disrupt relations to extended kin to which children are primarily tied through their parent figures—such as maternal and paternal aunts, uncles, cousins, and grandparents. Data allowing to study such consequences are scarce, and as a result, little is known about how children of separated and non-separated families differ in their wider family networks. The main contribution of the current study is to leverage new data that allow addressing this gap.

A better assessment of differences between separated and non-separated families is important because children of separation may be deprived, in the short term and longer term, of access to several benefits provided by the wider family network throughout their life course. These include financial and practical assistance, mentoring, comfort, company, and other forms of social interaction and support (Milardo, 2010). Such losses, in turn, can adversely affect children's outcomes such as educational attainment, occupational careers, social integration, health, and subjective well-being (Ahrons, 2007; de Bel, 2023).

According to family systems theory, parental separation involves reorganization at all levels of the family system (Cox & Paley, 1997; Hetherington et al., 1992). A similar expectation follows from social network theory, whereby the nucleus of a family network is seen as the adhesive that binds the periphery (Burt, 2005). From the child's perspective, the binding quality of the nucleus is rooted in the relationships between the child and each parent

figure, and in the relationship between both parents (Bowlby, 1990; Bretherton, 1992). In a non-separated family, the nucleus of a two-parent household binds the periphery of extended kin in both maternal and paternal lines. When parents break up, this binding force is weakened, potentially undermining the quality of ties to extended kin.

Whether and how ties to extended kin are impacted depends on the opportunities to invest in relationships available to both children and parents before and after separation. Key factors shaping such investment opportunities are the timing of separation—whether the child was younger or older (Seltzer, 1991; Woodward et al., 2000)—and the post-separation residence and physical custody arrangement—whether the child lived with in the mother's household, the father's household, or both (Kalmijn & Dronkers, 2015; Sobolewski & King, 2005).

Although kinship research has been reinvigorated in recent years (Furstenberg, 2020)—particularly in demography, where advances in formal methods (Caswell, 2024) and the rise of linked register data have opened new avenues (Alburez-Gutierrez et al., 2023; de Bel et al., 2025; Kolk et al., 2023)—detailed relational data beyond existence of and geographic proximity to extended kin is still scarce, preventing studies of how separation affects the quality of ties to extended kin. In the present study, we address this gap using novel data to compare the ego-centric family networks of younger adults aged 25 to 35 who did or did not experience parental separation, and examine how they differed in their relationships to nuclear kin and, in particular, to extended kin. The web-based KINMATRIX survey (Leopold, Becker, et al., 2024; Leopold, Raab, Becker, Buyukkececi, et al., 2024), conducted between 2022 and 2024, covers family networks in unprecedented scope and detail, allowing us to investigate differences by parental separation status for ties to a large array of nuclear, extended, and complex kin from both paternal and maternal lines.

Drawing on the U.S, sample of KINMATRIX, we examined four relational outcomes: frequency of contact with kin, emotional closeness to kin, future reliance on kin, and retrospective importance of kin. Our analysis was based on OLS and linear probability models estimated with 3,664 egos (1,141 from separated families) and 83,098 ego-kin dyads.

3.2. Background

Parental separation imposes demands on several parties involved. Parents, as actors of union dissolution, often have to overcome personal crises while rearranging their residence and other life domains (Furstenberg, 1990). The challenges are more complex for couples with children (Leopold & Kalmijn, 2016), with mothers facing a higher risk of economic difficulties that may necessitate increased working hours or adjustments in childcare arrangements (Holden & Smock, 1991; Van Winkle & Leopold, 2021). Because parents are often preoccupied with the many consequences of separation, children may not only experience stress from these changes but also a lack of parental support that can affect their relationship with both parents (Amato, 2000).

Family systems theory emphasizes that weakening relationships within the nucleus—i.e., between parents and between parents and their children—might entail ripple effects undermining the quality of ties to the wider family network (Chan & Elder, 2000; Cox & Paley, 1997; de Bel et al., 2023; Hetherington et al., 1992). A similar expectation follows from social network theory, whereby the network periphery of extended kinship relations may drift away if no longer bound together by an "intact" two-parent nucleus. In contrast to this erosion hypothesis, a competing view holds that children may intensify extended family bonds to compensate for a loss of parental support. Moreover, new kin such as step-(grand)parents, step-siblings, or half-siblings may be acquired on both lines after parental separation (Kalmijn & Dronkers, 2015; Wellman & Wortley, 1990).

Overall, prior research has found more support for the erosion hypothesis than for the compensation hypothesis (Table 3.1). Erosion in separated families is manifest particularly in less frequent contact with both maternal and paternal sides of the family compared to non-separated families. For instance, school children of separation were found to be less likely to include both fathers and mothers in their support networks, with stronger effects for fathers than for mothers (Kalmijn & Dronkers, 2015). Other studies showed that parents had less frequent contact with their in-laws (de Bel et al., 2023), and adolescents and adult children reduced contact with grandparents (Jappens & Van Bavel, 2016). However, previous studies rarely differentiated between family members on maternal and paternal sides, and were unable to examine ties beyond the nuclear family (and occasionally grandparents) to examine potential erosion across the wider family network. Additionally, studies often lacked a sufficient sample size to investigate variation beyond average effects, in particular differences by children's age at parental separation and post-separation physical custody arrangements.

Table 3.1. Overview of studies on parental separation effects on kin relations, sorted by kin type and year of publication

Authors	Kin type	Effect on relationship	Dependent variable(s)	Data	Country
Studies on relations to nuclear kin					
Booth & Amato, 1994	mothers and fathers	negative	closeness and contact frequency	Longitudinal Marital Instability over the Life Course Study, *N*=419 parents and their children	US
Webster & Herzog, 1995	mothers and fathers	negative	contact frequency	Americans' Changing Lives [ACL] Survey, *N*=1,892	US
Kalmijn, 2008	mothers and fathers	negative	distance, contact	Survey of Health, Ageing, and Retirement in Europe (SHARE), *N*=3,454	10 EU
Hetherington et al., 2019	mothers and fathers	negative	communication frequency, affection	Two-year longitudinal study of the impact of divorce on family functioning and children's development. *N*=24 families	US
Shapiro & Lambert, 1999	fathers	negative	father-child bond	National Survey of Families and Households, *N*=844	US
Juby et al., 2007	fathers	negative	contact frequency	NLSCY study, *N*= 1,315	Canada
Peters & Ehrenberg, 2008	fathers	negative	involvement / affective fathering	University-based online study, *N*=96 divorced families	US and Canada
Swiss & Le Bourdais, 2009	fathers	negative	contact frequency	General Social Survey (GSS), *N*=859	Canada
Spaan et al., 2022	fathers	negative	closeness	Parents and Children in the Netherlands survey (OKiN), *N*= 1,948	Netherlands
Poortman & Voorpostel, 2009	siblings	more conflict	contact, quality, conflict	Netherlands Kinship Panel Study, *N*= 2,707	Netherlands
Hank & Steinbach, 2023	siblings	more estrangement	estrangement (contact, emotional closeness)	German Family Panel (pairfam), *N*=5,729	Germany
Buyukkececi & Çineli, 2024	siblings	more conflict	conflict, contact	German Family Panel (pairfam), *N*= 4,967	Germany

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Table 3.1. continued

Authors	Kin type	Effect on relationship	Dependent variable(s)	Data	Country
Studies on relations to extended kin					
Drew & Smith, 1999	grandparents	negative	proximity, contact, emotional involvement	Grandparents' Federation, *N*=86	UK
Ahrons, 2007	grandparents, stepparents, siblings	negative	distance, conflict	Longitudinal Binuclear Family Study, *N*=173	US
Westphal et al., 2015	grandparents	negative, with highest differences in high-conflict parental relationships	contact frequency	NFN survey, *N*=3,842	Netherlands
Jappens & Van Bavel, 2016	grandparents	negative	contact frequency	"Divorce in Flanders" (DiF) survey, *N*= 1,257 children	Netherlands
Albertini & Tosi, 2018	grandparents	seeing a non-resident parent increased care frequency from grandparents	care frequency	Cross-sectional Family and Social Subject Survey, *N*=782	Italy
de Bel et al., 2023	grandparents	negative	contact frequency	Cross-sectional Divorce in Flanders (DiF), *N*= 3474	Belgium

3.2.1. Parental separation and ties to nuclear kin

3.2.1.1. Relationships with parents

Research consistently shows that children of separated parents tend to have weaker relationships with both their mothers and fathers compared to children from non-separated families. These differences include lower levels of closeness when in adulthood (Amato & Sobolewski, 2001; Scott et al., 2007) and less frequent contact both in adulthood and childhood (Albertini & Garriga, 2011; Amato & Booth, 1991; Booth & Amato, 1994; de Graaf & Fokkema, 2007; Hetherington et al., 2019; Kalmijn, 2008, 2013b; Köppen et al., 2018). The adverse effects on contact frequency with underage children are more pronounced for fathers than for mothers (Juby et al., 2007; Swiss & Le Bourdais, 2009). For adult children, contact to separated fathers remains less frequent than contact to separated mothers (Shapiro & Lambert, 1999; Spaan et al., 2022; de Graaf & Fokkema, 2007). Separated fathers generally show reduced involvement and are less likely to be relied upon when their children need help, indicating lower affective fathering (Peters & Ehrenberg, 2008). This lower involvement is particularly common when fathers do not reside with their children after separation (Koster & Castro-Martín, 2021). A substantial minority of fathers never contact their children after separation (Kalmijn, 2015a).

The erosion of the father-child relationship after separation can be attributed to several factors. These include non-resident fathers' lower investment opportunities in relationships with children (Furstenberg, 1990), mothers often receiving a larger or full share of custody (Berger et al., 2008; Claessens & Mortelmans, 2018; Kalmijn, 2008), a higher likelihood of fathers remarrying and starting new families (Di Nallo, 2019; Ivanova et al., 2013), and the loss of kin keeper benefits provided by former wives, such as arranging family-related events with their children (Cooney & Uhlenberg, 1990; Kalmijn, 2007, 2008).

Children might also experience strained relationships with their mothers after parental separation (Umberson, 1992). However, the erosion of these relationships is usually not as severe as it is for fathers. Mothers are typically considered the kin keepers of the family system and, on average, have closer relationships with their children due to traditional child care arrangements (Bianchi et al., 2006) that facilitate stronger attachments formed in childhood (Bowlby, 1990). As a result, children who have reached adulthood might be more inclined to support their mothers to help them deal with the negative consequences of separation, such as financial strain (Leopold, 2018; Leopold & Kalmijn, 2016), psychological distress (Williams & Umberson, 2004), and lower social functioning (Kalmijn, 2008; Kalmijn & van Groenou, 2005). Such support might buffer the consequences of separation for mothers and strengthen their relationships with children (Buyukkececi & Leopold, 2024).

Conversely, children of separated parents might feel pressured to take sides and divide their attention between both parents (Braver et al., 2006; Forehand & McCombs, 1989), especially when the mother and father have a strained relationship or unresolved conflicts. Mothers, who often obtain custody, might even be blamed more often by their children for the situation because they are more accessible and responsive during the separation process and more involved in discussing the separation details with their children (Beal, 1979).

3.2.1.2. Relationships with siblings

Sibling relations are a core family subsystem (Fingerman & Bermann, 2000) comprising the longest-lasting ties (Cicirelli, 1995) and a shared experience of many family events, including parental separation. The effects of this event on sibling relationships are ambiguous. On the one hand, the sibling bond may be activated or reinforced during times of need and crisis (Kalmijn & Leopold, 2018; Riley & Riley, 1993). For example, siblings might comfort each other to cope with the stress associated with parental separation. On the other hand, conflict between parents may spill over to their children and increase tension and misunderstandings

between siblings (Amato, 1993; Poortman & Voorpostel, 2009), especially when siblings take opposing sides in the conflict (Amato, 1993). Prior research has shown that adult siblings from separated families experience a higher probability to be estranged (i.e., a lack of contact or emotional closeness) (Hank & Steinbach, 2023), greater conflict (Buyukkececi & Çineli, 2024), with significantly more negative relationships in families where parental conflict remains strong (Poortman & Voorpostel, 2009). This dynamic appears to be gendered before children reach adulthood, with brothers more often taking sides with fathers and sisters with mothers, hence negatively impacting brother-sister ties in particular (Amato, 1993; Frank, 2008; van Dijk et al., 2022).

3.2.2. Parental separation and ties to extended and complex kin

3.2.2.1. Relationships with grandparents

Compared to children from intact families, a strong relationship with grandparents is particularly important for children of separated parents (Jappens & Van Bavel, 2019). However, similar to sibling relationships, negative effects of parental separation may spill over to relationships with grandparents. Children of separation have significantly less contact and emotional involvement with grandparents compared to children from intact families (Drew & Smith, 1999). This erosion of relationship quality more often concerns ties to paternal grandparents, again a result of the fact that most children reside with their mothers after separation (Ahrons, 2007; Berger et al., 2008). In the absence of shared custody or other physical custody arrangements (Kalmijn, 2008; Kemp, 2007), and particularly in cases of paternal repartnering (Raley & Sweeney, 2020) and legal constraints limiting regular contact with the father (Kruk & Hall, 1995), children often lose contact with their paternal grandparents (de Bel et al., 2023).

Additionally, unresolved conflict between parents may lead custodial mothers to limit contact with paternal grandparents to establish a "clean break" with the former partner (Kruk, 1989; Kruk & Hall, 1995). In contrast, little impact of parental conflict was found on contact with maternal grandparents for minor children of separation (Westphal et al., 2015). Research has also shown that frequent contact with non-resident parents increased support and care from grandparents for children of separation below age 14 (Albertini & Tosi, 2018).

3.2.2.2. Relationships with aunts, uncles, and cousins

Aunts and uncles remain "forgotten kin" (Milardo, 2010) in empirical research despite the significant role they may play in children's lives. They can supplement the role of parents, sometimes even acting as second parents (Milardo, 2010), offer advice when it cannot be sought from parents, provide support and constructive criticism (Milardo, 2005), and help compensate for missing resources such as access to education (Erola et al., 2018). We know little about the relationship between children of separation and their aunts and uncles (Furstenberg, 2020). In quantitative studies, aunts and uncles are typically grouped together in a catch-all category of "other relatives" rather than being considered as unique ties and distinguished by their qualities, such as maternal or paternal lineage (Furstenberg, 2020).

A similar situation is observed with cousins, who are often not considered at all or appear only in residual omnibus categories in surveys. This omission is significant because cousins are often fellow "life travelers" who fulfill important roles as friends and confidants and can contribute in important ways to social integration and individual well-being (Adams, 1999; Schneider, 2014). Moreover, ties to extended kin in general, and to cousins in particular, are more abundant than ties to nuclear kin. Even if these ties are weaker on average, this "strength in numbers" is an important countervailing factor reinforcing their relevance (Leopold, Raab, Becker, Buyukkececi, et al., 2024). In some contexts, including the United States and Eastern Europe, cousins of every degree and on both sides are commonly referred to as brothers and

sisters (Adams, 1999). However, cousins are more likely to interact during positive occasions (e.g., Christmas, holidays, family gatherings) while siblings share more diverse interactions, including challenging times like parental separation (Adams, 1999).

3.2.2.3. Relationships to "complex kin"

Although this study focused only on biological, nuclear, and extended relatives, it is important to note that parental repartnering can bring additional family members—stepmothers, stepfathers, half-siblings, stepsiblings, and others—into children's lives (Hadfield et al., 2018; Raley & Sweeney, 2020; Sweeney, 2010). Children from separated families do not always regard these newcomers as "real" kin (Ganong & Coleman, 1994), but evidence shows that current union status, and especially co-residence, matters more for the quality of these ties than biological relatedness (Kalmijn, 2013a). Because we did not incorporate any complex kin, our study did not fully assess potential compensation in the context of parental separation. Accordingly, it does not offer an adequate test of erosion-versus-compensation hypotheses.

3.3. Hypotheses

A general expectation follows from social network theory and family system theory (Burt, 2005; Cox & Paley, 1997; Hetherington et al., 1992): *Parental separation erodes extended kin relations (Hypothesis 1).* Beyond this general expectation, several factors point to heterogeneity in these effects. Because all of these factors are derived from a shared premise, we term the associated expectations "investment opportunity" hypotheses. These hypotheses relate to the degree of investment that children may receive or lose in relationships following parental separation. The expected loss of opportunities to invest in relations to paternal and maternal extended kin is understood as a downstream effect of disruption in the family nucleus. A key factor discussed in the previous sections concerns kinship lines, whereby investments in father relationships are more often undermined by separate residence, paternal re-partnering,

the formation of new families, and the loss of kin-keeper benefits provided by former wives. Accordingly, we expected that *parental separation erodes extended kin relations more strongly in the paternal line (Hypothesis 2).*

A key moderator underlying this differential investment opportunity is the post-separation physical custody arrangement. In separated families, the binding quality of the nucleus, which may affect the quality of relationships with extended kin, erodes most strongly for the non-resident parent. Extended kin in the line of this parent, commonly but not always the father, experience limited opportunities to invest in relationships to this parent's children, leading to the expectation of lower contact frequency with, closeness to, importance of, and reliance on extended kin: *Parental separation erodes extended kin relations more strongly in the line of the non-resident parent (Hypothesis 3).*

In contrast, joint physical custody arrangements, where both parents share custody after separation, can help maintain strong relationships between parents, between each parent and the child (Kalmijn & Dronkers, 2015; Köppen et al., 2018; Sobolewski & King, 2005), and between the child and extended kin. Accordingly, we expected that *the erosion of extended kin relations is attenuated in case of joint physical custody arrangements (Hypothesis 4)*.

When shifting the view from post-separation to pre-separation opportunities to invest in family ties, children's age at parental separation appears as a further important moderator. Younger children are particularly vulnerable to being deprived of parental contact and support, and financial and caregiving demands are often highly challenging for mothers with young children. Moreover, the development of stable ties to non-custodial fathers is impeded by shorter durations of shared residence. Children who are older at the time of parental separation had more time to establish a close bond with their fathers—less dependent on their mothers as mediators or enablers—which can be continued after parental separation (Seltzer, 1991;

Woodward et al., 2000). Again, our expectations for relations on extended kin take the form of downstream effects: As disruption of the family nucleus is more severe when children are younger at the time of parental separation, we expected the erosion of their relationships with the periphery—i.e., extended kin—to be more pronounced: *The erosion of extended kin relations is stronger when parental separation is experienced at younger ages (Hypothesis 5)*.

3.4. Method

3.4.1. Data

We used cross-sectional data from the KINMATRIX survey, which was conducted in Denmark, Finland, Germany, Italy, the Netherlands, Norway, Poland, Sweden, the United Kingdom, and the United States (Leopold, Becker, et al., 2024; Leopold, Raab, Becker, Buyukkececi, et al., 2024). The US sample analyzed in the present study is the largest country sample (N = 5,005 anchor respondents and N = 113,697 anchor-kin dyads) and was recruited in two rounds of data collection conducted in 2022-23 and 2023-24. KINMATRIX provides comprehensive data on an anchor respondent's *(ego)* family members (*alters*). These include biological parents and full siblings as well as paternal and maternal grandparents, aunts, uncles, first-degree cousins, half-siblings, and step-relatives resulting from separation and re-partnering (Leopold, Becker, et al., 2024).

Anchor respondents were selected within an age range of 25 to 35 from the respondent pool of Dynata*'s* access panels, using sampling quotas for sex, age, education level, and region calculated for the relevant age range from the US National Census Bureau and official statistics (OECD). Non-probability data are increasingly used in quantitative social sciences, supported by research showing a satisfactory level of "natural randomization" in widely recruited quota samples, the effectiveness of quality controls during and after data collection, and validation

results demonstrating the robustness of bivariate and multivariate estimates to non-probability sampling (Peer et al., 2022; Vehovar et al., 2016).

The age bounds of 25 to 35 were chosen as they encompass one family generation—the youngest to have reached adulthood—within a life stage associated with high demands in work and family lives and pertinent to kinship solidarity. In a bilineal kinship system such as the United States, kinship structures look very different depending on the vantage point from which they are viewed (Herlofson & Hagestad, 2011). KINMATRIX therefore offers a deliberately selective—but theoretically valuable—perspective on kinship networks available to younger adults, extending horizontally to the same generation and upward to older generations. A benefit of this approach is mitigating bias not only by selective survival but also by selective fertility, given that younger adults' generative behavior cannot influence the presence of their collateral or older vertical kin.

A practical advantage of the survey's focus on younger participants is their familiarity with web-based interfaces (Kaplowitz et al., 2004; Kelfve et al., 2020; Shih & Fan, 2008). Remaining quality issues in the raw data were addressed both during data collection and in the subsequent data cleaning process, which involved validity checks focusing on reported knowledge of *alter* numbers, names, and vital statuses (see the online supplement, *S01 – Survey documentation*). Additionally, the cleaned data were validated by comparing them to various benchmarks derived from official data and probability-based surveys. The online supplement (*S02 – Benchmarking*) presents selected benchmarking results, showing that the KINMATRIX samples closely aligned with external benchmark data regarding the number of siblings, living parents and grandparents, the likelihood of (grand)parental separation, and relational characteristics like contact frequency and emotional closeness to immediate family members.

3.4.2. Web-survey design

The age bounds of 25 to 35 focused on younger adults and viewed their kinship networks "bottom-up", i.e., horizontally and upwards to adult family members from the same or older generations. Each anchor respondent *(ego)* constructed a personal *(ego-centric)* family network and provided information on various relations to and characteristics of the *alters* within this network (Leopold, Raab, Becker, Büyükkececi, et al., 2024). After responding to a series of personal questions, respondents were asked to construct their family networks using various name generators to elicit the names of *alters*. For each *alter*, respondents reported on chosen real names, current living status, and, where relevant, retrospective details about the family structure (such as parental and grandparental separation, length of co-residence, etc.). If a respondent was uncertain about the number of a certain kinship type (e.g., not knowing the number of children of a paternal uncle), follow-up questions were used to ask about the number of those that they did know.

As respondents progressed through the survey, their kinship network expanded, and after each section, they were presented with an updated visual overview of all listed family members, displayed as a family tree. This helped simplify the process and enhance participant engagement while allowing respondents to review their data and make any necessary corrections. Once all name generators in the kinship tree section were completed, a full list of names was shown, with the kinship relation between the *ego* and each *alter* noted in parentheses beside each *alter's* name. This complete roster was then used, either partially or fully, for subsequent questions regarding *ego-alter* relationships and the characteristics of the *alters*. Different response formats were employed for these questions to reduce nonresponse and response bias. Details about the web-survey instrument, including questionnaires and respondent look-and-feel, are available in the online supplement (*S01 – Survey documentation*).

3.4.3. Sample selection

Our initial US sample consisted of 5,005 anchors. From this sample, we removed anchors for whom one or both parents had died before the interview to focus the analysis on an analytical sample of anchors whose parents were either both alive and together or both alive and separated. We also excluded implausible values or cases with unknown parental status, and anchors who reported implausible ages at parental separation (e.g., higher than the upper age bound of 35 years). Furthermore, we deleted observations with unknown post-separation physical custody arrangements and a small group of those who did not live with either parent after separation. A detailed sample selection flowchart is presented in Appendix A3, Table A3.1.

In the KINMATRIX questionnaire, individuals who experienced parental separation after reaching adulthood did not receive questions about their post-separation residence, and were hence excluded from our sample. This exclusion means that our analysis concentrated on experiencing parental separation and post-separation residence decisions being made before reaching adulthood (under the age of 20). After applying all sample restrictions, our final sample comprised 3,664 anchor respondents (*egos*), including 1,141 who experienced parental separation and 2,523 whose parents were still together at the time of interview.

Table 3.2 provides a descriptive overview of the final sample based on separation status. Respondents from separated families were on average 7.8 years old when their parents broke up. Overall, anchor respondents from separated families tended to have a lower satisfaction with life, a larger and more complex kin network, and a higher percentage of maternal and paternal grandparents who were separated. Additionally, the separated sample included a higher fraction of individuals who were black, unmarried, and lower-educated.

The key benefit of our data for assessing how children of separated and non-separated families differ in their wider kinship network was the comprehensive coverage of *alters*, in particular members of the extended family. Table A3.2 in Appendix A3 shows the number of *ego-alter* dyads included in the analysis for different kinship types by separation status and living status of kin. The separated sample included more than 2,000 *ego-alter* dyads for each type of extended kin, while the non-separated sample consisted of over 5,000 dyads for each kin type. Most *alters* were still alive, except for maternal and paternal grandparents.

Table 3.2. Descriptive statistics for separated and non-separated families

	Separated families					Non-separated families					
Variable	*M* / %	*SD*	Min	Max	*N*	*M* / %	*SD*	Min	Max	*N*	Variable description
Outcome variables											
Closeness to kin	2.57	0.77	1	5	1,141	2.99	0.92	1	5	2,523	*How close do you feel emotionally to each of these persons today?* 1 – Not at all close … 5 – Very close
Contact to kin	2.79	0.76	1	5	1,141	3.26	0.90	1	5	2,523	*How often are you in contact with each of these persons, adding up all visits, letters, phone calls, etc.?* 1 – Never … 6 – Daily or several times per week
Importance of kin	0.36		0	1	1,141	0.42		0	1	2,523	*If you think about the role of these persons in your life up to now: Who was important to you?* 0 – Not important 1 – Important
Count on kin	0.23		0	1	1,141	0.33		0	1	2,523	*"Who could you really count on if you needed help, today or in the future?"* 0 – Could not count on 1 – Could count on
Moderating variables											
Post-separation living arrangement					1,141						*In which household did you live after your parents separated?*
With mother	64.77				739						
With father	11.39				130						
With both	23.84				272						
Age at separation	7.81	5.24	1	19	1,066						Age of an anchor when parents separated

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Table 3.2. continued

	Separated families					Non-separated families					
Variable	*M* / %	*SD*	Min	Max	*N*	*M* / %	*SD*	Min	Max	*N*	Variable description
Control variables											
Anchor's age	30.00	3.16	25	35	1,141	30.19	3.17	25	35	2,523	Age of an anchor
Anchor's health	2.25	0.78	1	5	1,138	2.04	0.74	1	5	2,517	Self-rated health 1 – Very good … 5 – Very bad
Anchor's life satisfaction	6.40	2.25	0	10	1,134	7.02	2.07	0	10	2,513	*How satisfied are you with your life, all things considered?* 0 – Completely dissatisfied … 10 – Completely satisfied
Number of kin	25.00	10.96	6	82	1,141	21.63	12.20	6	117	2,523	Number of *alters*
Complex kin	0.82		0	1	1,141	0.11		0	1	2,523	Presence of any complex kin in a family (i.e., any half-siblings, step-siblings, or parents' partners)
Grandparental separation	0.58		0	1	1,141	0.32		0	1	2,523	Any of anchor's grandparents separated
Number of children	0.77	1.03	0	3	1,141	0.61	0.93	0	3	2,523	Number of anchor's children
Education					1,136					2,517	Education level of an anchor
Incomplete	2.73				31	0.99				25	
Secondary (high school)	23.24				264	10.13				255	
Some college	23.94				272	13.03				328	
Voc. or technical degree	3.35				38	1.91				48	
Associate's degree	8.54				97	8.66				218	
Bachelor's degree	27.29				310	37.66				948	
Master's degree	9.07				103	21.97				553	
Doc. / professional degree	1.85				21	5.64				142	
Ethnicity					1,038					2,307	Ethnicity of an anchor
Asian / Asian American	2.70				28	8.63				199	
Caucasian / White	75.34				782	78.63				1814	
African American / Black	13.87				144	7.72				178	
Nat. Hawaii. / Pac. Isl.	0.39				4	0.22				5	
Other	7.71				80	4.81				111	
Partnership status					1,141					2,523	Partnership status of an anchor
Married	30.32				346	40.15				1,013	
Partner but not married	24.63				281	17.52				442	
Divorced	3.77				43	2.77				70	
Single	40.67				454	39.40				994	
Widowed	0.61				7	0.16				4	

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Table 3.2. continued

	Separated families					Non-separated families					
Variable	*M* / %	*SD*	Min	Max	*N*	*M* / %	*SD*	Min	Max	*N*	Variable description
Control variables											
Family values index	8.46	3.64	0	16	1,069	9.48	3.81	0	16	2,384	Additive index of 4 variables: *Parents and children should support each other for a lifetime; you should get married if you live with your partner; marriage is a lifelong union; couples should marry at the latest after childbirth*
Flag variable	0.11		0	1	1,141	0.10		0	1	2,523	A respondent was flagged if any of the following three scenarios applied: 1) % of unknown or invalid names among all kin was larger than 30% 2) at least two instances of repeated "don't know" responses on the number of kin (even if prompted to report only those known to respondents) 3) % of unknown vital status of kin was larger than 30%

Source: KINMATRIX. *N* are number of anchors.

3.4.4. Measures

3.4.4.1. Dependent Variables

We examined four outcomes, which covered anchors' assessments of past, current, and future relationships with kin (see Table 3.2 for details and descriptive statistics). Although our hypotheses focused on relations to extended kin, we also examined relationships with nuclear kin. Each outcome was measured separately for each *alter* (i.e., anchor-kin dyad) available in the data. Current (i.e., present-day) relations were assessed by items for emotional closeness and frequency of contact. Closeness ("How close do you feel emotionally to each of these persons today?") was measured on a scale from 1 to 5 (1—not at all close, 2—not too close, 3—somewhat close, 4—pretty close, 5—very close), and contact frequency ("How often are you in contact with each of these persons, adding up all visits, letters, phone calls, etc.?") was assessed from 1 to 5 (1—never, 2—less often, 3—several times per year, 4—1-3 times per month, 5—once per week or more frequently).

Past relationships were assessed by an item on perceived kin importance, measured by the retrospective question, "If you think about the role of these persons in your life up to now: Who was important to you?" Future relationships were evaluated through an item on reliance in times of need using the prospective survey question "Who could you really count on if you needed help, today or in the future?" For both questions, anchor respondents answered on dichotomous scales by selecting names from the roster of kin (0—not selected, 1—selected). For questions related to emotional closeness, contact, and reliance, only living alters were included. For the question on kin importance, both deceased and living kin were considered.

3.4.4.2. Independent Variable and Control Variables

Parental separation was captured using the survey question "Are your parents still together?" and categorized as 1—"separated" if both parents were alive but no longer together, and as 0—

"not separated" if both parents were alive and still together at the time of the interview. We controlled for various potential confounders in the relationship between parental separation status and each outcome. These included the anchor's age (25 to 35), self-rated health, life satisfaction, education, ethnicity, number of alters per anchor, presence of complex kin in the family, number of own children, family values (an additive index of 4 variables), and grandparental separation for both maternal and paternal grandparents. Additionally, a flag variable was used to control for potential differences in terms of knowledge about the names, numbers, or living status of kin. A detailed description of all control variables, including full coding schemes, is presented in Table 3.2.

Despite the cross-sectional nature of our data, these controls allowed us to account for various sources of potential confounding in the estimates of parental separation on each of the four relational outcomes. One risk associated with this comprehensive set is overcontrol bias. If variables such as education, health, life satisfaction, partnership status, or family values lie on the pathway between parental separation and the relational outcomes, controlling for them would introduce downward bias in the estimated total effect. To test for this possibility, we re-estimated every model without these potential mediators (see Supplementary material, Appendix D3). The coefficients for parental separation changed only marginally, indicating that overcontrol bias is unlikely to affect our results.

An additional mediation pathway runs through the parent–child relationship itself. Parental separation may weaken ties to extended kin because it first erodes the child's bond with the parent who connects them to that side of the family—typically the father. We explored this mechanism by adding the current father-child relationship as a mediator between separation and ties to paternal relatives. The results (see Supplementary material, Appendix C3, Figure C3.1) suggest a potentially substantial indirect effect via father-child closeness.

Their interpretation, however, is tenuous given the absence of data on father-child bonds before and after the break-up.

3.4.4.3. Models

We used Ordinary Least Squares (OLS) regression analyses to model the 5-point outcome scales of emotional closeness and frequency of contact, respectively. Because the scales of both outcomes are ordinal and assumptions of OLS may hence be violated, we additionally estimated logistic regression models for dichotomized indicators of closeness (1—at least somewhat close) and contact frequency (1—at least several times per year). As results did not differ substantially (see Appendix E3), we proceeded with the full 5-point outcome scales. For the outcomes of importance and reliance, which were already collected in dichotomous form, we used an equivalent OLS estimation by linear probability models. The results of these linear probability models were substantively identical to estimates obtained from logistic models for the binary outcomes. In all models, we accounted for the nested structure of our data by clustering the standard errors at the anchor level.

To test if parental separation eroded extended kin relations (Hypothesis 1), we estimated four models (Models 1-4, Tables B3.1-B3.2 in Appendix B3) for each outcome. To test for differences across kinship types, we interacted parental separation with a variable distinguishing between nine types: 1—Father, 2—Mother, 3—Full siblings, 4—Paternal grandparents, 5—Maternal grandparents, 6—Paternal aunts/uncles, 7—Maternal aunts/uncles, 8—Paternal cousins, 9—Maternal cousins. We present the findings from these models graphically in the form of marginal effects on absolute scales pertaining to scale-point differences and percentage-point differences, respectively (Figure 3.1). To test whether the expected erosion was stronger in the paternal line (Hypothesis 2), we present contrast effects from otherwise identically specified models (Models 5-8, Tables B3.3-B3.4 in Appendix B3) for each kin category (Figure 3.2).

Next, we evaluated the expectations of our three investment hypotheses. To examine if the erosion was greater in the line of the non-resident parent (Hypothesis 3) and attenuated in case of joint physical custody arrangements (Hypothesis 4), we interacted the kin categories with the post-separation physical custody arrangement variable. We coded the physical custody arrangement variable "In which household did you live after your parents separated?" as 0—No separation, 1—Lived with mother, 2—Lived with father, 3—Lived with both (Models 9-12, Tables B3.5-B3.6 in Appendix B3). To evaluate differences between earlier separations and later separations (Hypothesis 5), we additionally interacted the physical custody arrangement variable with a variable that distinguished between three categories (0—No separation, 1—Separation before the age of 8, 2—Separation at the age of 8 and older) (Models 13-16, Tables B3.7-B3.8 in Appendix B3). The cut-off at age 8 was placed at the mean age at parental separation. Limited case numbers did not allow for detailed analyses beyond this cut-off.

3.5. Results

We present our results on all five hypotheses in graphical form (Figures 3.1, 3.2, 3.3, 3.4). Figure 3.1 pertains to Hypothesis 1, showing estimated average marginal effects of parental separation on each of the four outcomes, controlling for various potential confounders (See Table 3.2). For each outcome, parental separation was associated with an erosion of relationships with nuclear kin, most notably for ties to fathers but also to mothers and full siblings. Turning to extended kin ties, we found a pronounced erosion in terms of closeness and contact (Models 1 and 3). Reductions in closeness and contact emerged consistently for all kin types (grandparents, aunts, uncles, cousins) in both maternal and paternal lines. The largest differences by parental separation status were found for paternal grandparents, showing reductions of approximately half a scale point or 0.6 SD in the estimated means of closeness and contact (see Appendix B3, Tables B3.1-B3.3 for details).

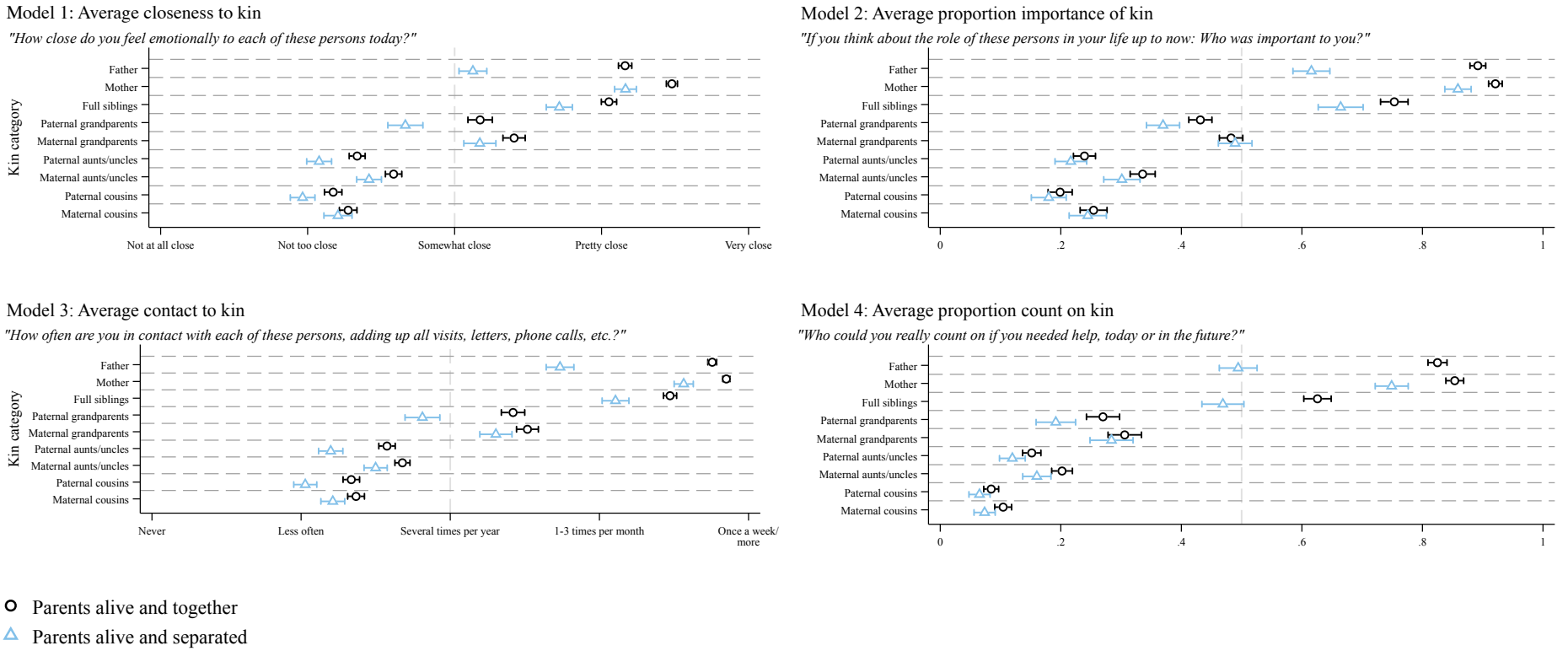

Figure 3.1. Marginal effects of parental separation on ties to nuclear and extended kin. Data are from KINMATRIX. Models 1 (*N*=50,478) and 3 (*N*=50,478) represent average marginal effects of parental separation estimated using OLS regression. Models 2 (*N*=60,361) and 4 (*N*=51,064) represent average marginal effects of parental separation estimate using linear probability models (OLS). Each model controls for anchor's age, health, life satisfaction, education, ethnicity, partnership status, number of kin, presence of complex kin, number of children, grandparental separation, family values, and flags. See Table 3.2 for details on the variables. Estimates are shown along with their 95% confidence intervals. Clustered SEs.

For the retrospective and prospective measures of kin importance and reliance on kin (Models 2 and 4), the pattern of results was similar overall, although differences by separation status were less pronounced for ties to extended kin. Overall, the results supported the general expectation that parental separation eroded ties to extended kin (Hypothesis 1).

Figure 3.2 presents the results for Hypothesis 2, showing contrast effects based on the same set of Models 1-4. The white squared markers represent the paternal kin line, while the black triangle markers indicate maternal kin and siblings. For all outcomes, the greatest contrast effects concerned ties to fathers across all four outcomes. For relations to extended kin, disproportionate downstream effects on those in the paternal line emerged only for the outcomes of closeness and particularly for frequency of contact (Models 5 and 7). For example, the negative effects of parental separation on contact to grandparents were three times larger for paternal than for maternal grandparents; for aunts, uncles, and cousins, negative effects were between 1.5 and 2 times larger (see Appendix B3, Table B3.3). However, for the remaining outcomes of importance and reliance, we did not find substantial differences between maternal and paternal extended kin in the effects of parental separation (Models 6 and 8). Overall, these results partially supported Hypothesis 2.

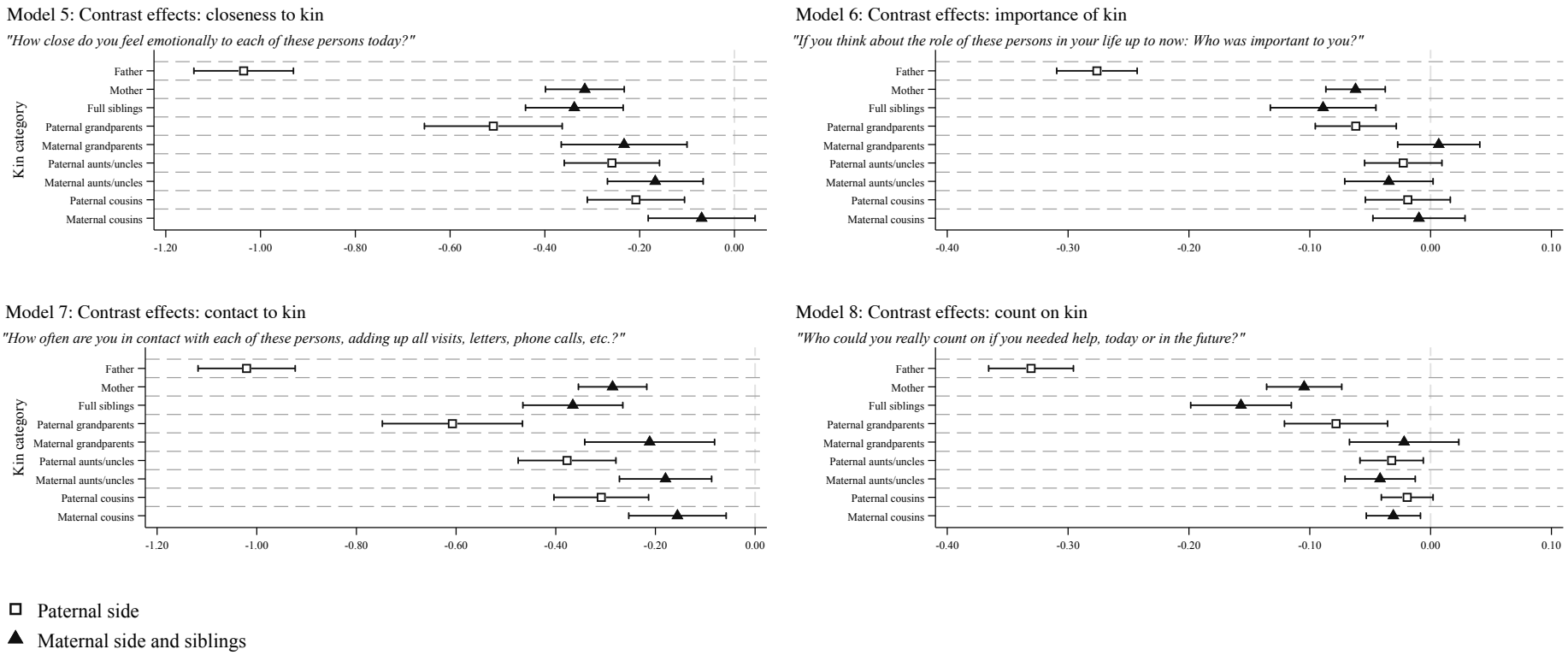

Figure 3.2. Contrast effects of parental separation on ties to extended kin. Data are from KINMATRIX. The graphs represent contrast effects "parental separation vs. no parental separation" for every kin category. Models 5 (*N*=50,478) and 7 (*N*=50,478) represent average marginal effects of parental separation estimated using OLS regression. Models 6 (*N*=60,361) and 8 (*N*=51,064) represent average marginal effects of parental separation estimated using linear probability models (OLS). Each model controls for anchor's age, health, life satisfaction, education, ethnicity, partnership status, number of kin, presence of complex kin, number of children, grandparental separation, family values, and flags. See Table 3.2 for details on the variables. Estimates are shown along with their 95% confidence intervals. Clustered SEs.

Figure 3.3 pertains to Hypothesis 3 and Hypothesis 4, presenting results from the moderation analysis for different post-separation physical custody arrangements (see Tables B3.5-B3.6 in Appendix B3 for details). Regarding Hypothesis 3, we observe the expected patterns across all outcomes. The erosion of family ties—nuclear and extended—was generally more pronounced in the non-resident parent's line. Children of separated parents tended to have significantly weaker relationships with their fathers when they resided with their mothers after separation, and conversely, exhibited lower levels of closeness, contact, importance, and reliance on their mothers when they lived with their fathers following parental separation. A corresponding downstream pattern was observed for ties to extended kin, whereby the weakening of bonds was more pronounced in the non-resident parent's line.

Regarding Hypothesis 4, the results in Figure 3.3—represented by square markers in dark blue color—suggest that joint physical custody arrangements partially mitigated the erosion of ties to extended kin. In particular, the estimates for ties to extended kin in the non-resident parent's line were consistently more negative than the corresponding estimates for joint physical custody arrangements. In some cases, the quality of ties to nuclear and extended kin in joint physical custody arrangements was even on par with or stronger than the corresponding estimates for the resident parent and his or her line. Overall, the results presented in Figure 3.4 were broadly consistent with the expectations stipulated in Hypothesis 3 and Hypothesis 4, attesting to the relevance of post-separation physical custody arrangements for the quality of ties in the wider family network.

Finally, we examined differences by separation timing in Figure 3.4 (see Tables B3.7-B3.8 in Appendix B3 for details). This figure breaks down the findings shown in Figure 3.3 by younger age (stronger colors) and older age (weaker colors) at parental separation. Overall, the timing of separation appeared to play the expected role primarily for nuclear ties, as indicated by a pattern of more negative effects for separations experienced at younger ages and less negative effects at

older ages. Yet, these differences were partly slight, absent, or even reversed and hence neither particularly pronounced nor fully consistent across outcomes and nuclear kin types. Correspondingly, no clear pattern of empirical support was found for the expectation stipulated in Hypothesis 5, suggesting that the erosion of extended kin ties was more strongly moderated by the post-separation physical custody arrangement than by the timing of parental separation.

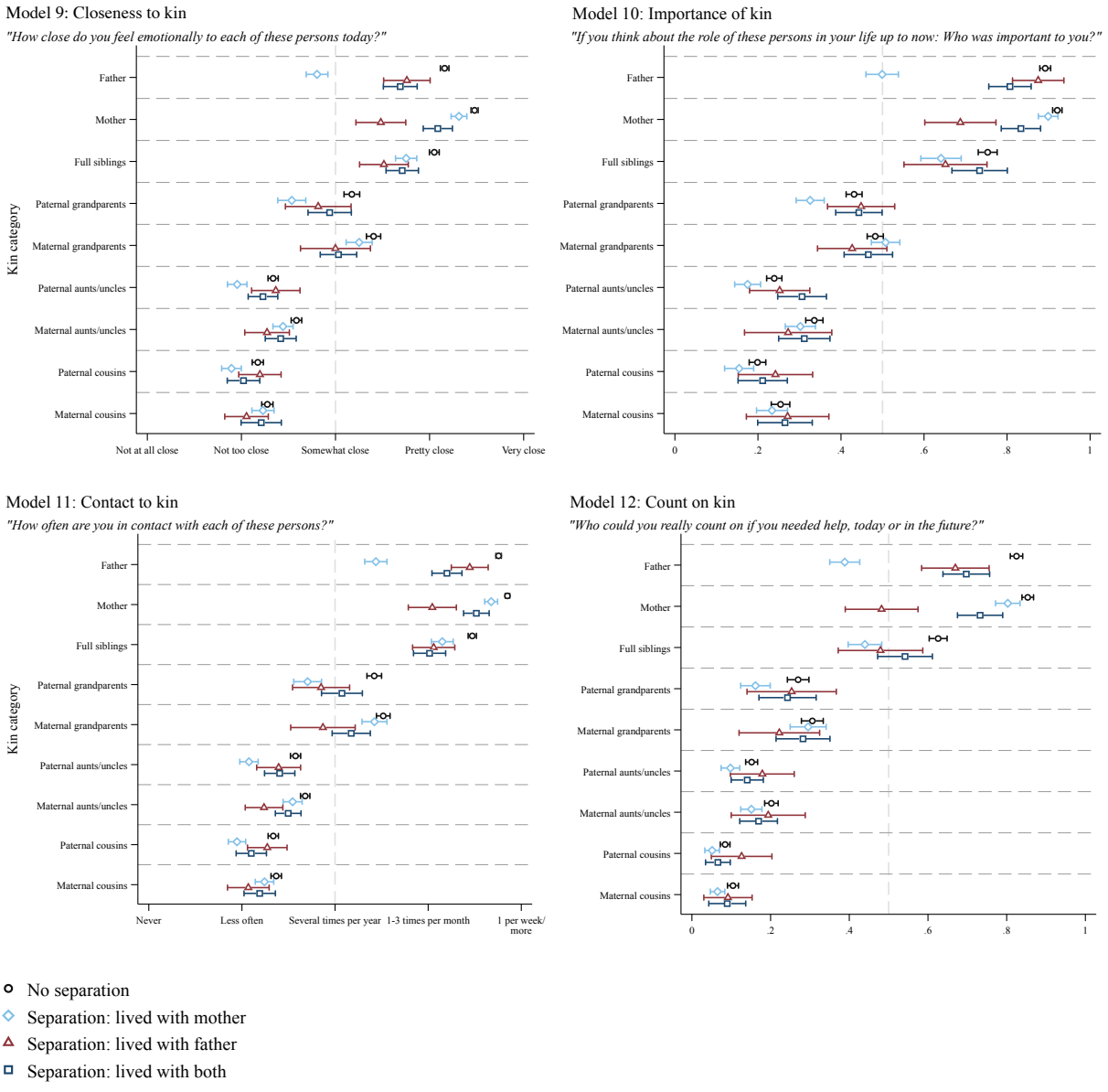

Figure 3.3. Differences by post-separation physical custody arrangement. Data are from KINMATRIX. Models 9 (*N*=50,478) and 11 (*N*=50,478) represent average marginal effects of parental separation estimated using OLS regression. Models 10 (*N*=60,361) and 12 (*N*=51,064) represent average marginal effects of parental separation estimates using linear probability models (OLS). Each model controls for anchor's age, health, life satisfaction, education, ethnicity, partnership status, number of kin, presence of complex kin, number of children, grandparental separation, family values, and flags. See Table 3.2 for details on the variables. Estimates are shown along with their 95% confidence intervals. Clustered SEs.

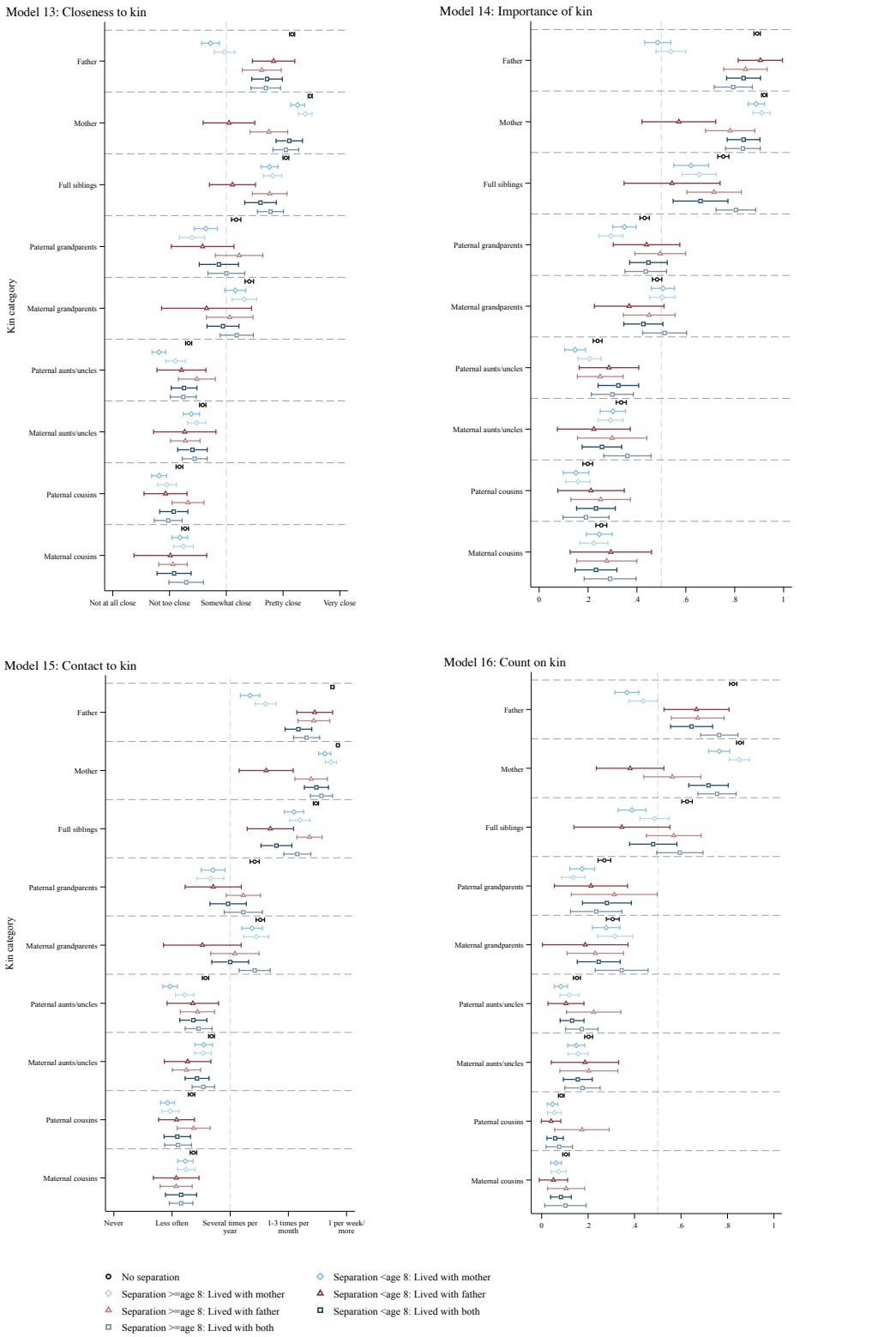

Figure 3.4. Differences by post-separation physical custody arrangement and age at separation. Data are from KINMATRIX. Models 13 (*N*= 49,654) and 15 (*N*=49,654) represent average marginal effects of parental separation estimated using OLS regression. Models 14 (*N*= 59,389) and 16 (*N*=50,216) represent average marginal effects of parental separation estimate using linear probability models (OLS). Each model controls for anchor's age, health, life satisfaction, education, ethnicity, partnership status, number of kin, presence of complex kin, number of children, grandparental separation, family values, and flags. See Table 3.2 for details on the variables. Estimates are shown along with their 95% confidence intervals. Clustered SEs.

3.6. Discussion

This study aimed to investigate how the relationships between younger adults and their extended kin differed between separated and non-separated families, using data that covered the extended family network more fully than previous assessments and captured these relationships in high detail, including past, present, and future relational outcomes. Additionally, we explored differences beyond general patterns, focusing on variation between maternal and paternal lines, by the timing of parental separation, and by the post-separation physical custody arrangement.

Social network and family systems theories suggest an erosion of kin relationships for children of separation compared to those from intact families (Cox & Paley, 1997; de Bel et al., 2023; Furstenberg, 1990; Hetherington et al., 1988; Kalmijn, 2008). Our results supported this expectation, revealing three main findings. First, consistent with Hypothesis 1, we found that parental separation eroded relations with grandparents, aunts, uncles, and cousins. This empirical support was strong and consistent for the outcomes of current contact, current emotional closeness, and future reliance. It was limited for the retrospective outcome of kin importance, where we did not observe differences between separated and non-separated groups for cousins, paternal aunts, uncles, and maternal grandparents.

Additionally, we found that parental separation more strongly eroded extended kin relations within the paternal line, aligning with theoretical expectations (Burt, 2005; Cox & Paley, 1997; Hetherington et al., 1988). However, this contrast by kinship line pertained only to the present-day outcome of closeness and contact, but not to the remaining outcomes of kin importance and reliance. Support for Hypothesis 2 was therefore only partial. Overall, these findings suggest that parental separation is associated with a pronounced erosion of current

social integration with paternal extended kin, while we observed no indication for compensation of these losses by closer ties to maternal extended kin.

Second, we argued that the erosion of extended kin ties emerges as a downstream effect from parental separation, reflecting lower investment opportunities in these connections. We hypothesized specific patterns developing from gendered post-separation physical custody arrangements, with fathers often receiving a smaller share of custody. In support of this expectation, we found that the erosion of family ties, both nuclear and extended, was more pronounced in the non-resident parent's line (Hypothesis 3). Conversely, we found partial support for our Hypothesis 4, suggesting that joint physical custody arrangements tended to mitigate the erosion of extended kin relations.

Third, we further hypothesized varying effects by the timing of parental separation, whereby early breakups reduce the likelihood of children being able to build, maintain, and preserve strong relationships with the extended kin network of the non-custodial parent. However, we found empirical support for the expected stronger effects of parental separations experienced at younger ages only for nuclear ties, whereas we did not observe a clear gradient by age at parental separation in the extent of erosion in extended kin relationships, inconsistent with Hypothesis 5.

Our study has several limitations that warrant further consideration in future research. The main limitation is that we relied on cross-sectional data, given that current longitudinal data lack the required depth of information on extended kin ties. Even though our findings of erosion in nuclear and extended family networks are broadly consistent with theoretical expectations, our conclusions rest on relatively strong identification assumptions. The comprehensive set of controls we included accounted for potential differences between younger adults from separated and non-separated families in terms of various factors, ranging from demographic

characteristics such as age, education, ethnicity, partnership status, and number of children, to health and well-being, family-related values and attitudes, and aspects specific to kinship networks, such as number of kin, presence of complex kin, and grandparental separation. However, we were not able to control for potential confounders that remain, notably a conflicted family climate in general and, more specifically, parental conflict prior to separation. As a result, the associations we observe may reflect the corrosive effects of prolonged conflict on parent-child and kin relationships, with the break-up simply marking an event embedded in that process. Whether an estimate of "exogenous" separation net of prior conflict is conceptually desirable is another matter, and one that concerns not only our study but the literature on separation effects on adult and child outcomes more generally.

A second limitation is that we focused on ties to genealogical kin. A common additional consequence of parental separation is the influx of new kin, such as step-parents and step-siblings. Inclusion of these complex kinship ties was beyond the scope of this paper. As a result, our conclusions about the absence of compensation or the overall extent of family erosion remain tentative, as step-kin could potentially serve as either a source of compensation or further erosion. For instance, prior findings suggested that relationships with step-siblings are generally weaker (de Leeuw et al., 2024; Steinbach & Hank, 2018) than with full siblings, although they tend to involve less conflict (Deater-Deckard & Dunn, 2002; Steinbach & Hank, 2018). Relations with step-parents might introduce ambivalence and tension but often also close relationships. Children of separation often have stronger ties to their stepfathers than to their biological fathers, even after controlling for duration of residence (Kalmijn, 2013a). Accounting for this potential source of compensation for the erosion of ties to fathers and paternal kin is an important objective for future research. If adequate data become available, this could include not only step-fathers but also further step-paternal kin.

Finally, we note that our study is limited to a narrow age band of younger adults aged 25 to 35, omitting other life stages during which nuclear and extended kinship ties, as well as their association with parental separation can look different. For example, late adolescents and young adults in their early twenties are often still embedded in their natal households. During this earlier life stage, interactions with the resident parent, siblings, and grandparents are likely more intense, and contrasts by custodial arrangements in associations with parental separation potentially amplified.

Overall, our study demonstrates that the losses experienced from parental separation go beyond what has been assessed previously. We were able to establish several robust associations pointing to sizable ripple effects across the extended family network of children of separation. These losses might be consequential for younger adults, in particular on the clear patterns found for lower levels of current social integration with kin. What we did not observe within our study is how much children of separation, and their extended kin, invest in order to maintain these relationships despite the challenges posed by family disruption. In the absence of such investments, the ripple effects observed here might have been even larger. Compensatory investment in relationships, in all its potential types, such as initiating visits and family gatherings, maintaining contact, and offering emotional support, warrant future investigation in research on separation.

Our study further highlights the importance of relationship gatekeeping in the family network, illustrated here by how a disrupted family nucleus may no longer serve as an adhesive that binds extended ties in the periphery. If one nuclear tie is disrupted, an entire line of extended kin may be affected in the process. Conversely, our results suggest that investment in preserving ties to both parents, in particular in the context of effective joint physical custody arrangements, can help mitigate potentially far-reaching disruptive effects. In this respect, not

only the adverse effects of parental separation, but also the beneficial effects of a "good breakup" and successful joint custody may extend further than has been previously assessed.

Future research along the lines of the current study should reach beyond the US context to European countries to gain insight into cultural differences and varying attitudes towards family formation and separation. Another promising direction is a focus on the intergenerational reproduction of separation. If children of separation are more likely to experience separation of their own unions (Amato & Patterson, 2017; Dronkers & Härkönen, 2008), then this may further add to the overall relational damage within their family network. Conversely, adverse effects may originate in older generations, such as separation of paternal or maternal grandparents, and reverberate through the generations that follow.

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3.8. Appendix

Appendix A3

Table A3.1. Sample selection flow chart: US sample

Variable	Cases Lost	Cases Left
		Start sample: 5005
Drop unplausible values on parental status (e.g. not known death status, death years are unplausible)	85	4920
Keep clear cases: separated only if both alive; dead only if not separated before	388	4532
Delete unplausible values of children's age at separation (e.g. older than 35)	4	4528
Drop if either parent is dead, leave both parents alive	482	4046
Drop if anchor lived with neither parent after separation	34	4012
Drop missing values on the post-separation living arrangement variable	348	3664
		Final sample: 3664
		Separation: 1141
		No separation: 2523

Table A3.2. Number of ego-alter dyads by kin category, separation and living status

Dyads	Separated	Non-separated
Anchor—Father	1141	2523
Alive	1141	2523
Dead	0	0
Unknown	0	0
Anchor—Mother	1141	2523
Alive	1141	2523
Dead	0	0
Unknown	0	0
Anchor—Full sibling	1702	4213
Alive	1656	4138
Dead	42	74
Unknown	4	1
Anchor—Paternal grandparent	2282	5046
Alive	784	1567
Dead	1374	3383
Unknown	124	96
Anchor—Maternal grandparent	2282	5046
Alive	938	1707
Dead	1250	3175
Unknown	94	164
Anchor—Paternal aunt/uncle	2913	6986
Alive	2406	5898
Dead	397	906
Unknown	110	182
Anchor—Maternal aunt/uncle	2662	5844
Alive	2236	5027
Dead	388	709
Unknown	38	108
Anchor—Paternal cousin	4584	11461
Alive	4278	10938
Dead	88	305
Unknown	218	218
Anchor—Maternal cousin	4401	9813
Alive	4199	9508
Dead	137	185
Unknown	65	120

Appendix B3

Table B3.1. Estimated effects of parental separation status by kin category: closeness and contact

	Model 1: Closeness		Model 3: Contact	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Parental status (ref: parents alive and together)				
Parents alive and separated	-0.858***	0.063	-0.858***	0.061
Kin category (ref: father)				
Mother	0.318***	0.019	0.095***	0.011
Full siblings	-0.111***	0.027	-0.275***	0.023
Paternal grandparents	-1.010***	0.043	-1.364***	0.041
Maternal grandparents	-0.770***	0.041	-1.258***	0.038
Paternal aunts/uncles	-1.802***	0.032	-2.139***	0.031
Maternal aunts/uncles	-1.538***	0.034	-2.016***	0.029
Paternal cousins	-1.965***	0.035	-2.363***	0.030
Maternal cousins	-1.848***	0.036	-2.312***	0.031
Parental status##Kin category				
Parents alive and separated#Mother	0.720***	0.063	0.734***	0.058
Parents alive and separated#Full siblings	0.675***	0.067	0.633***	0.066
Parents alive and separated#Paternal grandparents	0.536***	0.080	0.428***	0.077
Parents alive and separated#Maternal grandparents	0.810***	0.084	0.816***	0.083
Parents alive and separated#Paternal aunts/uncles	0.772***	0.065	0.634***	0.063
Parents alive and separated#Maternall aunts/uncles	0.831***	0.070	0.800***	0.067
Parents alive and separated#Paternal cousins	0.808***	0.068	0.685***	0.065
Parents alive and separated#Maternal cousins	0.926***	0.076	0.816***	0.069
Constant	3.834***	0.226	5.054***	0.211
N	50478		50478	

Note: Data are from KINMATRIX study 2022-2024. *N* represents total number of observations (person rows). Closeness "How close do you feel emotionally to each of these persons today?" is on a scale from 1—Not at all close to 5—Very close. Contact "How often are you in contact with each of these persons, adding up all visits, letters, phone calls, etc.?" is on a scale from 1—Never to 5—Once a week/more. Each model controls for anchor's age, health, education, ethnicity, partnership status, number of kin in a family, presence of complex kin in a family, number of anchor's children, grandparental separation, flags (e.g. % of unknown or invalid names among all kin larger than 30%), anchor's life satisfaction, family values index. Clustered SEs.

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table B3.2. Estimated effects of parental separation status by kin category: importance and reliance

	Model 2: Importance		Model 4: Reliance	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Parental status (ref: parents alive and together)				
Parents alive and separated	-0.275***	0.021	-0.292***	0.020
Kin category (ref: father)				
Mother	0.029***	0.007	0.029***	0.008
Full siblings	-0.136***	0.011	-0.195***	0.012
Paternal grandparents	-0.462***	0.011	-0.557***	0.015
Maternal grandparents	-0.412***	0.011	-0.521***	0.015
Paternal aunts/uncles	-0.651***	0.011	-0.668***	0.010
Maternal aunts/uncles	-0.558***	0.012	-0.618***	0.011
Paternal cousins	-0.694***	0.011	-0.735***	0.010
Maternal cousins	-0.641***	0.012	-0.716***	0.011
Parental status##Kin category				
Parents alive and separated#Mother	0.214***	0.020	0.226***	0.022
Parents alive and separated#Full siblings	0.192***	0.025	0.176***	0.025
Parents alive and separated#Paternal grandparents	0.214***	0.021	0.255***	0.026
Parents alive and separated#Maternal grandparents	0.284***	0.023	0.312***	0.028
Parents alive and separated#Paternal aunts/uncles	0.253***	0.021	0.298***	0.020
Parents alive and separated#Maternal aunts/uncles	0.244***	0.024	0.288***	0.022
Parents alive and separated#Paternal cousins	0.255***	0.023	0.308***	0.020
Parents alive and separated#Maternal cousins	0.267***	0.025	0.299***	0.021
Constant	0.717***	0.081	0.838***	0.051
N	60361		51064	

Note: Data are from KINMATRIX study 2022-2024. *N* represents total number of observations (person rows). Importance "If you think about the role of these persons in your life up to now: Who was important to you?" is on a scale from 0—Not important to 1—Important. Reliance "Who could you really count on if you needed help, today or in the future?" is on a scale from 0—Could not to 1—Could count on. Each model controls for anchor's age, health, education, ethnicity, partnership status, number of kin in a family, presence of complex kin in a family, number of anchor's children, grandparental separation, flags (e.g. % of unknown or invalid names among all kin larger than 30%), anchor's life satisfaction, family values index. Clustered SEs.

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table B3.3. Contrast effects of parental separation versus no separation: closeness and contact

	Model 5: Closeness			Model 7: Contact		
	Contrast effect	*CI*		Contrast effect	*CI*	
Nuclear						
(Parents alive and separated#Father) vs (Parents alive and together#Father)	-1.040***	-1.141	-0.931	-1.020***	-1.118	-0.923
(Parents alive and separated#Mother) vs (Parents alive and together#Mother)	-0.316***	-0.399	-0.233	-0.286***	-0.355	-0.217
(Parents alive and separated#Full Siblings) vs (Parents alive and together#Full Siblings)	-0.338***	-0.441	-0.235	-0.366***	-0.466	-0.265
Extended						
(Parents alive and separated#Paternal grandparents) vs (Parents alive and together#Paternal grandparents)	-0.509***	-0.654	-0.363	-0.607***	-0.748	-0.467
(Parents alive and separated#Maternal grandparents) vs (Parents alive and together#Maternal grandparents)	-0.233**	-0.365	-0.100	-0.212**	-0.342	-0.081
(Parents alive and separated#Paternal aunts/uncles) vs (Parents alive and together#Paternal aunts/uncles)	-0.259***	-0.359	-0.158	-0.377***	-0.475	-0.279
(Parents alive and separated#Maternal aunts/uncles) vs (Parents alive and together#Maternal aunts/uncles)	-0.167**	-0.268	-0.066	-0.180***	-0.272	-0.087
(Parents alive and separated#Paternal cousins) vs (Parents alive and together#Paternal cousins)	-0.208***	-0.310	-0.105	-0.309***	-0.404	-0.214
(Parents alive and separated#Maternal cousins) vs (Parents alive and together#Maternal cousins)	-0.069	-0.182	0.044	-0.156**	-0.253	-0.058
N	50478			50478		

Note: Data are from KINMATRIX study 2022-2024. *N* represents total number of observations (person rows). Closeness "How close do you feel emotionally to each of these persons today?" is on a scale from 1—Not at all close to 5—Very close. Contact "How often are you in contact with each of these persons, adding up all visits, letters, phone calls, etc.?" is on a scale from 1—Never to 5—Once a week/more. Each model controls for anchor's age, health, education, ethnicity, partnership status, number of kin in a family, presence of complex kin in a family, number of anchor's children, grandparental separation, flags (e.g. % of unknown or invalid names among all kin larger than 30%), anchor's life satisfaction, family values index. Clustered SEs.

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table B3.4. Contrast effects of parental separation versus no separation: importance and reliance

	Model 6: Importance			Model 8: Reliance		
	Contrast effect	*CI*		Contrast effect	*CI*	
Nuclear						
(Parents alive and separated#Father) vs (Parents alive and together#Father)	-0.276***	-0.309	-0.243	-0.331***	-0.366	-0.296
(Parents alive and separated#Mother) vs (Parents alive and together#Mother)	-0.062***	-0.087	-0.038	-0.105***	-0.136	-0.074
(Parents alive and separated#Full Siblings) vs (Parents alive and together#Full Siblings)	-0.089***	-0.133	-0.045	-0.157***	-0.199	-0.115
Extended						
(Parents alive and separated#Paternal grandparents) vs (Parents alive and together#Paternal grandparents)	-0.062***	-0.095	-0.028	-0.078***	-0.121	-0.036
(Parents alive and separated#Maternal grandparents) vs (Parents alive and together#Maternal grandparents)	0.007	-0.027	0.041	-0.022	-0.067	0.023
(Parents alive and separated#Paternal aunts/uncles) vs (Parents alive and together#Paternal aunts/uncles)	-0.023	-0.055	-0.009	-0.032*	-0.058	-0.006
(Parents alive and separated#Maternal aunts/uncles) vs (Parents alive and together#Maternal aunts/uncles)	-0.035†	-0.071	0.002	-0.042**	-0.071	-0.013
(Parents alive and separated#Paternal cousins) vs (Parents alive and together#Paternal cousins)	-0.019	-0.054	0.016	-0.019†	-0.041	-0.002
(Parents alive and separated#Maternal cousins) vs (Parents alive and together#Maternal cousins)	-0.010	-0.048	0.029	-0.031**	-0.053	-0.008
N	60361			51064		

**Note:* Data are from KINMATRIX study 2022-2024. *N* represents total number of observations (person rows). Importance "If you think about the role of these persons in your life up to now: Who was important to you?" is on a scale from 0—Not important to 1—Important. Reliance "Who could you really count on if you needed help, today or in the future?" is on a scale from 0—Could not to 1—Could count on. Each model controls for anchor's age, health, education, ethnicity, partnership status, number of kin in a family, presence of complex kin in a family, number of anchor's children, grandparental separation, flags (e.g. % of unknown or invalid names among all kin larger than 30%), anchor's life satisfaction, family values index. Clustered SEs.

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table B3.5. Effects of separation by living arrangement and kin category: closeness and contact

	Model 9: Closeness		Model 11: Contact	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Post-separation physical living arrangement (ref: no separation)				
Separation: lived with mother	-1.185***	0.072	-1.159***	0.072
Separation: lived with father	-0.220†	0.132	-0.146	0.107
Separation: lived with both	-0.278**	0.100	-0.383***	0.090
Kin category (ref: father)				
Mother	0.318***	0.019	0.095***	0.011
Full siblings	-0.112***	0.027	-0.276***	0.023
Paternal grandparents	-1.010***	0.043	-1.364***	0.041
Maternal grandparents	-0.770***	0.041	-1.258***	0.038
Paternal aunts/uncles	-1.802***	0.032	-2.139***	0.031
Maternal aunts/uncles	-1.538***	0.034	-2.016***	0.029
Paternal cousins	-1.966***	0.035	-2.364***	0.030
Maternal cousins	-1.848***	0.036	-2.313***	0.031
Lived with mother##Kin category				
Lived with mother#Mother	1.190***	0.073	1.143***	0.070
Lived with mother#Full siblings	1.030***	0.082	0.972***	0.084
Lived with mother#Paternal grandparents	0.726***	0.093	0.615***	0.092
Lived with mother#Maternal grandparents	1.209***	0.101	1.230***	0.101
Lived with mother#Paternal aunts/uncles	0.961***	0.077	0.805***	0.077
Lived with mother#Maternall aunts/uncles	1.176***	0.083	1.145***	0.082
Lived with mother#Paternal cousins	1.042***	0.080	0.895***	0.079
Lived with mother#Maternal cousins	1.274***	0.089	1.150***	0.083
Lived with father##Kin category				
Lived with father#Mother	-0.595**	0.184	-0.496**	0.159
Lived with father#Full siblings	-0.150	0.180	-0.118	0.154
Lived with father#Paternal grandparents	0.065	0.216	-0.241	0.168
Lived with father#Maternal grandparents	-0.007	0.212	-0.337*	0.196
Lived with father#Paternal aunts/uncles	0.415**	0.162	0.116	0.151
Lived with father#Maternall aunts/uncles	0.073	0.165	-0.162	0.150
Lived with father#Paternal cousins	0.400**	0.146	0.207	0.141
Lived with father#Maternal cousins	0.144	0.163	-0.034	0.152
Lived with both##Kin category				
Lived with both#Mother	0.081	0.109	0.221*	0.098
Lived with both#Full siblings	0.116	0.110	0.079	0.105
Lived with both#Paternal grandparents	0.243†	0.137	0.227†	0.133
Lived with both#Maternal grandparents	0.114	0.138	0.227†	0.135
Lived with both#Paternal aunts/uncles	0.385**	0.112	0.387***	0.105
Lived with both#Maternal aunts/uncles	0.256*	0.123	0.317**	0.110
Lived with both#Paternal cousins	0.341**	0.122	0.318**	0.113
Lived with both#Maternal cousins	0.349*	0.141	0.310**	0.119
Constant	3.826***	0.227	5.052***	0.213
N	50478		50478	

Note: Data are from KINMATRIX study 2022-2024. *N* represents total number of observations (person rows). Closeness "How close do you feel emotionally to each of these persons today?" is on a scale from 1—Not at all close to 5—Very close. Contact "How often are you in contact with each of these persons, adding up all visits, letters, phone calls, etc.?" is on a scale from 1—Never to 5—Once a week/more. Controls—same as in B3.4. Clustered SEs. † p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table B3.6. Effects of separation by living arrangement and kin category: importance and reliance

	Model 10: Importance		Model 12: Reliance	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Post-separation physical living arrangement (ref: no separation)				
Separation: lived with mother	-0.390***	0.024	-0.395***	0.023
Separation: lived with father	-0.012	0.034	-0.119**	0.045
Separation: lived with both	-0.085**	0.029	-0.094**	0.033
Kin category (ref: father)				
Mother	0.029***	0.007	0.029***	0.008
Full siblings	-0.136***	0.011	-0.195***	0.012
Paternal grandparents	-0.462***	0.011	-0.557***	0.015
Maternal grandparents	-0.412***	0.011	-0.521***	0.015
Paternal aunts/uncles	-0.651***	0.011	-0.668***	0.010
Maternal aunts/uncles	-0.558***	0.012	-0.618***	0.011
Paternal cousins	-0.694***	0.011	-0.735***	0.010
Maternal cousins	-0.641***	0.012	-0.716***	0.010
Lived with mother##Kin category				
Lived with mother#Mother	0.371***	0.023	0.386***	0.025
Lived with mother#Full siblings	0.285***	0.031	0.254***	0.030
Lived with mother#Paternal grandparents	0.287***	0.025	0.330***	0.030
Lived with mother#Maternal grandparents	0.418***	0.028	0.429***	0.034
Lived with mother#Paternal aunts/uncles	0.327***	0.025	0.380***	0.023
Lived with mother#Maternall aunts/uncles	0.361***	0.029	0.384***	0.025
Lived with mother#Paternal cousins	0.344***	0.027	0.397***	0.023
Lived with mother#Maternal cousins	0.373***	0.029	0.398***	0.023
Lived with father##Kin category				
Lived with father#Mother	-0.217***	0.050	-0.216***	0.059
Lived with father#Full siblings	-0.090	0.055	0.003	0.068
Lived with father#Paternal grandparents	0.033	0.053	0.150*	0.068
Lived with father#Maternal grandparents	-0.040	0.051	0.078	0.067
Lived with father#Paternal aunts/uncles	0.028	0.048	0.183**	0.054
Lived with father#Maternall aunts/uncles	-0.046	0.061	0.147*	0.066
Lived with father#Paternal cousins	0.059	0.055	0.190**	0.055
Lived with father#Maternal cousins	0.029	0.059	0.139*	0.053
Lived with both##Kin category				
Lived with both#Mother	-0.003	0.031	0.006	0.036
Lived with both#Full siblings	0.074†	0.038	0.048	0.041
Lived with both#Paternal grandparents	0.096**	0.035	0.101*	0.046
Lived with both#Maternal grandparents	0.070†	0.041	0.105*	0.045
Lived with both#Paternal aunts/uncles	0.155***	0.040	0.122***	0.034
Lived with both#Maternal aunts/uncles	0.065	0.040	0.095*	0.039
Lived with both#Paternal cousins	0.103*	0.040	0.115**	0.034
Lived with both#Maternal cousins	0.096*	0.043	0.108**	0.039
Constant	0.709***	0.081	0.832***	0.052
N	60361		51064	

Note: Data are from KINMATRIX study 2022-2024. *N* represents total number of observations (person rows). Importance "If you think about the role of these persons in your life up to now: Who was important to you?" is on a scale from 0—Not important to 1—Important. Reliance "Who could you really count on if you needed help, today or in the future?" is on a scale from 0—Could not to 1—Could count on. Controls—same as in B3.4. Clustered SEs. † p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table B3.7. Effects by living arrangement, age at separation, and kin category: closeness and contact

	Model 13: Closeness		Model 15: Contact	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Age at separation (ref: age of 8 and older)				
No separation	1.047***	0.101	1.010***	0.099
Before age of 8	-0.191	0.122	-0.219†	0.126
Kin category (ref: father)				
Mother	1.421***	0.106	1.121***	0.102
Full siblings	0.821***	0.116	0.576***	0.120
Paternal grandparents	-0.604***	0.120	-0.972***	0.118
Maternal grandparents	0.338*	0.141	-0.183	0.140
Paternal aunts/uncles	-0.851***	0.112	-1.359***	0.106
Maternal aunts/uncles	-0.493***	0.112	-1.052***	0.110
Paternal cousins	-1.023***	0.110	-1.612***	0.106
Maternal cousins	-0.717***	0.119	-1.326***	0.115
Age at separation##Kin category				
No separation#Mother	-1.104***	0.107	-1.026***	0.103
No separation#Full siblings	-0.932***	0.119	-0.852***	0.122
No separation#Paternal grandparents	-0.407**	0.128	-0.392**	0.125
No separation#Maternal grandparents	-1.109***	0.147	-1.076***	0.145
No separation#Paternal aunts/uncles	-0.949***	0.116	-0.779***	0.110
No separation#Maternall aunts/uncles	-1.042***	0.117	-0.962***	0.114
No separation#Paternal cousins	-0.939***	0.115	-0.750***	0.111
No separation#Maternal cousins	-1.127***	0.125	-0.984***	0.119
Before age of 8#Mother	0.113	0.145	0.161	0.142
Before age of 8#Full siblings	0.195	0.157	0.167	0.166
Before age of 8#Paternal grandparents	0.524**	0.166	0.329*	0.166
Before age of 8#Maternal grandparents	0.089	0.189	0.203	0.190
Before age of 8#Paternal aunts/uncles	-0.050	0.145	0.009	0.146
Before age of 8#Maternal aunts/uncles	0.164	0.153	0.278†	0.156
Before age of 8#Paternal cousins	0.117	0.147	0.222	0.146
Before age of 8#Maternal cousins	0.175	0.158	0.241	0.156
Post-separation physical living arrangement (ref: lived with mother)				
Lived with father	0.664**	0.198	0.839***	0.168
Lived with both	0.772***	0.162	0.728***	0.147
Age at separation##Post-separation physical living arrangement				
Before age of 8#Lived with father	0.508†	0.287	0.302	0.245
Before age of 8#Separation: lived with both	0.244	0.227	0.118	0.207

Note: Data are from KINMATRIX study 2022-2024. *N* represents total number of observations (person rows). Closeness "How close do you feel emotionally to each of these persons today?" is on a scale from 1—Not at all close to 5—Very close. Contact "How often are you in contact with each of these persons, adding up all visits, letters, phone calls, etc.?" is on a scale from 1—Never to 5—Once a week/more. Each model controls for anchor's age, health, education, ethnicity, partnership status, number of kin in a family, presence of complex kin in a family, number of anchor's children, grandparental separation, flags (e.g. % of unknown or invalid names among all kin larger than 30%), anchor's life satisfaction, family values index. Clustered SEs. † p<0.10, * p<0.05, ** p<0.01, *** p<0.001

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Table B3.7. continued. Effects by living arrangement, age at event, and kin category: closeness and contact

	Model 13: Closeness		Model 15: Contact	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Kin category##Post-separation physical living arrangement				
Mother#Lived with father	-1.297***	0.249	-1.168***	0.204
Mother#Lived with both	-1.069***	0.187	-0.866***	0.170
Full siblings#Lived with father	-0.663*	0.257	-0.632**	0.209
Full siblings#Lived with both	-0.740***	0.184	-0.737***	0.184
Paternal grandparents#Lived with father	0.182	0.297	-0.261	0.212
Paternal grandparents#Lived with both	-0.122	0.213	-0.144	0.212
Maternal grandparents#Lived with father	-0.917**	0.277	-1.191***	0.274
Maternal grandparents#Lived with both	-0.851***	0.231	-0.714**	0.227
Paternal aunts/uncles#Lived with father	-0.266	0.227	-0.608**	0.209
Paternal aunts/uncles#Lived with both	-0.545**	0.183	-0.443*	0.175
Maternal aunts/uncles#Lived with father	-0.810***	0.224	-1.085***	0.216
Maternal aunts/uncles#Lived with both	-0.762***	0.195	-0.714***	0.188
Paternal cousins#Lived with father	-0.255	0.215	-0.422*	0.206
Paternal cousins#Lived with both	-0.623**	0.196	-0.510**	0.189
Maternal cousins#Lived with father	-0.816***	0.228	-0.986***	0.220
Maternal cousins#Lived with both	-0.686**	0.220	-0.804***	0.178
Age at separation##Kin category## Post-separation physical living arrangement				
Before age of 8#Mother#Lived with father	-1.024*	0.412	-0.948	0.366
Before age of 8#Mother#Lived with both	-0.075	0.266	-0.107	0.243
Before age of 8#Full siblings#Lived with father	-1.136**	0.366	-0.910	0.345
Before age of 8#Full siblings#Lived with both	-0.408	0.273	-0.395	0.264
Before age of 8#Paternal grandparents#Lived with father	-1.335**	0.440	-0.834	0.345
Before age of 8#Paternal grandparents#Lived with both	-0.649*	0.313	-0.420	0.304
Before age of 8#Maternal grandparents#Lived with father	-0.692	0.535	-0.786	0.476
Before age of 8#Maternal grandparents#Lived with both	-0.361	0.331	-0.492	0.324
Before age of 8#Paternal aunts/uncles#Lived with father	-0.444	0.365	-0.084	0.372
Before age of 8#Paternal aunts/uncles#Lived with both	0.019	0.265	0.017	0.246
Before age of 8#Maternal aunts/uncles#Lived with father	-0.449	0.421	-0.331	0.366
Before age of 8#Maternal aunts/uncles#Lived with both	-0.243	0.289	-0.255	0.264
Before age of 8#Paternal cousins#Lived with father	-0.771*	0.327	-0.557	0.323
Before age of 8#Paternal cousins#Lived with both	-0.082	0.281	-0.144	0.259
Before age of 8# Maternal cousins#Lived with father	-0.517	0.449	-0.315	0.369
Before age of 8#Maternal cousins#Lived with both	-0.441	0.315	-0.135	0.269
Constant	2.807***	0.253	4.032***	0.245
N	49654		49654	

Note is identical to the previous page

Table B3.8. Effects by living arrangement, age at event, and kin category: importance and reliance

	Model 14: Importance		Model 16: Reliance	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Age at separation (ref: age of 8 and older)				
No separation	0.352***	0.034	0.355***	0.033
Before age of 8	-0.050	0.042	-0.057	0.041
Kin category (ref: father)				
Mother	0.371***	0.033	0.414***	0.036
Full siblings	0.122**	0.041	0.054	0.042
Paternal grandparents	-0.247***	0.034	-0.302***	0.037
Maternal grandparents	-0.037	0.039	-0.118*	0.050
Paternal aunts/uncles	-0.330***	0.034	-0.311***	0.034
Maternal aunts/uncles	-0.247***	0.040	-0.279***	0.035
Paternal cousins	-0.380***	0.037	-0.381***	0.032
Maternal cousins	-0.317***	0.042	-0.364***	0.034
Age at separation##Kin category				
No separation#Mother	-0.342***	0.034	-0.385***	0.037
No separation#Full siblings	-0.258***	0.043	-0.249***	0.043
No separation#Paternal grandparents	-0.215***	0.036	-0.255***	0.040
No separation#Maternal grandparents	-0.375***	0.041	-0.403***	0.052
No separation#Paternal aunts/uncles	-0.320***	0.036	-0.357***	0.035
No separation#Maternall aunts/uncles	-0.311***	0.041	-0.339***	0.037
No separation#Paternal cousins	-0.313***	0.039	-0.355***	0.034
No separation#Maternal cousins	-0.324***	0.044	-0.353***	0.035
Before age of 8#Mother	0.032	0.046	-0.016	0.050
Before age of 8#Full siblings	0.021	0.059	-0.022	0.057
Before age of 8#Paternal grandparents	0.109*	0.047	0.112*	0.051
Before age of 8#Maternal grandparents	0.057	0.053	0.027	0.064
Before age of 8#Paternal aunts/uncles	-0.006	0.046	0.029	0.044
Before age of 8#Maternal aunts/uncles	0.064	0.054	0.064	0.047
Before age of 8#Paternal cousins	0.039	0.052	0.061	0.043
Before age of 8#Maternal cousins	0.076	0.055	0.066	0.044
Post-separation physical living arrangement (ref: lived with mother)				
Lived with father	0.305***	0.055	0.231***	0.066
Lived with both	0.249***	0.051	0.320***	0.052
Age at separation##Post-separation physical living arrangement				
Before age of 8#Lived with father	0.121	0.077	0.071	0.101
Before age of 8#Separation: lived with both	0.102	0.068	-0.050	0.074

Note: Data are from KINMATRIX study 2022-2024. *N* represents total number of observations (person rows). Importance "If you think about the role of these persons in your life up to now: Who was important to you?" is on a scale from 0—Not important to 1—Important. Reliance "Who could you really count on if you needed help, today or in the future?" is on a scale from 0—Could not to 1—Could count on. Each model controls for anchor's age, health, education, ethnicity, partnership status, number of kin in a family, presence of complex kin in a family, number of anchor's children, grandparental separation, flags (e.g. % of unknown or invalid names among all kin larger than 30%), anchor's life satisfaction, family values index. Clustered SEs.

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

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Table B3.8. continued. Effects by living arrangement, age at event, and kin category: importance and reliance

	Model 14: Importance		Model 16: Reliance	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Kin category##Post-separation physical living arrangement				
Mother#Lived with father	-0.434***	0.067	-0.523***	0.088
Mother#Lived with both	-0.332***	0.053	-0.424***	0.058
Full siblings#Lived with father	-0.252**	0.073	-0.155†	0.090
Full siblings#Lived with both	-0.105	0.064	-0.213**	0.068
Paternal grandparents#Lived with father	-0.102	0.077	-0.048	0.111
Paternal grandparents#Lived with both	-0.113†	0.060	-0.232**	0.073
Maternal grandparents#Lived with father	-0.357***	0.076	-0.325**	0.096
Maternal grandparents#Lived with both	-0.245**	0.072	-0.302***	0.078
Paternal aunts/uncles#Lived with father	-0.259***	0.069	-0.134†	0.079
Paternal aunts/uncles#Lived with both	-0.159*	0.065	-0.266***	0.058
Maternal aunts/uncles#Lived with father	-0.299**	0.087	-0.184*	0.090
Maternal aunts/uncles#Lived with both	-0.185**	0.069	-0.306***	0.064
Paternal cousins#Lived with father	-0.210**	0.080	-0.117	0.080
Paternal cousins#Lived with both	-0.223**	0.068	-0.298***	0.057
Maternal cousins#Lived with father	-0.258**	0.084	-0.199**	0.075
Maternal cousins#Lived with both	-0.192*	0.075	-0.301***	0.067
Age at separation##Kin category## Post-separation physical living arrangement				
Before age of 8#Mother#Lived with father	-0.303**	0.114	-0.160	0.131
Before age of 8#Mother#Lived with both	-0.071	0.077	0.099	0.088
Before age of 8#Full siblings#Lived with father	-0.253†	0.133	-0.204	0.156
Before age of 8#Full siblings#Lived with both	-0.195*	0.095	0.024	0.099
Before age of 8#Paternal grandparents#Lived with father	-0.230*	0.117	-0.211	0.149
Before age of 8#Paternal grandparents#Lived with both	-0.140†	0.083	0.059	0.103
Before age of 8#Maternal grandparents#Lived with father	-0.203†	0.119	-0.048	0.155
Before age of 8#Maternal grandparents#Lived with both	-0.184†	0.097	-0.009	0.109
Before age of 8#Paternal aunts/uncles#Lived with father	-0.029	0.111	-0.131	0.113
Before age of 8#Paternal aunts/uncles#Lived with both	-0.012	0.091	0.038	0.080
Before age of 8#Maternal aunts/uncles#Lived with father	-0.198	0.137	-0.078	0.147
Before age of 8#Maternal aunts/uncles#Lived with both	-0.208*	0.094	0.036	0.088
Before age of 8#Paternal cousins#Lived with father	-0.149	0.126	-0.198†	0.114
Before age of 8#Paternal cousins#Lived with both	-0.032	0.094	0.040	0.079
Before age of 8# Maternal cousins#Lived with father	-0.124	0.137	-0.122	0.116
Before age of 8#Maternal cousins#Lived with both	-0.172†	0.100	0.039	0.088
Constant	0.358***	0.089	0.485***	0.062
N	59389		50216	

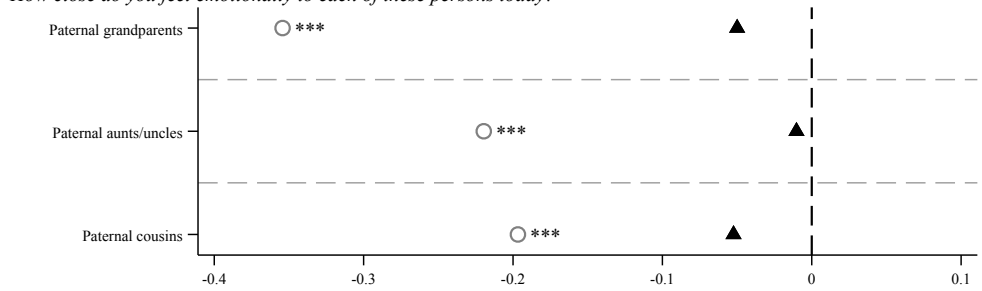
Note: Data are from KINMATRIX study 2022-2024. *N* represents total number of observations (person rows). Importance "If you think about the role of these persons in your life up to now: Who was important to you?" is on a scale from 0—Not important to 1—Important. Reliance "Who could you really count on if you needed help, today or in the future?" is on a scale from 0—Could not to 1—Could count on. Each model controls for anchor's age, health, education, ethnicity, partnership status, number of kin in a family, presence of complex kin in a family, number of anchor's children, grandparental separation, flags (e.g. % of unknown or invalid names among all kin larger than 30%), anchor's life satisfaction, family values index. Clustered SEs.

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Appendix C3

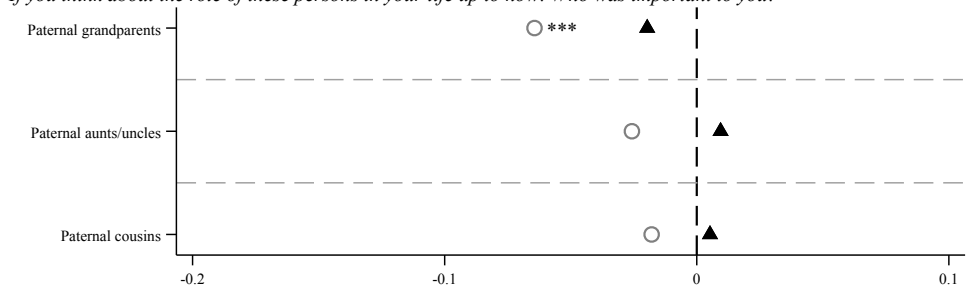
Model 17: Closeness to kin

"How close do you feel emotionally to each of these persons today?"



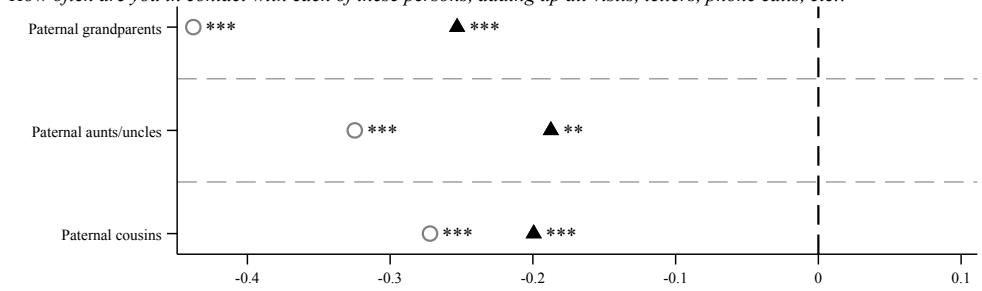
Model 19: Importance of kin

"If you think about the role of these persons in your life up to now: Who was important to you?"



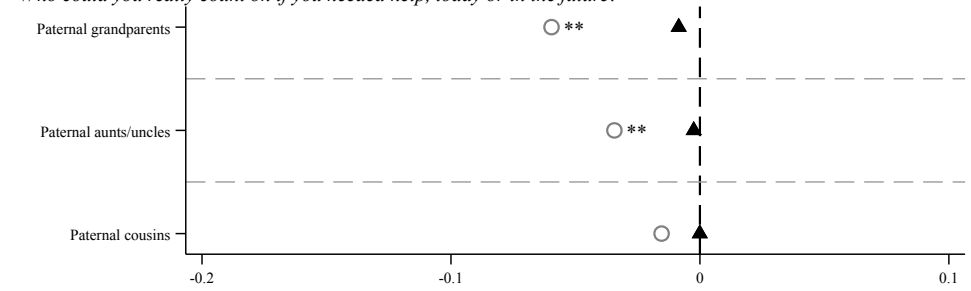
Model 18: Contact to kin

"How often are you in contact with each of these persons, adding up all visits, letters, phone calls, etc.?"



Model 20: Count on kin

"Who could you really count on if you needed help, today or in the future?"



○ Reference models: no mediation

▲ Mediated models: bond to father

Figure C3.1. Mediation analysis: The indirect association between parental separation and paternal extended kin relations through bond with father. Data are from the KINMATRIX study 2022, 2023. The markers show the main coefficient of parental separation without and with a mediated variable "Bond to father". *** – p-value of parental separation coefficient is <.001; ** – p-value of parental separation coefficient is <.01; * – p-value of parental separation coefficient is <.05. Both mediated and non-mediated models control for anchor's age, ethnicity, number of kin in a family, grandparental separation, flags (e.g. % of unknown or invalid names among all kin larger than 30%). Clustered SEs.

Appendix D3

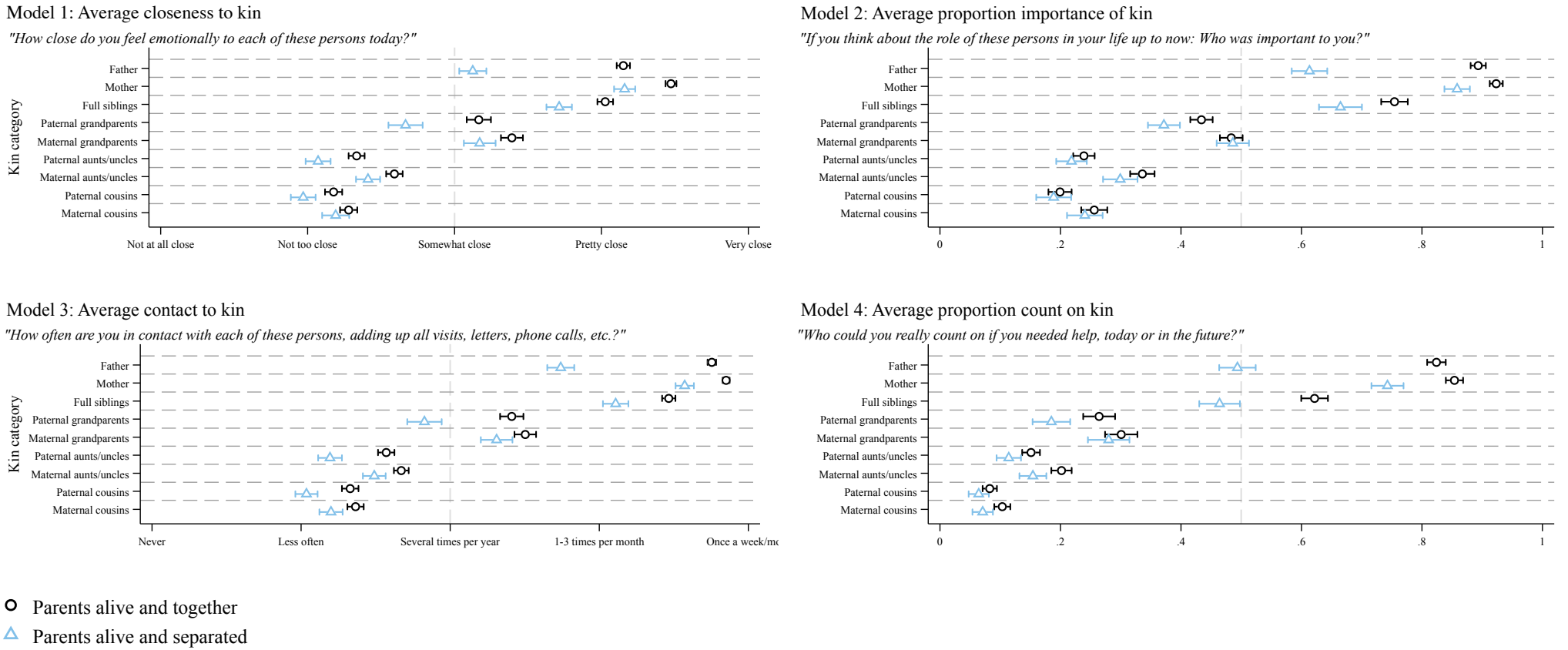


Figure D3.1. Marginal effects of parental separation on ties to nuclear and extended kin: without potential mediators. Data are from KINMATRIX. Models 1 (*N*=53,919) and 3 (*N*=53,919) represent average marginal effects of parental separation estimated using OLS regression. Models 2 (*N*=64,509) and 4 (*N*=54,549) represent average marginal effects of parental separation estimate using linear probability models (OLS). Each model controls for anchor's age, ethnicity, number of kin, presence of complex kin, number of children, grandparental separation, and flags. See Table 3.2 in the main text for details on the variables. Estimates are shown along with their 95% confidence intervals. Clustered SEs.

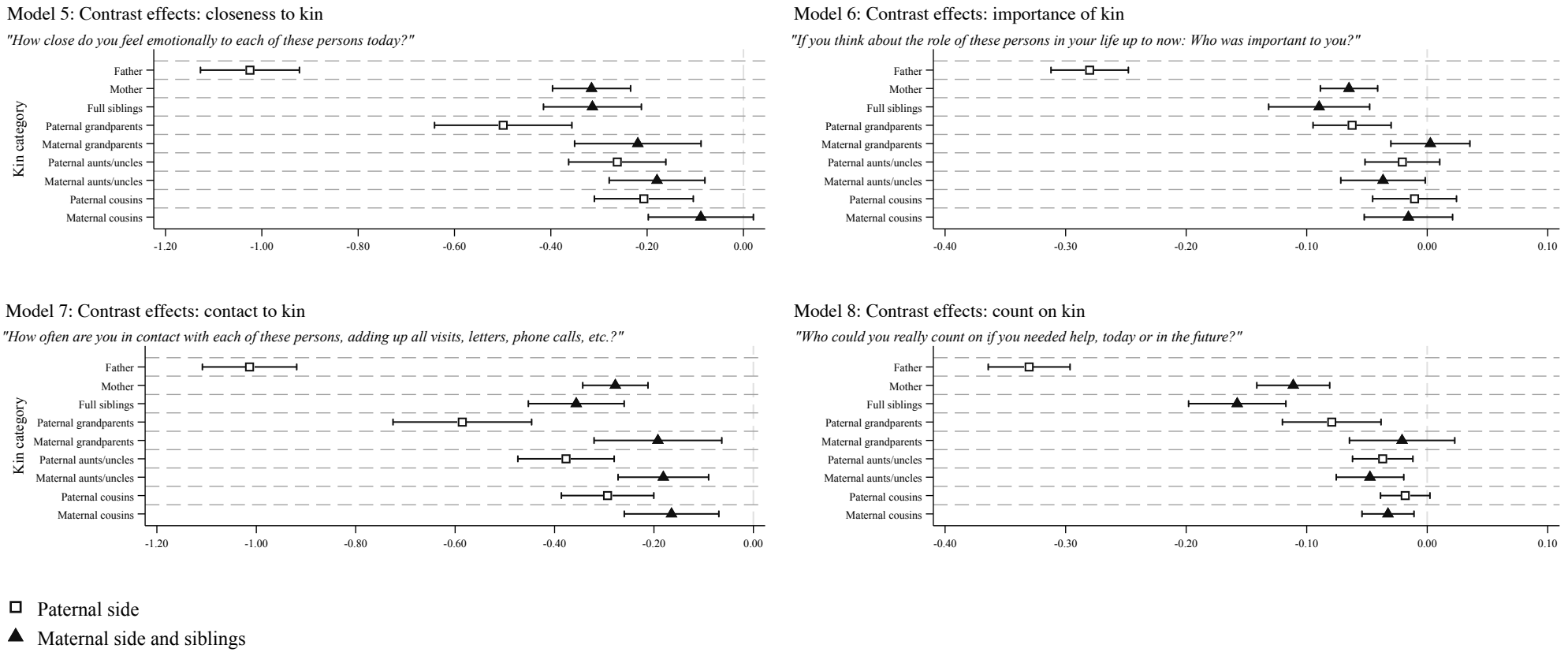


Figure D3.2. Contrast effects of parental separation on ties to extended kin: without potential mediators. Data are from KINMATRIX. The graphs represent contrast effects "parental separation vs. no parental separation" for every kin category. Models 5 (N=53,919) and 7 (N=53,919) represent average marginal effects of parental separation estimated using OLS regression. Models 6 (N=64,509) and 8 (N=54,549) represent average marginal effects of parental separation estimated using linear probability models (OLS). Each model controls for anchor's age, health, life satisfaction, education, ethnicity, partnership status, number of kin, presence of complex kin, number of children, grandparental separation, family values, and flags. See Table 3.2 for details on the variables. Estimates are shown along with their 95% confidence intervals. Clustered SEs.

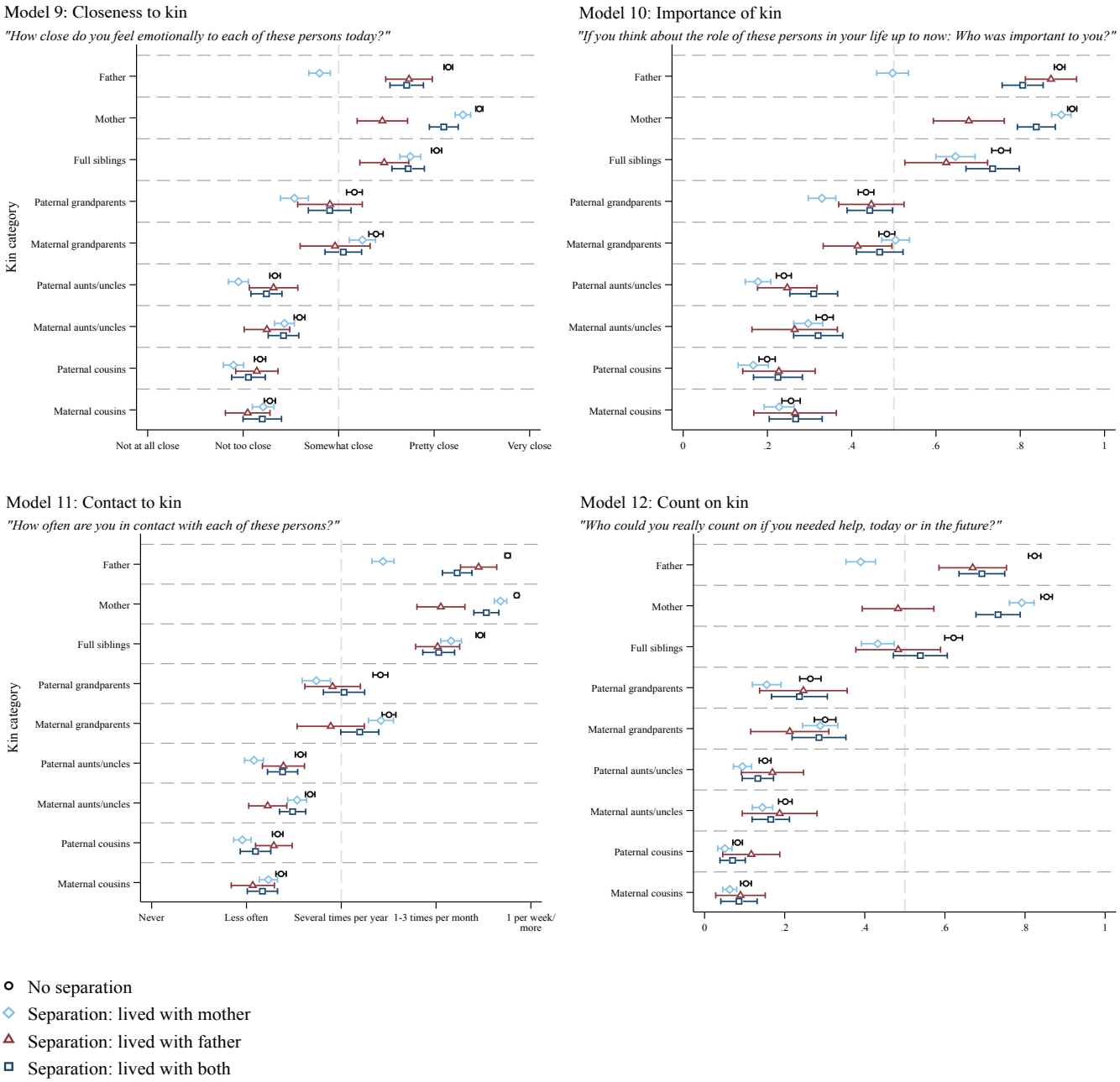


Figure D3.3. Differences by post-separation physical custody arrangement: without potential mediators. Data are from KINMATRIX. Models 9 (N=53,919) and 11 (N=53,919) represent average marginal effects of parental separation estimated using OLS regression. Models 10 (N=64,509) and 12 (N=54,549) represent average marginal effects of parental separation estimates using linear probability models (OLS). Each model controls for anchor's age, health, life satisfaction, education, ethnicity, partnership status, number of kin, presence of complex kin, number of children, grandparental separation, family values, and flags. See Table 3.2 for details on the variables. Estimates are shown along with their 95% confidence intervals. Clustered SEs.

Parental separation & extended kin

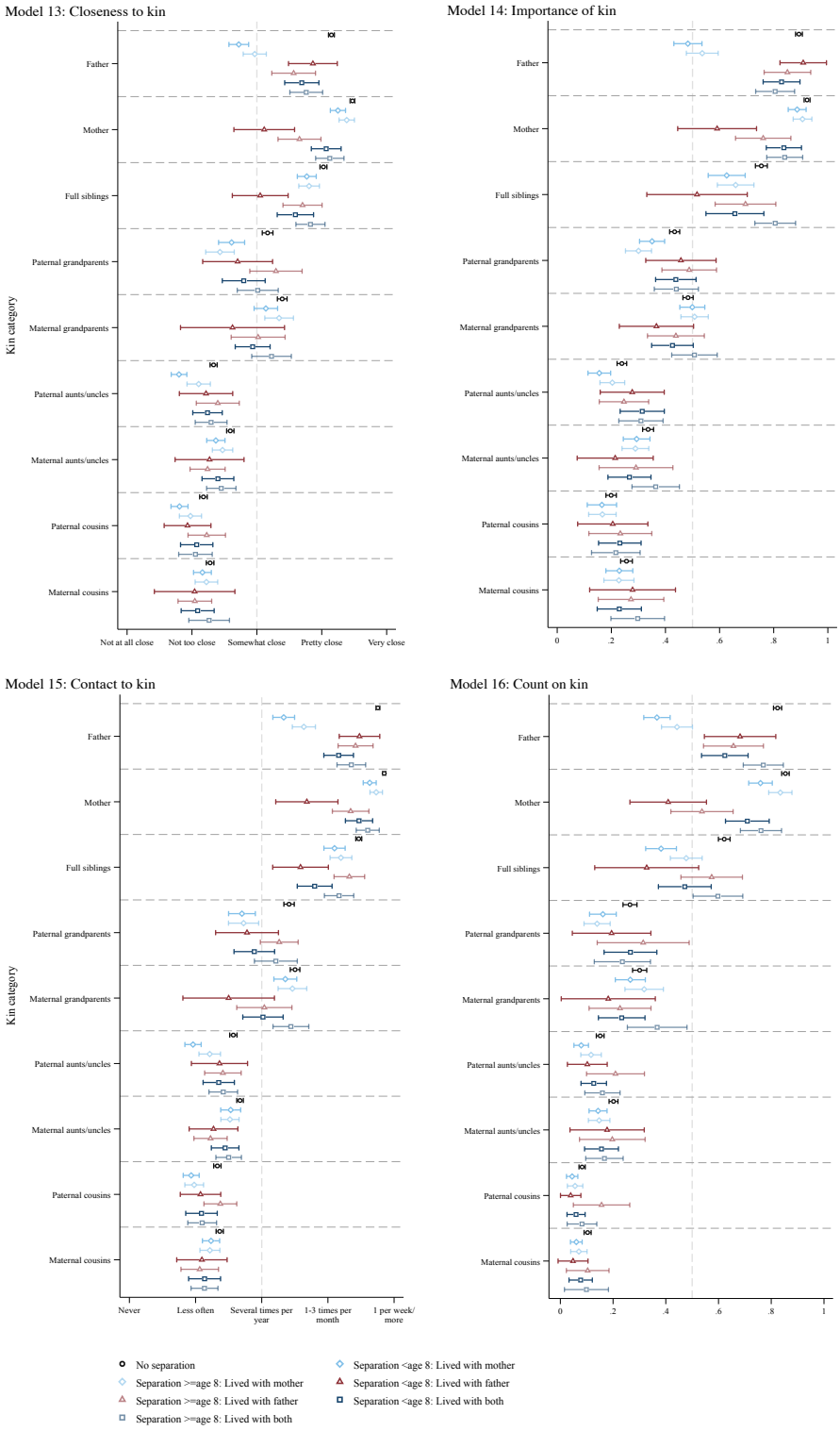


Figure D3.4. Differences by post-separation physical custody arrangement and age at separation: without potential mediators. Data are from KINMATRIX. Models 13 (N=53,001) and 15 (N=53,001) represent average marginal effects of parental separation estimated using OLS regression. Models 14 (N=63,422) and 16 (N= 53,607) represent average marginal effects of parental separation estimate using linear probability models (OLS). Each model controls for anchor's age, health, life satisfaction, education, ethnicity, partnership status, number of kin, presence of complex kin, number of children, grandparental separation, family values, and flags. See Table 3.2 for details on the variables. Estimates are shown along with their 95% confidence intervals. Clustered SEs.

Appendix E3

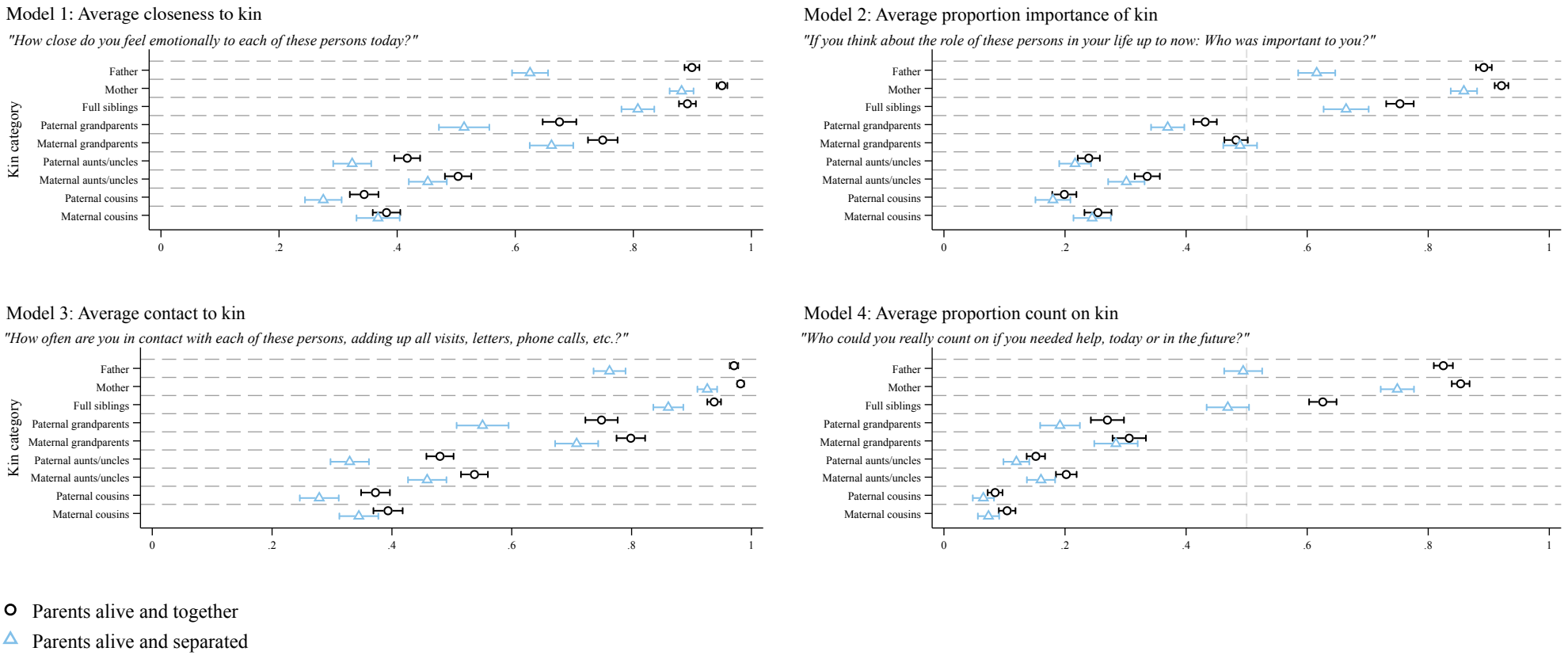


Figure E3.1. Marginal effects of parental separation on ties to nuclear and extended kin: closeness and contact as binary outcomes. Data are from KINMATRIX. Model 1 (N=50,478), Model 2 (N=60,361), Model 3 (N=50,478), and Model 4 (N=51,064) represent average marginal effects of parental separation estimated using logistic regressions. Each model controls for anchor's age, health, life satisfaction, education, ethnicity, partnership status, number of kin, presence of complex kin, number of children, grandparental separation, family values, and flags. Closeness is recoded as 1—"At least somewhat close", 0—"Otherwise". Contact is recoded as 1—"At least several times per year contact", 0—"Otherwise". Estimates are shown along with their 95% confidence intervals. Clustered SEs.

CHAPTER 4

THE INTERPLAY BETWEEN SETTLEMENT INTENTIONS AND INTEGRATION AMONG UKRAINIAN REFUGEES IN GERMANY

by Leona Przechomski[1], Kateryna Sytkina[1,2], Andreas Ette[3] & Eldad Davidov[1]
[1]University of Cologne, [2]University of Mannheim, [3]Federal Institute for Population Research

Abstract

Recent theoretical critiques have challenged the conceptualization of settlement intentions and integration as predetermined, exogenous, or unidirectionally linked factors. Instead, they call for a more dynamic perspective that acknowledges their reciprocal relationship over time. This study addresses this call by examining the reciprocal interplay between settlement intentions and integration among Ukrainian refugees in Germany. Specifically, we investigated whether a better integration increases the intention to settle in the host society or vice versa, or whether they both reinforce each other. We employed a register-based four-wave probability panel survey that included various integration measures and settlement intentions of Ukrainian refugees who arrived in Germany after the Russian invasion of Ukraine in February 2022. The results from the random intercept cross-lagged panel models (RI-CLPMs) suggested reciprocal within-person effects between settlement intentions and both cultural and social integration. Ukrainian refugees who shifted from a temporary to a permanent outlook subsequently improved their German language skills, had more contact with Germans, and felt more welcome in Germany. Conversely, increases in language proficiency, contact, and feelings of being welcome were followed by shifts toward permanent settlement intentions. By way of contrast, no reciprocal associations were found between intentions to stay and economic integration in the form of employment. These findings underline the importance of addressing integration in its multidimensionality. The observed reciprocal associations challenge static, unidirectional perspectives that view either settlement intentions or integration as exogenous drivers of the other. Instead, they support a conceptualization of both as dynamic and reciprocal reinforcing processes.

4.1. Introduction

Settlement intentions and refugee integration have increasingly drawn attention from migration scholars and policymakers alike. Previous research has predominantly focused on how integration affects immigrants' and refugees' decisions to settle or return (De Haas & Fokkema, 2011; De Vroome & van Tubergen, 2014; Jensen & Pedersen, 2007). To a lesser extent, studies have also examined how settlement intentions shape integration processes (van Tubergen, 2010; van Tubergen & Kalmijn, 2009; Wachter & Fleischmann, 2018). However, the potential reciprocity of the relationship between settlement intentions and integration has received comparatively less attention. Recent literature has highlighted gaps in understanding this reciprocity (Ette et al., 2025; Wachter & Fleischmann, 2018).

Migration scholarship, particularly longitudinal and transnational approaches increasingly emphasized that intentions—to settle, return, or remigrate—can change dynamically due to evolving personal and structural circumstances (Bilgili et al., 2022; De Haas et al., 2019). This dynamism may be particularly pronounced for refugees, whose initial migration decisions often involve urgent displacement and limited long-term planning. Their intentions to settle or return may shift significantly in response to new experiences, including those tied to integration (De Vroome & van Tubergen, 2014; Harris & Todaro, 1970; Sjaastad, 1962). Conversely, intentions to settle permanently in a host country may increase the motivation and efforts to integrate as the expected time to profit from it is longer (Esser, 2004).

In this study, we investigate the underexplored reciprocal relationship between integration and settlement intentions among Ukrainian refugees in Germany. We use data from the IAB-BiB-FReDA-BAMF-SOEP study, a register-based probability panel survey collected biannually on Ukrainian refugees who arrived in Germany after February 2022 (Brücker et al., 2023; IAB-BiB FReDA BAMF SOEP, 2022). We employed random intercept cross-lagged

panel models (RI-CLPMs, Hamaker et al., 2015) to examine how settlement intentions interact with four integration indicators over time: German language proficiency, contact with Germans, feeling welcome in Germany, and employment status in Germany.

This study makes three key contributions to the migration literature. First, we conceptualize and model settlement intentions and integration as a *dynamic*, *reciprocal process*, moving beyond the common unidirectional perspective. In doing so, we respond to recent calls to understand these dynamics as interconnected processes rather than independent paths, challenging theoretical boundaries in migration research (Bilgili et al., 2022). Second, we offer an analytical contribution through the use of longitudinal data and RI-CLPMs. By capturing *intra-individual changes*, we contribute to a better understanding of the decision-making processes for settling in a foreign country and the development of integration over time. Third, we operationalize refugee integration within a *multidimensional framework*, encompassing cultural, social, and structural dimensions, to better align with its theorized complexity (Ghosn et al., 2021; Kuhlman, 1991). By adopting this comprehensive perspective, we aim to advance the understanding of integration as a multifaceted process.

Ukrainian refugees represent an especially relevant case for studying settlement intentions and integration for several reasons. The Russian invasion of Ukraine in February 2022 triggered the largest displacement in Europe since mid-20s century, with over one million individuals officially registered in Germany alone by the end of that year (BAMF, 2023; Brücker et al., 2023). Despite the scale of this movement, Ukrainian refugees remain relatively under-researched, leaving significant gaps in understanding their integration trajectories and settlement plans. Furthermore, the forced and abrupt nature of their flight—typical of many refugee experiences—may render their settlement intentions especially sensitive to evolving integration experiences. At the same time, Ukrainian refugees benefit from relatively flexible legal and mobility frameworks compared to other refugee populations. Much of Ukraine

remains under democratic governance, allowing visits to certain regions, and the European Union's (EU) temporary protection directive grants Ukrainian refugees substantial freedom of movement across the EU (Sauer et al., 2023). These circumstances offer a unique opportunity to study how integration experiences and settlement intentions influence each other over time. Moreover, studying this group offers valuable insight into the integration and settlement dynamics of a predominantly female refugee population, many of whom fled with children and without a partner (Brücker et al., 2023; van Tubergen et al., 2024).

In the next sections, we provide a description of Ukrainian refugees in the German context, present the theoretical background of the study, and formulate testable hypotheses. After that, we present the empirical part of the study including the data, variables, and analytical strategy we used. Finally, we present, evaluate, and discuss the results.

4.2. Ukrainian refugees in the German context

Most Ukrainian refugees who arrived in Germany after the Russian invasion in February 2022 initially entered under the visa-free regime established by the 2017 EU-Ukraine Association Agreement (European Commission, 2017). Following their arrival, they were encouraged to register under the EU's Temporary Protection Directive (TPD), activated on March 4, 2022. In Germany, the TPD granted Ukrainian refugees access to residence rights, housing, healthcare, education, and employment opportunities (European Commission, 2024; Federal State of Berlin, 2024; Heiermann & Atanisev, 2024). Unlike other refugee groups, Ukrainian refugees were not required to stay in reception centers or follow standard distribution protocols (Brücker et al., 2023). Furthermore, Ukrainian refugees fell under the provisions of the Social Code II, which granted them access to basic social benefits, instead of the Asylum Seekers Benefits Act. This facilitated their integration into the support framework provided by public employment services including access to German language courses (Brücker et al., 2023). Generally,

Ukrainian refugees had more expedited access to the labor market compared to, for example, refugees from Syria or Afghanistan (Brücker et al., 2023; Heiermann & Atanisev, 2024).

Ukrainian refugees in Germany are predominantly female due to martial law in Ukraine, which restricted men aged 18–60 from leaving the country (Andrews et al., 2023) [1]. Many women arrived alone or with children (Brücker et al., 2023). Compared to other refugee groups, Ukrainians were met with more favorable public attitudes and lower racist or ethnic prejudices (Bansak et al., 2016; De Coninck, 2023; van Tubergen et al., 2024).

4.3. Theoretical considerations

4.3.1. Settlement intentions and integration

Settlement intentions refer to refugees' stated plans or desires concerning their future place of residence, particularly whether they intend to stay in their current country of residence. Grounded in the *theory of planned behavior*, intentions are conceptualized as central precursors to behavior, shaped by attitudes, perceived behavioral control, and social norms (Ajzen, 1991). They capture subjective preferences and anticipatory evaluations of future possibilities under conditions of uncertainty. In forced migration contexts, uncertainty and temporal liminality may make settlement intentions particularly susceptible to changes over time. They can serve as a proxy for understanding broader decision-making processes, revealing how refugees navigate complex trade-offs between legal stability, economic opportunities, and prospective long-term integration.

Integration can be understood as a process of inclusion of immigrants in the destination society and its institutions and encompasses multiple dimensions (De Haas et al., 2019). Based on existing conceptualizations (Ager & Strang, 2008; Entzinger & Biezeveld, 2003), we

[1] Exceptions apply only in specific cases, such as soldiers undergoing rehabilitation in Germany, as well as men with disabilities, three or more underage children, or who are the only caregivers in the family.

focused on cultural, social, and structural dimensions of integration in this study. Cultural integration refers to the incorporation of immigrants into the cultural norms, values, and practices of the host society, for instance through language acquisition (Heckmann, 2005). Social integration involves participation in the host society's social life. Contact with natives, as well as feeling welcome in the host country are potential indicators of social integration (Dustmann, 1996). Structural integration refers to the incorporation of immigrants into the core institutions of the host society, such as the labor market (Heckmann, 2005).

4.3.2. The interplay between settlement intentions and integration

In the following, we present theories and mechanisms behind the relationship between settlement intentions and integration, alongside an approach that addresses the potential reciprocity of this relationship.

Explanations for the settlement intentions of immigrants (De Vroome & van Tubergen, 2014; Harris & Todaro, 1970; Sjaastad, 1962) often suggest that migrants base their migration and settlement decisions on weighing their costs and benefits. According to *neoclassical migration* and *human capital theory*, migrants are expected to settle where they can achieve the highest returns on their investments in human capital, maximize their productivity, and earn the highest wages (De Haas et al., 2019). Combining this framework with the concept of the ongoing reassessment of settlement intentions, intra-individual increases in integration—such as increased German language proficiency, more frequent social contact with natives, greater institutional knowledge, or employment—are likely to facilitate the productive use of human capital, enhance economic outcomes, and, thereby, make permanent settlement a more attractive option. According to these theories, the driving mechanism underlying intentions to stay in a host country is utility-maximizing behavior (De Haas & Fokkema, 2011). Based on this explanation, we expect stronger integration to increase the intentions to stay in Germany.

Hypothesis 1: *A stronger integration of Ukrainian refugees in Germany—greater proficiency in the German language (a), more frequent contact with Germans (b), a stronger sense of being welcome in Germany (c), or being employed (d)—will increase their intentions to settle permanently in Germany.*

A similar mechanism can also explain how settlement intentions may conversely affect integration. According to Esser (2004), settlement intentions make investments in host country specific resources more attractive, as the expected time to profit from the returns is longer. In other words, the decision to settle in a host country increases the incentive to invest in country-specific capital—such as language acquisition, building social ties with natives, or obtaining recognition of educational qualifications—thereby fostering successful integration into the host society. Based on this logic, our second hypotheses suggests that stronger intentions to stay in Germany are likely to result in better integration.

Hypothesis 2: *Intentions to settle permanently among Ukrainian refugees in Germany, compared to temporarily, will increase their level of integration in Germany—including their German language proficiency (a), frequency of contact with Germans (b), sense of being welcome in Germany (c), and likelihood of employment in Germany (d).*

More recent approaches, such as that of Bilgili et al. (2022), suggest a *longitudinal and transnational framework* arguing that integration and intentions to settle reinforce each other in a dynamic process over time. Following this framework, neither integration nor settlement intentions are fixed or predetermined but are subject to change over time. They evolve through a reciprocal process in which each influences and is influenced by the other.

Hypothesis 3: *Ukrainian refugees' intentions to settle in Germany and their integration into German society—indicated by their German language proficiency (a), contact with*

Germans (b), sense of being welcome in Germany (c), and employment status in Germany—affect each other in a reciprocal relationship.

Figure 4.1 summarizes our hypotheses.

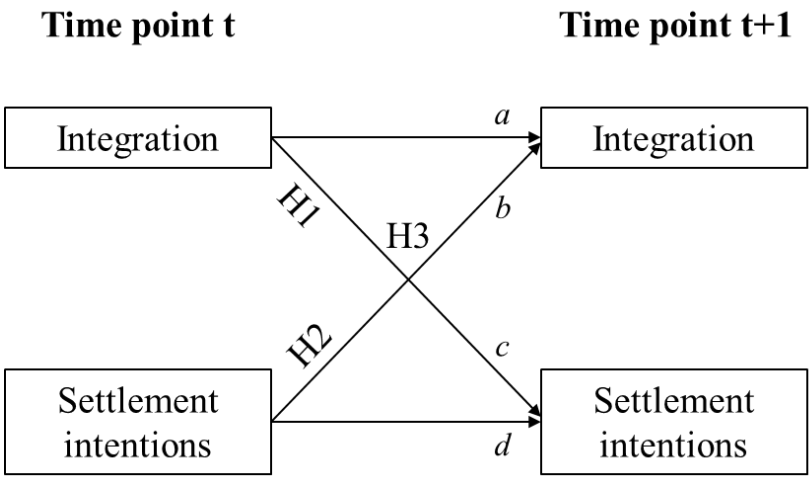


Figure 4.1. Graphical presentation of hypotheses and model. Parameter a indicates the auto-regressive effect from integration in time point t to integration in time point t+1. Parameter b indicates the cross-lagged effect from integration in time point t to settlement intentions in time point t+1. Parameter c indicates the auto-regressive effect from settlement intentions in time point t to settlement intentions in time point t+1. Parameter b indicates the cross-lagged effect from settlement intentions in time point t to integration in time point t+1.

4.3.3. Previous findings

Previous studies predominantly examined unidirectional relationships between cultural, social, and structural integration and migrants' settlement intentions, typically employing between-individual comparisons and cross-sectional data. They mainly focused on how integration influences intentions to stay rather than the other way around:

Cultural integration—particularly language proficiency—has received the most academic attention in the literature. Studies investigating the effect of host-country language skills on settlement intentions reported positive associations among refugees from Afghanistan, Iraq, Iran, and Somalia in the Netherlands (Di Saint Pierre et al., 2015), African immigrants in Spain and Italy (De Haas & Fokkema, 2011), and female Ukrainian refugees in different European

countries, for whom better English proficiency was associated with stronger intentions to stay in the host country (van Tubergen et al., 2024). In contrast, studies of Syrian refugees in Germany found no significant association (Hannafi & Marouani, 2023), and Ukrainian labor migrants in Poland exhibited only indirect relations between language proficiency and settlement intentions (mediated by attachment to the host city, see: Toruńczyk-Ruiz & Brunarska, 2020). Studies on the reverse direction have found consistently positive effects—stronger intentions to stay were related to greater efforts to learn the host-country language and improvements in language proficiency, both in the Netherlands (Geurts & Lubbers, 2017; van Tubergen, 2010; van Tubergen & Kalmijn, 2009; Wachter & Fleischmann, 2018) and Germany (Dustmann, 1999).

Social integration has also been found to shape and be shaped by settlement intentions. Frequent contact with natives and stronger ties to them were consistently associated with stronger settlement intentions among immigrants and refugees across multiple contexts (De Vroome & van Tubergen, 2014; Di Saint Pierre et al., 2015; Hannafi & Marouani, 2023; Toruńczyk-Ruiz & Brunarska, 2020). Immigrants planning longer stays were also more inclined to develop social ties with natives (Martinovic et al., 2015; Wachter & Fleischmann, 2018). While the link between *feeling welcome in a host country and intentions to settle* has received limited direct empirical attention, related constructs have been explored under the broader umbrella of social and psychological integration. For example, access to emotional social capital—specifically, knowing people who could provide care during illness or psychological support—was associated with lower return intentions among Ukrainian migrants in Poland (Toruńczyk-Ruiz & Brunarska, 2020), as was psychological attachment to the host country among guest workers in Germany (Constant & Massey, 2002). Although not identical, these concepts suggest that feelings of being welcome—reflected in perceived social

acceptance, emotional connection, and belonging—are likely to affect migrants' long-term settlement intentions.

Empirical research on the association between *structural integration*—particularly the incorporation into the labor market—and the intention to stay in a host country showed an inconsistent pattern. Whereas some studies showed that stable employment, higher earnings, and benefit coverage encouraged permanent settlement among immigrants in Germany (Constant & Massey, 2002; Waldorf, 1995) and Denmark (Jensen & Pedersen, 2007), other studies found no significant effect between economic integration and settlement intentions among immigrants and refugees in the Netherlands (De Vroome & van Tubergen, 2014; Di Saint Pierre et al., 2015), Syrian refugees in Germany (Hannafi & Marouani, 2023), and African immigrants in Spain and Italy (De Haas & Fokkema, 2011). Research on how intentions to stay affect labor market outcomes also had inconsistent result. For instance, migrant women who intended to stay permanently in Germany were found to participate less often in the German labor market compared to migrant women who intended to only stay temporary (Dustmann, 1997). Settlement intentions of Eastern European immigrants in the Netherlands were found to evolve alongside employment patterns but did not consistently predict them (Wachter & Fleischmann, 2018). These studies pointed to a possible trade-off in how migrants allocated time and resources depending on whether they planned a temporary or long-term stay.

In the next section we will describe the data and methods we used to test our hypotheses.

4.4. Data, variables, and methods

4.4.1. Data

We utilized data from the longitudinal IAB-BiB/FReDA-BAMF-SOEP Survey on Ukrainian Refugees in Germany (Brücker et al., 2023). The survey's first wave was administered between the end of August and early October 2022, beginning six months after the Russian invasion of

Ukraine. It targeted Ukrainian nationals aged 18 to 70 years who relocated to Germany between February 24th and June 8th, 2022, and were registered at local population registration offices.

The survey followed a two-stage probability sampling: First, 100 German municipalities and cities were drawn to be the primary sampling units. Second, within these units, 48,000 addresses were randomly selected via the residents' registration offices for participation solicitation (Steinhauer et al., 2024). Participants were initially contacted by postal mail, invited to join the study online (CAWI), and later sent a reminder with a paper questionnaire. The response rate was 24.5%, with approximately 80% opting for online participation and an average completion time of 20 minutes.

The next waves of data collection took place approximately every six months: Wave 2 between January and March 2023, Wave 3 between June and July 2023, and Wave 4 between February and May 2024. Following Wave 2, the survey design included a random split of the sample into two groups, each focusing on distinct thematic areas. For this study, we used the subsample that was consistently asked about integration and settlement intentions in all waves.

Wave 1 included 5,985 respondents. Of these, 3,507 (59%) also participated in Wave 2. Of these Wave 2 participants, 2,450 (70%) also participated in Wave 3, and 389 (16%) of those who skipped Wave 2 rejoined, resulting in a total sample in Wave 3 of 2,839 participants. Of these Wave 3 participants, 2,245 (79%) also participated in Wave 4, plus additional 681 (22%) who rejoined after skipping Wave 3, resulting in a total of 2,926 participants in Wave 4. A detailed attrition flowchart is provided in Table A4.1 in the appendix. We restricted the analytical sample to participants whose responses did not appear to be provided by a third party or exhibited other suspicious response patterns (79 observations excluded), who lived in Germany at the time of data collection (551 observations excluded), and who participated in at least two of the four waves (2,067 observations excluded). Our final sample size consists of

3,918 respondents (with 12,560 observations across four waves). Detailed information on sample restriction is provided in Table A4.2 in the appendix.

We conducted a series of analyses to assess whether panel attrition and sample restrictions were selective in terms of participants demographic characteristics, settlement intentions and integration. The attrition analyses provided in Table A4.3 in the appendix, revealed that individuals with non-permanent settlement intentions, lower language proficiency, and lower education had a three to five percentage points higher likelihood of dropping out of the study. In contrast, differences in contact with Germans, feeling welcome in Germany, employment, and age showed no significant impact on dropping out of the study. The sample restriction selectivity analyses provided in Table A4.4 in the appendix, showed that individuals with non-permanent settlement intentions and lower language proficiency had a three to eight percentage points higher likelihood of being excluded from the sample based on the presented exclusion criteria. In contrast, contact with Germans, feeling welcome in Germany, employment, and gender, and age showed no significant impact on attrition or being excluded from the sample. We further tested whether the associations between integration and settlement intentions differed between participants who attrited or were excluded from the sample and those who stayed in the sample (see Tables A4.5, A4.6, A4.7 and A4.8 in the appendix). Results showed no significant differences except for the effects between contact with Germans and settlement intentions, which were slightly stronger for attritors and those excluded from the analytic sample. This suggests that the estimates in the further analyses are either unbiased by attrition and sample restriction or conservative in the case for contact with natives.

The primary method in our analyses, random intercept cross-lagged panel models (RI-CLPM) already mitigates bias from time-invariant factors (Hamaker et al., 2015). All time-varying variables influencing attrition were included and adjusted for in the models. We further applied full information maximum likelihood (FIML) to treat missing values in the analyses

and address selective panel attrition (Schafer & Graham, 2002). By incorporating all available data, including participants with incomplete observations, FIML effectively reduces bias from selective attrition and produces robust and efficient parameter estimates.

4.4.2. Variables

Settlement intention. Refugees' intention to settle in Germany was measured by asking how long they expected to stay. Response options were: (1) until the end of the war, (2) up to another year at most, (3) for a few more years, (4) forever, and (5) do not know. For the analysis, we recoded this variable into a binary measure, grouping categories (1), (2), (3), and (5) as temporary settlement intentions [0] and category (4) as permanent settlement intentions [1]. We ran a robustness check using an alternative operationalization of settlement, where participants who responded "do not know" were coded as missing. It did not change the results of the analysis.

Cultural integration was measured using an average index of three self-assessed items on *German language proficiency*: speaking, reading, and writing in German, ranging from (0) not at all to (4) very good. Social integration of Ukrainian refugees in Germany was assessed by *two* variables: *Contact to Germans,* inquiring about the frequency of contact with Germans, ranging from (0) never to (5) every day; and *feeling welcome,* inquiring about the feeling of being welcome in Germany, ranging from (0) not at all to (5) fully.

Structural integration was measured by a dummy variable indicating *employment* as (0) not employed versus (1) employed. We conducted a robustness check using an alternative operationalization of structural integration, where we defined integration as either being employed or participating in an official government-sponsored language course, which is often a preparatory step to entering the regulated German labor market. This specification yielded

results consistent with those based solely on employment, as presented in the main analysis (see Table 4.1 for the descriptive information of the variables used in the analysis).

4.4.3. Methods and analytical strategy

Our analytical strategy proceeded in two stages. In the first stage, we conducted a descriptive analysis of the settlement intentions and integration trajectories of Ukrainian refugees during their first two years in Germany. In the second stage, we examined the dynamic interplay between settlement intentions and the four aforementioned integration markers. Substantial within-person variation in the key variables underscored the potential of analyzing intra-individual change (see Table 4.1). To this end, we employed four random intercept cross-lagged panel models (RI-CLPM). The RI-CLPM extends the traditional cross-lagged panel model (CLPM) by separating *within-person processes* from *between-person differences* (Hamaker et al., 2015). It does so by including random intercepts accounting for stable, trait-like differences across individuals, and autoregressive paths capturing the short-term stability of each construct, specifically, the persistence of within-person deviations across time. This structure allows us to estimate how a within-person deviation in one domain (e.g., language proficiency) predicts a subsequent change in within-person deviation in another domain (e.g., settlement intentions), relative to the personal average (Mulder & Hamaker, 2021; Orth et al., 2020). We specified the RI-CLPMs following the approach outlined by Mulder and Hamaker (2021), including time-constrained lagged effects and time-varying grant means. This specification allowed us to estimate the overall reciprocal relationship between integration and settlement intentions across time, while still accounting for systematic changes in their average levels across waves.

All models were conducted in R version 4.4.0 with the lavaan package (Rosseel, 2012). We employed robust maximum likelihood estimation (MLR) due to convergence issues with categorical estimators (e.g., WLSMV). MLR provides standard errors and test statistics that

are robust to non-normality and heteroskedasticity (Huber, 1967; Yuan & Bentler, 2000).[2] Model fit was evaluated using the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). Following established guidelines, we considered the model fit acceptable when CFI was bigger than 0.95 and RMSEA smaller than 0.08 (West et al., 2023). In the online supplementary material, we provide a detailed description of all robustness checks, along with the R code used for the analyses.

4.5. Results

4.5.1. Descriptive results

Table 4.1 presents descriptive statistics for all variables used in the analysis, both for the full panel and disaggregated by wave. Our sample in Wave 1 consisted predominantly of women (81%) and highly educated individuals (71% tertiary education), with an average age of 41. Between Wave 1 (Summer 2022) to Wave 4 (Winter 2024), the proportion of Ukrainian refugees reporting an intention to stay in Germany permanently increased from 28% to 41%. Ukrainian refugees' self-assessed German language proficiency increased by almost one unit during that time. Structural integration, as measured by employment status, also rose markedly, with the employment rate nearly doubling from 15% to 29%. In contrast, indicators of social integration showed a downward trend: Contact with Germans and feeling welcome in Germany both decreased during the first two years. Thus, Ukrainian refugees had on average less contact with Germans and felt less welcome over time.[3]

[2] While MLR may attenuate parameter estimates of binary estimators, the consistency of findings across estimation strategies suggests that this bias, if present, was minimal in our case. Specifically, models that did converge using WLSMV, as well as additional fixed-effects robustness checks (logistic fixed effects regressions for all binary outcomes; linear fixed effects regressions for all continuous outcomes), produced similar results to the RI-CLPMS with MLR. These triangulated comparisons suggest that the results in this study are robust to different estimation strategies.

[3] To examine whether these developments also occurred within individuals over time (rather than being driven by compositional changes), we estimated fixed effects regression models. The results confirm the same directional trends at the within-person level, as shown in Table A4.9 in the appendix

Table 4.1. Descriptive statistics of variables used in the analysis

	Full panel		Wave 1		Wave 2		Wave 3		Wave 4	
Variable	Mean (overall SD) (between SD) (within SD)	Obs.	Mean (SD)	Obs.	Mean (SD)	Obs.	Mean (SD)	Obs.	Mean (SD)	Obs.
Settlement intention (0) "temporarily"; (1) "permanent"	0.33 (0.47) (0.39) (0.26)	N=12,513 n=3,917	0.28 (0.45)	3,888	0.29 (0.46)	3,282	0.34 (0.48)	2,634	0.41 (0.49)	2,709
Language proficiency from (0) "not at all" to (4) "very good"	1.32 (0.91) (0.78) (0.48)	N=12,551 n=3,918	0.88 (0.82)	3,916	1.29 (0.85)	3,289	1.58 (0.86)	2,636	1.74 (0.88)	2,710
Contact with Germans from (0) "never" to (5) "daily"	2.57 (1.80) (1.49) (1.04)	N=12,532 n=3,918	2.82 (1.80)	3,912	2.52 (1.78)	3,285	2.51 (1.80)	2,635	2.32 (1.80)	2,700
Feeling welcome from (0) "not at all" to (4) "fully"	2.66 (0.96) (0.74) (0.63)	N=12,543 n=3,918	3.02 (0.95)	3,911	2.61 (0.95)	3,288	2.57 (0.89)	2,636	2.28 (0.88)	2,708
Employment (0) "not employed"; (1) "employed"	0.21 (0.41) (0.33) (0.24)	N=12,516 n=3,918	0.16 (0.37)	3,900	0.19 (0.40)	3,279	0.22 (0.41)	2,635	0.28 (0.45)	2,702

Note: SD=standard deviation, Obs.=number of observations, N=number of person-wave observations, n=number of persons. Settlement intentions were measured as (1) permanent and (0) temporary settlement intentions; language proficiency was measured using a mean index of three self-assessed variables on speaking, reading, and writing the German language, ranging from (0) not at all to (4) very good; contact with Germans as the frequency of contact, ranging from (0) never to (5) daily; the feeling of being welcome in Germany on a scale from (0) not at all to (5) fully; employment variable as being (1) employed and (0) not employed.

4.5.2. Random intercept cross-lagged panel models

Table 4.2 presents the findings from the four RI-CLPMs, one for each integration marker. All models demonstrated excellent fit to the data (CFI≥0.97, RMSEA≤0.05). The autoregressive effects of all five constructs were statistically significant with varying magnitudes. Larger autoregressive effects indicated that deviations from the personal average tended to persist or follow a stable pattern over time, while smaller effects suggested that experiences were more situational or prone to short-term fluctuation. German language proficiency and employment showed the highest temporal consistency in within-person deviations, followed by settlement intentions, contact with Germans, and the feeling of being welcome.

Beyond these stability patterns, the cross-lagged effects revealed that Ukrainian refugees who experienced increases in their German language proficiency, contact with Germans, and feelings of being welcome in Germany (compared to their personal average), had subsequently a higher probability to shift toward permanent settlement intentions, supporting hypotheses 1a, 1b, and 1c. Conversely, shifts toward permanent settlement intentions were followed by increases in language proficiency, contact, and feelings of being welcome, supporting hypotheses 2a, 2b, and 2c. In terms of magnitude, German language proficiency had the strongest (standardized) effect on subsequent settlement intentions, followed by contact with Germans and feeling welcome in Germany. The effects from settlement intentions to German language proficiency, contact with Germans, and feeling welcome in Germany were similar in terms of (standardized) effect sizes. Taken together, the RI-CLPMs suggested bidirectional relationships between settlement intentions and the following integration markers: language proficiency, contact with Germans, and feeling welcome in Germany, supporting hypotheses 3a, 3b, and 3c.

Notably, the analysis suggested no empirical association between employment and settlement intentions. Thus, it provided no empirical support for hypotheses 1d, 2d and 3d.

Table 4.2 summarizes these findings. To assess the robustness of our findings, we carried out a series of supplementary analyses. These included testing the aforementioned alternative operationalizations of key constructs, as well as estimating less complex models (OLS, logistic, and fixed effects regressions), modifying the RI-CLPM specifications, combining the bivariate models into a grand model, incorporating additional control variables, and conducting subgroup comparisons. While minor variations occurred across specifications, the results of the supplementary analyses aligned with the central conclusions drawn from the RI-CLPM analyses, suggesting stable and reliable findings. A detailed account of all robustness checks, along with the R code used for the analyses, is provided in the online supplementary materials.

Table 4.2. Results of random intercept cross-lagged panel models

Model	Effect	IV (t)	DV (t+1)	Est.	Std. Est.	p	CFI	RMSEA	Obs.
Language	b; CL	Language	Settlement	0.069	0.105; 0.106; 0.106	0.000	0.989	0.040	3,918
	c; CL	Settlement	Language	0.116	0.071; 0.074; 0.075	0.001			
	a; AR	Language	Language	0.455	0.448; 0.452; 0.454	0.000			
	d; AR	Settlement	Settlement	0.326	0.309; 0.323; 0.325	0.000			
Contact	b; CL	Contact	Settlement	0.014	0.054; 0.053; 0.053	0.004	0.992	0.028	3,918
	c; CL	Settlement	Contact	0.239	0.059; 0.062; 0.063	0.003			
	a; AR	Contact	Contact	0.231	0.236; 0.231; 0.231	0.000			
	d; AR	Settlement	Settlement	0.327	0.31; 0.325; 0.327	0.000			
Welcome	b; CL	Welcome	Settlement	0.020	0.046; 0.039; 0.039	0.022	0.970	0.050	3,918
	c; CL	Settlement	Welcome	0.120	0.058; 0.061; 0.062	0.013			
	a; AR	Welcome	Welcome	0.131	0.155; 0.132; 0.131	0.000			
	d; AR	Settlement	Settlement	0.326	0.31; 0.325; 0.326	0.000			
Employment	b; CL	Employment	Settlement	0.014	0.012; 0.014; 0.015	0.495	0.985	0.037	3,918
	c; CL	Settlement	Employment	0.025	0.024; 0.024; 0.024	0.142			
	a; AR	Employment	Employment	0.481	0.403; 0.465; 0.477	0.000			
	d; AR	Settlement	Settlement	0.329	0.313; 0.327; 0.329	0.000			

Note: IV=independent variable, DV=dependent variable, Effect=effect type, Est.=unstandardized regression estimate, Std. Est.=standardized regression estimate, p=p value, CFI=comparative fit index, RMSEA=root mean square error of approximation, Obs.=number of observations, CL=cross-lagged, AR=autoregressive, parameters a, b, c, and d represent the effects shown in Figure 4.1; Model information: Estimator=MLR, Missings=FIML.

4.6. Discussion

Recent theoretical critiques have challenged the conceptualization of settlement intentions and integration as predetermined, exogenous, or unidirectionally linked factors. Instead, they call for a more dynamic perspective that acknowledges their reciprocal relationship over time (Bilgili et al., 2022). However, longitudinal studies that explicitly test this bidirectional relationship—particularly among refugees—remain scarce. This study addressed this gap by examining the reciprocal interplay between settlement intentions and integration among Ukrainian refugees in Germany, conducting four RI-CLPMs with data from the register-based four-wave IAB-BiB/FReDA-BAMF-SOEP probability panel survey of Ukrainian refugees arriving in Germany after February 2022.

Results demonstrated that permanent settlement intentions as well as structural and cultural integration indicators—specifically employment and German language proficiency—increased substantially during the first two years after arrival. In contrast, social integration—specifically having contact with Germans and feeling welcome in Germany—declined over time. The RI-CLPM analysis revealed some important key findings. The autoregressive effects, indicating within-person stability over time, were strongest for language proficiency, employment, and settlement intentions, and weakest for contact with Germans and feeling welcome. This suggested that cultural and social integration indicators were more susceptible to intra-individual change over time.

The results further revealed reciprocal within-person effects between settlement intentions and both cultural and social integration. Ukrainian refugees who typically reported temporary settlement intentions but shifted to a permanent outlook subsequently improved their German language skills, had more contact with Germans, and felt more welcome in Germany. Additionally, those who reported a higher language proficiency, more contact, or feeling more

welcome were likely to subsequently shift from temporary to permanent intentions to stay. Among these factors, improvements in German language proficiency had the strongest effect on subsequent changes in settlement intentions, pointing to its potentially central role in shaping Ukrainian's decision to settle in Germany. Beyond that, the positive reciprocal relationship between social integration and settlement intentions coincided with a descriptive trend of declining contact with Germans and feelings of being welcome over time. This juxtaposition suggests a buffering effect on the overall rise in permanent settlement intentions. That is, declining social integration may have slowed what would otherwise have been a sharper increase in intentions to stay permanently.

By way of contrast, no reciprocal associations were found between intentions to stay and economic integration in the form of employment. Although employment is often treated as a key indicator of structural integration (Heckmann, 2005; Naseh et al., 2024), its lack of significance in the bidirectional dynamic may reflect several factors: First, while employment status alone may not strongly shape the decision to settle, other dimensions of structural integration, such as job type, stability, satisfaction, or qualification match, could be more relevant. However, these variables were not consistently available for all employed individuals across waves, so we could not examine these possibilities. Second, those intending to stay permanently may have initially prioritized investments in host-country-specific skills, for example, language or qualifications, thereby delaying or limiting early labor market entry. This aligns with investment theory, which posits that long-term settlers may postpone immediate employment in favor of long-term integration gains (Peirce, 1995). Third, Germany's emphasis on language and integration courses over rapid labor market entry—compared to policies in other countries such as the Netherlands—may help explain why language proficiency emerged as a stronger predictor of settlement intentions (Brücker et al., 2023).

Altogether, these findings demonstrate that the integration of immigrants and refugees needs to be addressed and understood in its multidimensionality. They further underscore the importance of capturing dynamic within-person change rather than relying solely on between-group comparisons as the observed reciprocal relationships unfolded at the intra-individual level. Moreover, these reciprocal associations challenge static, unidirectional perspectives that view either settlement intentions or integration as exogenous drivers of the other. Instead, they support a conceptualization of both as dynamic and reciprocal reinforcing processes (Bilgili et al., 2022).

Our study is not without limitations. First, the interpretation of settlement intentions remains complex in the context of forced displacement. For many Ukrainian refugees, reported intentions may not reflect fixed settlement or migration plans but rather expectations about the course of the war. In this sense, any intention to stay might signal uncertainty rather than a clear desire to settle. In-depth interviews could cast some light on how Ukrainian respondents interpreted this question. Second, our measure of employment—being employed versus not employed—offered a relatively crude operationalization of structural integration. Future research could explore more nuanced indicators of structural integration that reflect the quality and sustainability of labor market participation. Third, the estimator (MLR) we employed in our RI-CLPM analyses may attenuate parameter estimates for binary outcomes. The consistency of results across different estimation strategies suggested that any such bias is likely negligible (see robustness checks in the online supplementary material). However, future research could further explore alternative estimators as data and model specifications allow. Lastly, the specific legal, demographic, and societal context of our sample should be kept in mind when interpreting the findings. Ukrainian refugees in Germany benefited from temporary protection status, early access to welfare and employment systems favorable integration policies, and consisted predominantly of highly educated women. These factors may have

influenced both integration trajectories and settlement aspirations. While such characteristics vary across countries and refugee groups, they are important to keep in mind when assessing the broader applicability of these findings. It remains to be studied whether similar patterns would emerge in non-European contexts, among other refugee or immigrant populations, and over longer time periods. Notwithstanding the caveats, our study was able to expand on previous studies that used cross-sectional datasets, and employ a unique panel data set to examine the reciprocal associations between integration and intentions to stay in Germany from a dynamic perspective.

In sum, this study provides robust evidence that refugee integration and settlement intentions are not separate outcomes. Instead, they appear to be mutually reinforcing processes that co-evolve over time reinforcing processual and relational understandings of migration and integration. While these insights are drawn from a specific case, the analytic approach may serve as a model for studying similar processes in other contexts.

4.7. References

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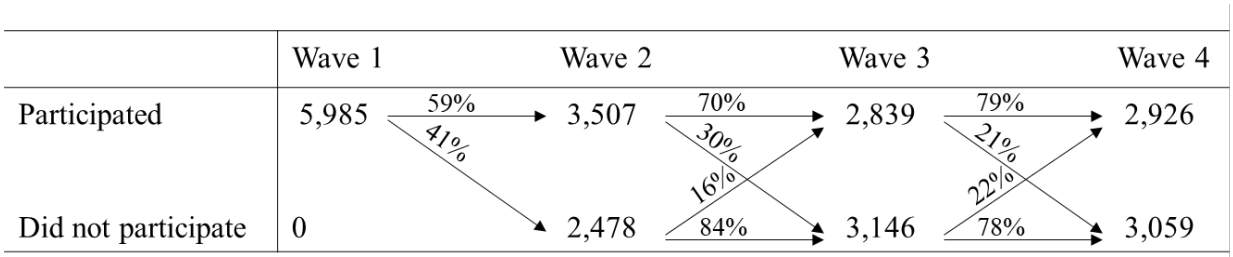
4.8. Appendix

Appendix A4

Table A4.1. Attrition flow chart



Note: Number of persons who participated and did not participate per wave.

Table A4.2. Inclusion criteria for building the analytic sample

Criteria	Person-wave observations		Persons	
	N	%	N	%
Initial sample	15,257	100	5,985	100
Responses incoherent	79	0	0	0
Did not live in Germany	551	4	0	0
Participated in less than two waves	2,067	14	2,067	35
Analytic sample	12,560	82	3,918	65

Table A4.3. Attrition selectivity analysis

Dependent variable (DV): Attrition in the next wave (0) "stayed", (1) "attrited"	Effects displayed: AME
Settlement intentions	-0.048***
Language proficiency	-0.030***
Contact with Germans	n.s.
Feeling welcome in Germany	n.s.
Employment	n.s.
Age	n.s.
Female	n.s.
Education	-0.026***
Number of observations (person-wave)	11,809
Number of cases (person)	5,924

Note: Model: random-effects logistic regression, AME=average marginal effects. Settlement intentions were measured as (1) permanent and (0) temporary settlement intentions; language proficiency was measured using a mean index of three self-assessed variables on speaking, reading, and writing the German language, ranging from (0) not at all to (4) very good; contact with Germans as frequency of contact, ranging from (0) never to (5) daily; the feeling of being welcome in Germany on a scale from (0) not at all to (5) fully; employment variable as being (1) employed and (0) not employed; female as being (0) male and (1) female; education with the International Standard Classification of Education (ISCED) scale from 2011 ranging from (0) less than primary education to (8) doctoral degree or equivalent. ***p<0.001, **p<0.01, *p<0.05

Table A4.4. Sample restriction selectivity analysis

Dependent variable (DV): Cleaned in the next wave (0) "not cleaned", (1) "cleaned"	Effects displayed: AME
Settlement intentions	-0.080***
Language proficiency	-0.015***
Contact with Germans	n.s.
Feeling welcome in Germany	n.s.
Employment	n.s.
Age	n.s.
Female	n.s.
Education	n.s.
Number of observations (person-wave)	7,900
Number of cases (person)	3,697

Note: The dependent variable (DV) indicates if observations (person-waves) are part of the analytic sample, thus participated and were not cleaned from the sample (0), or if they were excluded from the analytic sample because of sample restriction criteria (1). Observations (person-waves) who did not participate in a particular wave ("attrition" variable=1) are coded as missing on the "cleaned" variable. Model: random-effects logistic regression, AME=average marginal effect. The variable cleaned in the next wave indicated if participants were cleaned from the sample in wave t+1 due to sample restrictions. Settlement intentions were measured as (1) permanent and (0) temporary settlement intentions; language proficiency was measured using a mean index of three self-assessed variables on speaking, reading, and writing the German language, ranging from (0) not at all to (4) very good; contact with Germans as frequency of contact, ranging from (0) never to (5) daily; the feeling of being welcome in Germany on a scale from (0) not at all to (5) fully; employment variable as being (1) employed and (0) not employed; female as being (0) male and (1) female; education with the International Standard Classification of Education (ISCED) scale from 2011 ranging from (0) less than primary education to (8) doctoral degree or equivalent. $^{***}p<0.001$, $^{**}p<0.01$, $^{*}p<0.05$

Table A4.5. Sensitivity analysis of integration–settlement effect for attrition

DV: Settlement intentions (0) "temporary", (1) "permanently"	Model 1	Model 2	Model 3	Model 4
Dependent variable (DV):	Settlement	Settlement	Settlement	Settlement
Effects displayed:	AME	AME	AME	AME
Language proficiency	0.051***	–	–	–
Contact with Germans	–	0.019***	–	–
Feeling welcome in Germany	–	–	0.031***	–
Employment	–	–	–	n.s.
Attrition next wave	-0.040***	-0.059***	-0.063**	-0.034***
Interaction term – respective "integration marker"*attrition next wave	**n.s.**	**0.011***	**n.s.**	**n.s.**
Number of observations (person-wave)	11,903	11,886	11,889	11,866
Number of cases (person)	5,963	5,956	5,955	5,953
Model type	RE-logit	RE-logit	RE-logit	RE-logit

Note: We conducted four random-effects logistic regression models to test if the effect from the respective integration marker (language proficiency, contact with Germans, feeling welcome, and employment) on settlement intentions differ for participants who dropped out of the sample in the next wave compared to those who stayed. AME=average marginal effect, RE-logit=random-effects logistic regression model. Attrition in the next wave is measured as (0) "stayed" and (1) "attrited"; settlement intentions were measured as (1) permanent and (0) temporary settlement intentions; language proficiency was measured using a mean index of three self-assessed variables on speaking, reading, and writing the German language, ranging from (0) not at all to (4) very good; contact with Germans as frequency of contact, ranging from (0) never to (5) daily; the feeling of being welcome in Germany on a scale from (0) not at all to (5) fully; employment variable as being (1) employed and (0) not employed. ***p<0.001, **p<0.01, *p<0.05

Table A4.6. Sensitivity analysis of settlement–integration effect for attrition

DVs: Different integration markers	Model 1	Model 2	Model 3	Model 4
Dependent variable (DV):	Language	Contact	Welcome	Employment
Effects displayed:	REs	REs	REs	AMEs
Settlement intentions	0.199***	0.326***	0.198***	n.s.
Attrition	n.s.	-.0107**	n.s.	n.s.
Integration term – settlement intentions*attrition in next wave	**n.s.**	**0.198****	**n.s.**	**n.s.**
Number of observations (person-wave)	11,903	11,886	11,889	11,866
Number of cases (person)	5,963	5,956	5,955	5,953
Model type	RE-reg	RE-reg	RE-reg	RE-logit

Note: We conducted four random-effects logistic and a random-effects logistic regression model to test if the effect of settlement intentions on the respective integration markers (language proficiency, contact to Germans, feeling welcome, and employment) differ for participants who dropped out of the sample in the next wave compared to those who stayed. REs=random effects, AMEs=average marginal effects, RE-reg=random-effects linear regression model, RE-logit=random-effects logistic regression model. Attrition in the next wave is measured as (0) "stayed" and (1) "attrited"; settlement intentions were measured as (1) permanent and (0) temporary settlement intentions; language proficiency was measured using a mean index of three self-assessed variables on speaking, reading, and writing the German language, ranging from (0) not at all to (4) very good; contact with Germans as frequency of contact, ranging from (0) never to (5) daily; the feeling of being welcome in Germany on a scale from (0) not at all to (5) fully; employment variable as being (1) employed and (0) not employed. ***p<0.001, **p<0.01, *p<0.05

Table A4.7. Sensitivity analysis of integration–settlement effect for restricted sample

DV: Settlement intentions (0) "temporary", (1) "permanently"	Model 1	Model 2	Model 3	Model 4
Dependent variable (DV):	Settlement	Settlement	Settlement	Settlement
Effects displayed:	AME	AME	AME	AME
Language proficiency previous wave	0.053***	–	–	–
Contact with Germans previous wave	–	0.020***	–	–
Feeling welcome in Germany previous wave	–	–	0.038***	–
Employment in previous wave	–	–	–	n.s.
Cleaned	-0.249***	-0.293***	-0.201***	-0.257***
Interaction term – respective "integration marker"*cleaned	**n.s.**	**0.011***	**n.s.**	**n.s.**
Number of observations (person-wave)	7,942	7,936	7,939	7,921
Number of cases (person)	3,711	3,710	3,707	3,703
Model type	RE-logit	RE-logit	RE-logit	RE-logit

Note: We conducted four random-effects logistic regression models to test if the effects from the respective integration marker (language proficiency, contact with Germans, feeling welcome, and employment) to settlement intentions differ for observations (person-waves) which were excluded from the analytic sample because of sample restriction criteria (see table A5) compared to those which were included in the analytic sample (also referred to as the restricted sample). AME=average marginal effect, RE-logit=random-effects logistic regression model. The variable cleaned in the next wave indicated if participants were cleaned from the sample in wave t+1 due to sample restrictions. Settlement intentions were measured as (1) permanent and (0) temporary settlement intentions; language proficiency was measured using a mean index of three self-assessed variables on speaking, reading, and writing the German language, ranging from (0) not at all to (4) very good; contact with Germans as the frequency of contact, ranging from (0) never to (5) daily; the feeling of being welcome in Germany on a scale from (0) not at all to (5) fully; employment variable as being (1) employed and (0) not employed. ***p<0.001, **p<0.01, *p<0.05

Table A4.8. Sensitivity analysis of settlement–integration effect for restricted sample

DVs: Different integration markers	Model 1	Model 2	Model 3	Model 4
Dependent variable (DV):	Language	Contact	Welcome	Employment
Effects displayed:	REs	REs	REs	AMEs
Settlement intentions	0.196***	0.317***	0.206***	n.s.
Cleaned	n.s.	n.s.	n.s.	n.s.
Interaction term – respective "integration marker"*cleaned	**n.s.**	**n.s.**	**n.s.**	**n.s.**
Number of observations (person-wave)	7,942	7,936	7,939	7,921
Number of cases (person)	3,711	3,710	3,707	3,703
Model type	RE-reg	RE-reg	RE-reg	RE-logit

Note: We conducted four random-effects logistic and a random-effects logistic regression model to test if the effects of settlement intentions on the respective integration markers (language proficiency, contact to Germans, feeling welcome, and employment) differ for observations (person-waves) which were excluded from the analytic sample because of sample restriction criteria compared to those which were included in the analytic sample (also referred to as the restricted sample). REs=random effects, AMEs=average marginal effects, RE-reg=random-effects linear regression model, RE-logit=random-effects logistic regression model. The variable cleaned in the next wave indicated if participants were cleaned from the sample in wave t+1 due to sample restrictions. Settlement intentions were measured as (1) permanent and (0) temporary settlement intentions; language proficiency was measured using a mean index of three self-assessed variables on speaking, reading, and writing the German language, ranging from (0) not at all to (4) very good; contact with Germans as the frequency of contact, ranging from (0) never to (5) daily; the feeling of being welcome in Germany on a scale from (0) not at all to (5) fully; employment variable as being (1) employed and (0) not employed. ***p<0.001, **p<0.01, *p<0.05

Table A4.9. Average development of settlement intentions and integration within individuals over time

Model	DV	IV	Effect	(SE)	Obs.
Model 1: fixed effects	Settlement intentions	Wave	0.032***	(0.003)	3,917
Model 2 fixed effects	Language	Wave	0.285***	(0.004)	3,918
Model 3 fixed effects	Contact	Wave	-0.168***	(0.010)	3,918
Model 4 fixed effects	Welcome	Wave	-0.234***	(0.006)	3,918
Model 5 fixed effects	Employment	Wave	0.037***	(0.002)	3,918

Note: We conducted five fixed-effects regression analyses to model the average development of settlement intentions and integration (language proficiency, contact with Germans, feeling welcome, and employment) within individuals over time. The variable wave indicates the wave number and ranges from (1) to (4). Settlement intentions were measured as (1) permanent and (0) temporary settlement intentions; language proficiency was measured using a mean index of three self-assessed variables on speaking, reading, and writing the German language, ranging from (0) not at all to (4) very good; contact with Germans as the frequency of contact, ranging from (0) never to (5) daily; the feeling of being welcome in Germany on a scale from (0) not at all to (5) fully; employment variable as being (1) employed and (0) not employed. $^{***}p<0.001$, $^{**}p<0.01$, $^{*}p<0.05$

CHAPTER 5

ROMANTIC POTENTIAL AND HOMOPHILY IN EGO-CENTRIC FEMALE NETWORKS OF MALE REFUGEES IN GERMANY

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Abstract

Forced migration may disrupt social networks and complicate partnership formation, especially for young refugees at an active partnership-forming age. These challenges are often heightened by skewed sex ratios among co-ethnics. In the absence of network data, little is known about the availability of social networks with romantic potential. We used newly collected ego-centric PARFORM data from Germany (2022–2023) to examine the presence and romantic potential of women (*alters*; *N*=1,655) in the networks of young male Syrian and Afghan refugees (*egos*; *N*=1,139) who arrived unmarried between 2014-2018. We employed OLS and FE models to examine the presence of up to three offline and online female contacts and how romantic aspirations are associated with cultural homophily in terms of religion and country of origin. Findings reveal, *first*, that 42% of our sample did not report any female contacts. Male refugees reporting at least one woman in their social network were, on average, more educated, less religious, and scored higher on a modern values scale. *Second*, among female network contacts, refugees showed a stronger romantic aspiration for women who shared their religion, regardless of country of origin. Perceived parental preferences for cultural homophily did not moderate this relationship. Our findings suggest the importance of religious homophily for refugees' romantic aspirations and point to the need for further investigation into the partnership prospects of a potential risk group—refugees without female contacts.

5.1. Introduction

Forced migration is a challenging life event that may disrupt young refugees' access to social networks (Ekoh et al., 2023; Kraly et al., 2023), potentially interrupting their partnership formation plans. These challenges are often compounded by the limited availability of potential co-ethnic partners in the refugees' host countries. Given that homogamous unions—within the same ethnic or religious group—remain more prevalent than interethnic ones in various societies (Adserà & Ferrer, 2014; Dederichs & van Tubergen, 2025; González-Ferrer, 2006; Kalter & Schroedter, 2010), it is unclear how such unions develop under conditions of displacement, particularly during young adulthood, a period typically associated with active partner-seeking. This uncertainty is complicated by the pressure of a "social clock" (Neugarten et al., 1965)—culturally expected timing to engage in partnerships and marriage. Young refugees, who navigate their aspirations within disrupted networks and constrained co-ethnic partner markets, may face additional challenges in meeting cultural expectations around partnership timing.

The main contribution of this study is to examine the romantic potential of young male refugees' networks and the cultural factors shaping their partnership aspirations within their social networks. Understanding these dynamics is crucial, as access to female networks and the ability to realize romantic aspirations are key indicators of refugees' social integration (Dustmann, 1996), intentions to stay (Hannafi & Marouani, 2023), and autonomy in decisions (Bilgili et al., 2022; de Haas, 2021). Unrealized prospects on the partnership market may place refugees at heightened risk of adverse outcomes, such as mental health issues and loneliness (Belau et al., 2021; Eggerman et al., 2023; Song et al., 2024).

In the present study, we analyze novel ego-centric data on female networks of young male refugees from Syria and Afghanistan who arrived in Germany unmarried between 2014 and 2018. The majority (over 70%) of them arrived at age 16-30 (BAMF, 2016, 2023) without

accompanying family members (Damir-Geilsdorf & Sabra, 2018). Because men constituted a large numerical majority in this migration wave, they faced a pronounced scarcity of co-ethnic women (Spörlein et al., 2020), limiting opportunities for co-ethnic partnerships. Partnerships with women from other backgrounds were, however, constrained by cultural barriers, particularly differences in religiosity between predominantly Muslim sending societies and more secular host contexts (Fuchs et al., 2021; Norris & Inglehart, 2011). Prior studies have demonstrated that the majority population holds less favorable attitudes toward inter-ethnic relationships, particularly with Muslim partners (Cila & Lalonde, 2014; Czymara & Schmidt-Catran, 2017; Helbling, 2014) and those with higher levels of religiosity (Buunk & Dijkstra, 2017). These challenges were further compounded by refugees' legal insecurities: only those with recognized protection status obtained unrestricted labor market access and eligibility for language courses—key arenas for integration and partnership formation (Kosyakova & Brenzel, 2020). Taken together, demographic imbalances, cultural differences, and legal insecurities significantly shaped the partnership prospects of Syrian and Afghan refugees in Germany, making them a compelling case for studying union formation under conditions of displacement.

Major disruptions such as war often unsettle social relationships (Carr, 2018; Elder, 1994, 2000), and in cases of forced migration, they can undermine ties to family, friends, and potential partners, requiring individuals to rebuild their networks (Elder, 1994). The formation of new, and potentially romantic, ties is guided by individual aspirations and efforts to optimize available resources. A major force guiding this process is homophily, a tendency to seek partners with similar cultural or socio-economic characteristics (Leszczensky & Pink, 2019; Lewis, 2015).

In this study, we specifically investigate young male refugees' preferences for cultural homophily with women sharing the same religion or country of origin. A recent study that

implemented a factorial vignette survey suggested that religious homophily plays a significant role in shaping romantic partnerships among migrants (Heyne et al., 2025). Beyond this research on attitudes toward hypothetical partners, no study has employed network data to examine young male refugees' actual female contacts within their networks in relation to their romantic aspirations. As female network members can potentially become romantic partners, our perspective focuses on early-stage aspirations for romantic partnerships—prior to actual relationship formation—while taking into account women's cultural background.

Given that individual romantic aspirations can be further influenced by "third parties", such as parents (Kalmijn, 1994), we further examine the moderating role of parental expectations, specifically considering how they may alter individual romantic aspirations. Syrian and Afghan refugees, who tend to have comparatively high levels of religiosity (Fuchs et al., 2021), may place higher importance on cultural and parental alignment in partner selection. At the same time, structural barriers, such as skewed sex ratios and the limited availability of women with the desired characteristics in the host country, may constrain their opportunities to connect with culturally similar women. Taken together, these factors position Syrian and Afghan refugees as a unique case for studying romantic potential under conditions of social and demographic constraint.

5.2. Theoretical background

5.2.1. Forced migration as a disruptive life event

International migration reflects a relatively permanent collective displacement away from home, either voluntary or forced (Tyldum, 2021). Voluntary migration is a conscious choice to move and pursue unmet goals, while forced migration, first introduced by Petersen (1958), involves limited decision-making power without prior intention to move, often in response to life-threatening circumstances, as in the case of refugees (Zetter, 2018). With the rise of externally displaced individuals, the global refugee population continues to grow. As of 2024, two-thirds under UNHCR's mandate originate from Syria, Afghanistan, Venezuela, and Ukraine (UNHCR, 2024).

However, forced migration is more than mere displacement. It is a major life event that disrupts social ties and complicates the formation of new ones. It also requires refugees' agency in reconstructing their social systems (de Haas, 2021; Zetter, 2018).

A lens through which to view the disruption of ties is the life course perspective (Elder, 1994, 2000; Alwin et al., 2018). This perspective posits that lives are shaped by the timing, sequencing, and historical context of life events, emphasizing how major historical events, such as wars, may disrupt the expected life trajectories of individuals (Alwin et al., 2018). A core element of the life course perspective is the concept of "linked lives" (Elder, 1994; Elder et al., 2003; Elder & Shanahan, 2007), which highlights that individuals are embedded in interdependent relationships that may be disrupted during major life transitions. These ties may include family, friendships, and romantic partnerships. Moreover, the timing of such transitions plays a critical role. Individuals are often expected to follow a "social clock" (Neugarten et al., 1965)—a culturally shaped timeline for life events such as marriage and romantic relationships. Forced migration can interrupt these normative life plans. In our case, Syrian and Afghan

refugees are predominantly young men who were displaced during a life stage of an active partnership-forming age. As a result, the anticipated timing and sequence of these life events may be disrupted.

The challenge of forming new social ties in the host society comprises different dimensions, including social and economic integration (Kraly et al., 2023). Refugees are often required to reestablish their social ties and position in the labor market almost from scratch (Dustmann, 1996; Heckmann, 2005). Due to the unplanned nature of their migration, refugees frequently lose previous social statuses and must acquire new ones. This process of status reconstruction can play a crucial role in enabling refugees to build new friendships or form romantic relationships.

5.2.2. Emergence of romantic relationships

Our point of departure is an established theoretical framework which emphasizes the roles of opportunity structures, personal preferences, and third parties' influences in partnership formation (Kalmijn, 1998). An extension of this perspective to relationship initiation has highlighted the importance of contextual proximity, motivation, and third-party assistance (Sprecher et al., 2015).

A first necessary condition for initial interaction is that individuals are "proximal to each other" (Sprecher et al., 2015)—whether geographically or virtually—thereby creating opportunities to encounter potential partners. Romantic relationships may develop across a variety of social contexts (e.g., workplaces, social gatherings, and online platforms) and within social networks, emerging from the constraints of existing opportunity structures.

Second, the motivation to initiate a romantic relationship is shaped by multiple interrelated factors. Readiness for a relationship often increases the likelihood of engaging in behaviors that facilitate interaction. At the same time, significant life events—including forced

displacement—may necessitate periods of adjustment before individuals feel prepared to pursue new relationships. Attraction represents another central factor, reflecting the compatibility of physical, psychological, and personal characteristics. Attraction frequently occurs between individuals who share similarities (Byrne et al., 1970; Byrne & Clore Jr., 1967), whether through assortative mating or homogamy (Becker, 1974; Buss, 1985). More broadly, these motivations are rooted in the fundamental human need to belong (Gere & MacDonald, 2010) and the drive to form attachments as social beings (Bretherton, 1992).

Finally, third parties, including family, influence partner searches through norms and social sanctions (Kalmijn, 1998; Maddox, 2019). Social networks, as a form of third-party assistance, primarily provide opportunities to meet preferred partners (Sprecher et al., 2002). Family and friends often play both direct and indirect roles in shaping access to potential partners and individual aspirations, while also reinforcing patterns of homogamy (Buunk et al., 2012). Parks (2017) found that most people in relationships received assistance from their family or friends in the process of relationship initiation. Therefore, the initiation of romantic relationships emerges from social interactions within networks.

5.2.3. Cultural homophily in partnership aspirations

5.2.3.1. Individual preferences in partnership aspirations

In the realm of motivation to initiate a romantic relationship—hereafter termed romantic aspiration and operationalized as the imagination of such a relationship—individuals exhibit a tendency to prefer partners who share similar characteristics, such as religion, ethnicity, or country of origin. This phenomenon, also referred to as homophily, has been widely studied in economic theories of marriage (Becker, 1974), psychological research (Newcomb, 1956), and has served as a foundational concept in the sociological literature on partner selection (Kalmijn, 1994, 1998; McPherson et al., 2001).

Empirical studies have consistently shown that individuals are more likely to be attracted to and form lasting partnerships with those who share similar norms, values, and attitudes (Kalmijn, 1998; Clarkwest, 2007). The idea that similarity attracts has long been a cornerstone in the study of interpersonal relationships (Newcomb, 1956). This hypothesis has been consistently supported, demonstrating that even among strangers, shared characteristics enhance mutual attraction (e.g., Byrne, 1961; Byrne et al., 1970). It holds true not only for romantic relationships but also for friendships at earlier stages in life, when pupils in schools prefer to be friends with co-ethnic peers compared to inter-ethnic ones (Leszczensky & Pink, 2015).

Several interrelated mechanisms underlie this preference for similarity. One explanation is the desire to preserve a group's distinct cultural and social identity, which is reinforced through relationships that maintain in-group homogeneity (Tajfel, 1981). Shared backgrounds foster mutual understanding, as partners interpret each other's behaviors and intentions accurately and empathetically (DiMaggio & Mohr, 1985; Kalmijn, 1994). This mutual comprehension not only enhances relationship quality but also reduces potential conflicts (McPherson et al., 2001) and contributes to greater relationship stability and longevity (Schwartz, 2013). Similarity between partners is further associated with increased emotional well-being and marital harmony (Clarkwest, 2007). Partners who share cultural and social backgrounds often experience a deeper sense of connection, support, and satisfaction. Beyond individual benefits, these partnerships foster the transmission of cultural and socioeconomic resources to the next generation, as shared values create a stable environment for children's development (Kalmijn, 1991).

For Syrian and Afghan refugees, the preservation of cultural identity might be of higher priority compared to other characteristics. A qualitative study of Muslim migrants in Germany has shown that aspirations for culturally homogenous matches were of the highest importance

(Hense & Schorch, 2013). Another study supported this conclusion by demonstrating that cultural factors play a more significant role than structural ones, such as opportunities or places to meet (Kalmijn & Van Tubergen, 2010). During forced displacement, when refugees' countries of origin are under attack, the preservation of cultural identity within partnerships often becomes a primary concern. In our study, we specifically focus on cultural homophily as a predictor of imagining a relationship with women in refugees' networks.

5.2.3.2. Parental preferences for homophily

Refugees' preferences for cultural homophily may be further reinforced by third parties, such as close or extended family, peers, or religious communities through norms of religious and ethnic endogamy and sanctions when these norms are violated (Buunk et al., 2012; Huschek et al., 2012; Kalmijn, 1998; Kogan, Kuhlemann and Perleth 2025). Parents may favor homogamous unions for their children, believing that culturally shared mating (Kalmijn, 1994) preserves cultural heritage and promotes marital stability. Parents can be involved in the partner selection directly via matchmaking, such as finding a suitable partner during family gatherings or visits to the home country (Kalmijn, 1998; Maddox, 2019; Topgül, 2015) or through control strategies, including supervision or restriction (Apostolou, 2022). Indirect influence may occur via the cultural transmission of homophily preferences, along with other cultural values and knowledge (Berry et al., 2011; Cavalli-Sforza & Feldman, 2020; Maddox, 2019; Kogan, Kuhlemann, et al. 2025).

The indirect influence through the transmission of culture and norms is the primary focus of this paper. This cultural transmission of preferences for homophily from parents to children occurs through the processes of enculturation and socialization (Maddox, 2019). While enculturation is the natural process of absorbing culture by being surrounded by its members, socialization involves direct instruction and guidance from parents, who act as the primary agents of socialization, about their own culture (Berry & Georgas, 2009). Therefore, cultural

norms, values, and practices can be transmitted from parents to offspring through socialization (Min et al., 2012), serving the purpose of preserving culture and norms. Since values and norms are shaped early by primary socialization agents like parents and remain more stable than those formed during secondary socialization (Maddox, 2019), transmitted homophily preferences may persist into adulthood.

Research has shown that individuals with a migration background often meet their partners through family connections and advice (Hamel et al., 2013; Kogan, Kuhlemann, et al., 2025; Milewski & Hamel, 2010; Parks, 2017). A recent study found that Syrian and Afghan refugees were more likely to form homogamous unions based on nationality, religion, denomination, and language when partners were met through family networks, when parents were involved in selection, or when parents preferred endogamy (Kogan, Kuhlemann, et al., 2025).

5.2.4. Research questions and expectations

We examine the role of cultural homophily in shaping refugees' romantic aspirations, measured as the imagination of a relationship, by addressing the following three research questions:

1) Given their *available networks*, are refugees more likely to imagine a relationship with women who share their religion or country of origin compared to women of a different religion or country of origin?

2) Are refugees with *diverse networks* of female contacts in terms of religion or country of origin more likely to imagine a relationship with women who share the same religion or country of origin?

3) Do perceived parental preferences for a culturally similar partner reinforce homophily in refugees' romantic aspirations?

The first question addresses cultural homophily across different network structures, combining both culturally diverse and homogeneous female networks. The second question, in turn, speaks directly to aspirations for cultural homophily within culturally diverse networks. This distinction allows us to disentangle individual aspirations, revealed under conditions of choice, from structural selection into networks that are culturally homophilous. Finally, the third question addresses the moderating role of parents in the process of relationship initiation.

Building on the theoretical foundations outlined above and corresponding to the study's research questions, we examine the following expectations:

Hypothesis 1: Male refugees are more likely to imagine a relationship with women in their network who share ***(a)*** the same religion or ***(b)*** country of origin than with women who do not.

Hypothesis 2: Male refugees with culturally diverse networks are more likely to imagine a relationship with women in their network who share ***(a)*** the same religion or ***(b)*** country of origin than with women who do not.

Hypothesis 3: The positive relationship in H1 and H2 intensifies if parents place higher importance on a refugee sharing ***(a)*** the same religion or ***(b)*** country of origin with a potential partner.

5.3. Method

5.3.1. Data

We used cross-sectional data from the first wave of the PARFORM survey (pre-publication version v2.0, for technical reports see (Kogan, Heyne, et al., 2025). PARFORM was conducted between 2022 and 2023 using both CAPI (computer-assisted personal interviews) and CAWI (web survey) modes. The sample comprised men with Syrian or Afghan citizenship (born 1984–2002) who arrived in Germany unmarried between 2014 and 2018. In Wave 1, 3,412 individuals participated, with 33% of interviews conducted using CAPI.

One section of the survey, conducted using CAPI, focused on collecting detailed information about the ego-centric female networks of young male refugees, allowing up to three contacts to be reported. First, refugees (*egos*) were asked to report a free number of female contacts with whom they are currently in frequent contact, at least once per week—online or in-person—excluding those with whom they have a romantic relationship or familial ties, such as sisters, daughters, aunts, or mothers. Second, the interviewers asked questions about a maximum of three of the reported women (*alters*). All the interviewers were male, and most spoke the same language as the respondents. Anchors (*egos*) provided the names of up to three women and further information about each, including their cultural characteristics such as religiosity and country of origin. Additionally, they were asked to report each woman's age, education, and how they met.

5.3.2. Sample selection

Our analysis consists of two parts: 1) a descriptive comparison based on whether any women were reported in a network or not; and 2) for those who reported at least one female contact, an assessment of factors associated with imagining a relationship with women, focusing on homophily preferences in terms of religion and country of origin. The analytic sample of the

first part comprises 1,139 anchors (refugees) and 1,655 anchor-woman dyads; 665 anchors reported at least one woman in their network, and 474 did not report any (see Appendix A5, Table A5.1, and Figure A5.1 for a sample selection flowchart). This means that 42%—a substantial portion of our sample—had no female contacts in their social network. Of these, 23% are single respondents. Even if one excluded individuals who are either married or partnered, the respective proportion of single anchors who did not report any contacts is still high—at 41%. Because male refugees could report both in-person and online female contacts who can be contacted across borders, the absence of any reported women implies that the respondents did not have female contacts even in their country of origin. The second part of the analysis includes 506 anchors and 1,208 anchor-female dyads. This sample is slightly smaller because we excluded refugees who mentioned female contacts but did not provide any additional information about them (e.g., their religion, origin, education, way of contact etc.) (see Appendix A5, Figure A5.1). Therefore, this sample contains only those anchors who reported at least one characteristic of a mentioned female contact.

In addition to singles, our sample includes married respondents as well as those in either committed or casual relationships. A substantial proportion of respondents who were married or in a relationship reported that they could imagine a romantic relationship with their female contacts (almost 17% of ego-alter dyads among married and 30% among partnered respondents, see Appendix A5, Table A5.2). The majority of our respondents identify as Muslim, and under Sharia law, men are theoretically allowed to have several wives (Peters & Bearman, 2014). This religious and cultural context may underlie romantic aspirations even while in a relationship. To prevent selective exclusions, we retained married and partnered anchors in our sample. Sensitivity analyses excluding married respondents and including only singles are presented in the Appendix (see Appendix C5, Figures C5.3 and C5.4). These

additional checks demonstrate that our results remain robust even when married and parented respondents are excluded.

5.3.3. Descriptive overview

Table 5.1 provides a descriptive overview of our analytic sample based on whether male refugees reported any women or not. On average, male refugees were aged 29 years old. Of the respondents who reported at least one woman in their network, nearly 66 percent listed three women—the maximum number allowed by the questionnaire. Although the data was collected from both Syrian and Afghan male refugees, our sample is primarily composed of Syrian refugees. Of the anchors who reported at least one woman, 94 percent were Syrian. Because a sensitivity analysis that excluded Afghan respondents produced identical results (see Appendix C5, Figure C5.2), we left the Afghan cases in our main analysis.

Overall, both groups of anchors—who reported or did not report any women—placed high importance on religion and identified as Muslim. However, those who did not report any women showed even stronger indicators of religiosity and Muslim faith, and scored lower on an index of modern values. Male refugees who reported any women were positively selected in terms of integration and socio-economic indicators: a higher proportion were highly educated, had better German language skills compared to those who did not report any women, and rated themselves as more social. Additionally, interviewers rated them as more attractive. This suggests that refugees who did not report any women in their network—particularly those who are unmarried or unpartnered and have no female contacts—may constitute a particularly vulnerable group not only in terms of access to female contacts but also in terms of their broader social integration.

Table 5.2 presents the characteristics of reported women, showing that, on average, women in the networks of male refugees are 29 years old—similar in age to the anchor respondents.

Considering that reported female contacts were not necessarily limited to those with romantic potential, we did not exclude older women from the list of alters. We tested the robustness of our results by excluding the reported women who were over the age of 60 from the sample (see Appendix C5, Figure C5.5). The results remained robust.

Table 5.1. Descriptive statistics at anchor level

	Reported up to 3 women					Did not report women					
Variable	*M* / %	*SD*	Min	Max	*N*	*M* / %	*SD*	Min	Max	*N*	Variable description
Number of women reported					665					474	based on *"I will now ask you some questions one after the other about a maximum of 3 of these women. Let's start with the first woman. To answer these questions more easily, I first need the first letter of the first and last name"*
0						100.00				474	
1	16.39				109						
2	18.35				122						
3	65.26				434						
Country of origin											
Origin Afghanistan	.06		0	1	665	.14		0	1	474	based on *"Which country were you born in?"* 0 – Syria 1 – Afghanistan
Cultural components											
Religion Muslim	.82		0	1	626	.92		0	1	439	based on *"What religion and denomination do you belong to?"* 0 – Not Muslim (Christianity / Buddhism / Hinduism / Judaism / Another religion / No religion) 1 – Muslim (Islam: Sunni / Islam: Shiite / Islam: Alevi / Islam: Druze / Islam: other)
Importance of religion	.60		0	1	629	.75		0	1	433	based on *"How important is religion to you? Please answer on a scale of 1 (not important at all) to 5 (very important)"* 0 – Not important at all (1) / not important (2) / neither important nor unimportant (3) 1 – Important (4) / very important (5)
Modern values index	4.38	2.69	1	10	534	3.21	2.11	1	10	363	based on *"Please give me your opinion on the following statements: (1) sex before marriage, (2) living with the partner without being married, (3) marriage between two men, (4) abortion, (5) divorce and please answer using a scale from":* 1 – Under no circumstances OK to 10 – In any case, fine
Socio-economic components											
Employment status					663					459	based on *"What is your main occupation currently?"*
Not employed	31.37				208	34.86				160	0 – Unemployed / non-employed / student
In training	13.88				92	10.46				48	1 – Apprenticeship / vocational training etc.
Employed	54.75				363	54.68				251	2 – Full-time / part-time
University degree	.20		0	1	661	.14		0	1	451	based on *"What was your highest level of education before moving to Germany?"* 0 – No University degree 1 – University degree
German language skills	3.98	0.83	1.67	5	665	3.67	0.83	1	5	471	additive index based on *"How well can you (1) speak, (2) read, (3) write in German? Answer on a scale of 1 (not at all) to 5 (very well)"*

Source: PARFORM data, W1 2022-2023. *N* are number of anchors. Analytical weights are applied. Continued on the next page

Table 5.1 – continued

	Reported up to 3 women					Did not report women					
Variable	*M* / %	*SD*	Min	Max	*N*	*M* / %	*SD*	Min	Max	*N*	Variable description
Personal characteristics											
Mental health	3.71	1.05	1	5	663	3.71	1.15	1	5	463	*"On a scale of 1 (bad) to 5 (very good), how would you describe the current state of your mental health?"*
Anchor sociable	4.14	0.99	1	5	664	3.98	1.08	1	5	456	*"I am outgoing and sociable"* – self-evaluation: 1 – Strongly disagree 5 – Strongly agree
Anchor's attractivity	5.12	1.37	1	7	634	4.84	1.51	1	7	432	*"How attractive is the respondent?"* – interviewer evaluation: 1 – Completely not attractive 7 – Completely attractive
Co-origin contacts											
Proportion of co-origin male friends	.74		0	1	654	.80		0	1	398	based on *"I will now read out some activities, and places where one can do these activities. You then tell me regarding these places and activities, how high the proportion of other people with certain characteristics is":* 0 – None or very few (1) / Less than half (2) 1 – About half (3) / More than half (4) / All or almost all (5) Main activity = employment / school / training / studies / internship
Proportion of German male friends	.28		0	1	478	.29		0	1	245	
Proportion of co-origin people in the neighborhood	.20		0	1	607	.30		0	1	365	
Proportion of co-origin people in the main activity	.20		0	1	620	.25		0	1	385	
Parental expectations											
Perceived parental preference for ethnic homophily	.36		0	1	651	.42		0	1	424	based on *"On a scale from 1 (not important at all) to 5 (very important), how important is it or was it to your parents that your partner comes from the same country of origin as you / has the same religion as you":* 0 – Not important at all (1) / not important (2) / neither important nor unimportant (3) 1 – Important (4) / very important (5)
Perceived parental preference for religious homophily	.56		0	1	639	.58		0	1	419	
Demographic components											
Age	28.60	4.46	20	39	665	29.39	4.56	20	39	474	*"How old are you?"*
Years in Germany	7.49	0.90	4	9	665	7.60	0.83	4	9	474	based on *"When did you move to Germany?"*
Partnership status					647					441	based on *"What is your marital status today?"* and *"Are you currently in a relationship?"*
Single	57.96				375	58.73				259	0 – Single and indicated that is not in a relationship
In a relationship	29.52				191	14.06				62	1 – In a committed / casual relationship
Married	12.52				81	27.21				120	2 – Married

Source: PARFORM data, W1 2022-2023. *N* are number of anchors. Analytical weights are applied.

Table 5.2. Descriptive statistics – alter level

	Reported up to 3 women					
Variable	*M* / %	*SD*	Min	Max	*N*	Variable description
Dependent variable						*"Can you imagine a relationship with this woman?"*
Imagine a relationship	2.08	1.36	1	5	1183	1 – Absolutely not 5 – Absolutely yes
Characteristics of women						
Co-religious	.46		0	1	943	based on *"What religion and denomination do you belong to?"* and *"Which religion and denomination does this woman belong to?"* 0 – Belong to different religion 1 – Share the same religion
Co-origin	.37		0	1	1181	based on *"Which country were you born in?"* and *"Which origin does this woman have? (Syrian (1), Afghan (2), German (3), Other (4))"* 0 – Belong to different origin, 1 – Share the same origin
Age of a woman	28.97	8.80	18	82	1126	*"How old is this woman?"*
Woman's university degree	.45		0	1	1107	based on *"What is the highest level of education she acquired?"* 0 – No University degree 1 – University degree
Way of contact to a woman					1203	*"How do you usually contact this woman?"*
In person	23.36				281	1
Internet/Phone	39.65				477	2
Both	36.99				445	3
How met a woman					1196	*"How did you meet this woman?"*
Main activity (uni, work etc.)	45.82				548	1
Family/Friends	22.83				273	2
Dating apps/Social media/Other	31.35				375	3

Source: PARFORM data, W1 2022-2023. *N* are number of observations (anchor-alter dyads). Analytical weights are applied.

5.3.4. Variables

5.3.4.1. Dependent variable

We examined an outcome that measures a potential romantic aspiration with each female in the network of refugees. It was based on the survey question "Can you imagine a relationship with this woman?" and answered on a scale from 1—"Absolutely not" to 5—"Absolutely yes". This outcome was measured separately for each *alter* (anchor-woman dyad) in the data. At the alter level, the average score fell between low and medium (M = 2.08, SD = 1.36) (see Table 5.2).

5.3.4.2. Independent variables

To capture tendencies of cultural homophily in romantic aspirations, we generated two independent variables—whether a male refugee shared 1) the same religion and 2) the same country of origin with the woman. Co-religiosity was coded as 1—"Same religion", and as 0—"Different religion". An anchor (refugee) and alter (woman) shared the same religion if the anchor reported the same religion for himself and an alter from the following list of options: Islam Sunni, Islam Shiite, Islam Alevi, Islam Druze, Other denomination of Islam, Christianity, Hinduism, Judaism, Other religion, or No religion. A more parsimonious operationalization of this variable— considering any shared branch of Islam between an anchor and a woman as co-religious—did not yield substantially different results (see Appendix C5, Figure C5.6), though the main effects were slightly weaker. The co-origin variable was coded 1—"Same origin", and as 0—"Different origin." An anchor (refugee) and an alter (woman) were considered to share the same origin if both were Syrian or both were Afghan.

Respondents were allowed to indicate if they did not know the woman's religion or country of origin. In such cases, these "don't know" responses were coded as missing values in the dataset but were not excluded from the sample. These cases were retained in our sample to ensure that a refugee who reported the religion but not the country of origin of a woman (or vice versa) could still contribute to the estimation of the co-religiosity effect. Similarly,

dependent and control variables included missing values and were coded accordingly in the dataset. These missing values were not removed from the sample to preserve information from as many anchors as possible. The descriptive tables report the percentages for variables without accounting for missing values, as the aim was to present the shares relative to the observed categories, treating them as 100%.

5.3.4.3. Control variables

We controlled for potential confounders in the relationship between cultural homophily and imagining a relationship. *First*, demographic and socio-economic characteristics of refugees were included: age, years in Germany, employment status, level of education (university degree or less), and partnership status. Older refugees may have fewer opportunities to engage with culturally diverse female networks, but may imagine relationships more readily. Refugees with shorter tenure in Germany and fewer resources—captured through a lack of gainful employment or university degree—may report women who share their religion or country of origin. Partnership status may also influence openness to imagining new relationships.

Second, we accounted for personal characteristics of refugees (sociability, attractiveness, mental health) and broader opportunity structure (number of male friends, proportion of co-origin people in the neighborhood and in the main activity). More sociable and attractive individuals with larger friendship networks and better mental health are more likely to engage with diverse female networks and to imagine relationships. By contrast, refugees in contexts with a higher share of co-origin individuals are more likely to form homophilous female networks and imagine corresponding relationships.

Third, to test our Hypotheses 1 and 2, we controlled for perceived parental preferences for religious and ethnic homogamy in their offspring's partnerships, as stronger perceived parental preferences may directly or indirectly encourage refugees to select into culturally homophilous female networks and imagine relationships within them.

Finally, we controlled for characteristics of women (alters): number of women reported, age, way of contact, and university degree. Refugees with more female contacts may include more culturally diverse women in their networks, reducing the role of homophily. Younger and more educated women in these networks tend to be more culturally diverse and their presence increases the likelihood of imagining relationships. In-person contact increases exposure to report women from different religions and countries of origin, increasing openness to rate them as potential partners. A detailed description and coding schemes of all control variables can be found in Tables 5.1 and 5.2.

5.3.5. Models

We employed both Pooled Ordinary Least Squares (POLS) regression analyses and Fixed-Effects Models (FE) for within-estimation to model romantic aspiration measured on a 5-point scale of imagining a relationship with women in one's network. We additionally estimated logistic regressions for a dichotomized dependent variable measured as 1—"At least maybe" (values 3, 4, 5), 0—"Otherwise" (values 1, 2). This additional check did not yield different results (see Appendix C5, Figure C5.1). We proceeded with the 5-point scale outcome in the main analysis. All models accounted for the nested structure of our data by using clustered standard errors at the anchor level.

To test whether anchors are more likely to imagine a relationship with a female alter if they both share the same religion or country of origin (Hypothesis 1) and whether—given a diverse network—an anchor is more likely to imagine a relationship with the co-religious or co-origin woman than with one from a different religion or country of origin (Hypothesis 2), we estimated two models (see Appendix B5, Table B5.1, Models 1-2). Model 1 is an OLS model that represents total variance, while Model 2 is an FE model restricted to within-anchor variance in imagining a relationship based on co-religiosity and co-origin. In our sample, approximately 42% of the total variance is between anchors (see Appendix A5, Table A5.3).

We present the findings from these models graphically in the form of marginal effects on absolute scales pertaining to scale-point differences (Figure 5.1). To test whether the positive relationships in Hypothesis 1 and Hypothesis 2 are stronger with higher importance parents place on a refugee sharing the same religion or country of origin with a potential partner (Hypothesis 3), we interacted the co-religious indicator with parental importance for religious homophily (see Appendix B5, Table B5.2, Models 3-5), and the co-origin indicator with parental importance for origin-based homophily (see Appendix B5, Table B5.3, Models 4-6). We coded the parental importance for religious or origin-based homophily variables as 1—"Important", 0—"Not Important".

5.4. Results

Our results are presented in graphical form in Figures 5.1 and 5.2. Figure 5.1 pertains to Hypotheses 1 and 2 and illustrates the predicted margins of romantic aspiration—operationalized as imagining a relationship with women in one's network—women who share either religion (panel *a* to the left) or country of origin (panel *b* to the right) with the ego. The figure compares estimates from both between-within (POLS) and within-individual (FE) models, with all specifications controlling for a range of potential confounders.

Sharing the same religion with a woman was associated with being more confident (a higher score) in imagining a relationship with them compared to inter-religious women, independent of women's origin and other confounders. The estimated coefficient corresponds to an increase of 0.33 points on the 5-point scale of imagining a relationship. This effect is small to moderate in size, accounting for 0.24 *SD* of the overall variation (*SD*(outcome)=1.36) (see also Appendix B5, Table B5.1 for details, Model 1). From a within-anchor perspective, if a male refugee had a choice between a co-religious female contact and one of a different religion in his female network, the difference was of a similar magnitude, amounting to 0.36 scale points or 0.26 *SD*, holding a woman's origin and other alter-variant confounders constant.

In relative terms, the predicted mean score for romantic aspiration toward a co-religious woman was approximately 15% higher than the corresponding prediction for an inter-religious woman (see Appendix B5, Table B5.1 for details, Model 2). We did not find substantial differences between co- and inter-origin women, whether controlling for religion or not—if the woman was from the same country of origin did not appear to matter.

Additionally, we estimated an interaction effect between co-religion and co-origin of ego and alter (see Appendix B5, Figure B5.1 and Table B5.4). The moderate correlation between co-religion and co-origin (r = 0.5) and an acceptable variance inflation factor (VIF) (3.7) allowed us to interact both variables. This additional check supported that religious homophily played a more substantial role than shared origin in shaping male refugees' imagined relationships with female contacts. From both perspectives on total (POLS) and within-anchor variance (FE), the highest outcome scores appeared when a male refugee shared both religion and origin with a woman. However, the added value of shared country of origin seemed minimal. Overall, our results provide partial support for our expectations. Male refugees' tendency to imagine a relationship with women from their network increased if these women shared the same religion (Hypothesis 1a), and was higher for a co-religious woman than for an inter-religious woman from their network (Hypothesis 2a).

Figure 5.2 presents the results for Hypothesis 3, showing the moderation analysis for parental aspirations for religious or origin-based homophily (see Appendix B5, Tables B5.2 and B5.3). Overall, our results do not support the expectations in Hypothesis 3. The relationship between sharing the same religion or origin with female contacts from both total and within-anchor perspectives was not stronger if parents placed higher importance on their sons' homogamy in terms of religion or origin of origin with a potential partner.

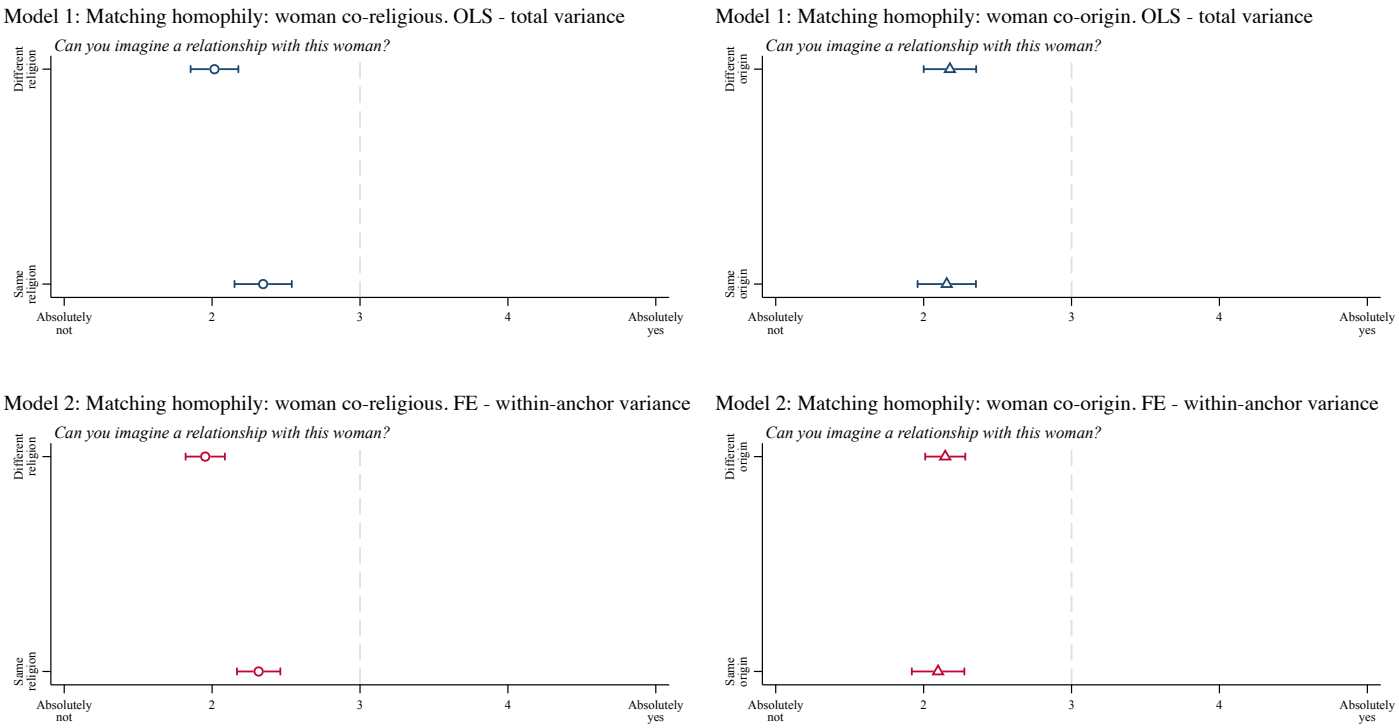

Figure 5.1. Average marginal effects for being (a) co-religious (on the left) and (b) co-origin (on the right) with reported women on imagining a relationship with them. Data are from PARFORM, W1 2022-2023. Model 1 (N=640) is an OLS model that represents predicted margins for being co-religious or co-origin with women on imagining a relationship with them and controls for characteristics of women, demographic, socio-economic components, personality components, and opportunity structures of refugees. Model 2 (N=823) is an FE model that represents within-anchor estimation of being co-religious or co-origin with a woman from the network on imagining a relationship and controls for woman's characteristics. See Tables 5.1 and 5.2 for details about control variables. Clustered SEs. For detailed estimates see Appendix B5, Table B5.1.

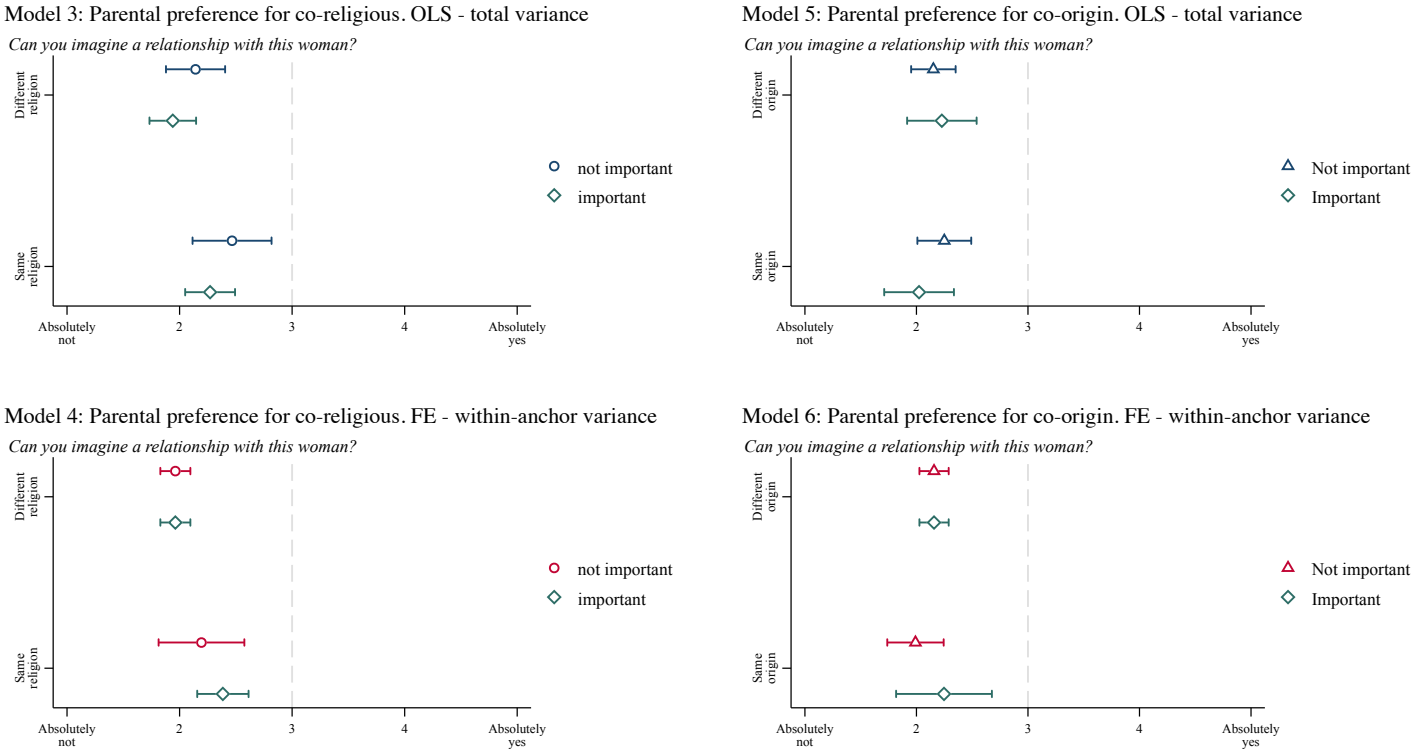

Figure 5.2. Differences by parental importance placed on (a) religious (to the left) and (b) origin-based (on the right) homophily. Data are from PARFORM, W1 2022-2023. Models 3 and 5 (N=640) are OLS models that represent predicted margins for an interaction term of being co-religious and parents placing importance on religious homophily (Model 3) and for being co-origin and parents placing importance on origin-based homophily (Model 5) on imagining a relationship with women from the network. These models control for characteristics of women, demographic, socio-economic components, personality components, and opportunity structures of refugees. Model 3 additionally controls for woman's origin and perceived parental preferences for origin-based homophily, and Model 5—for woman's religion and perceived parental preferences for religious homophily respectively. Models 4 (N=810) and 6 (N=813) are FE within-person models. These models control for women's characteristics. Model 4 additionally controls for woman's origin, Model 6—for woman's religion. See Tables 5.1 and 5.2 for details about control variables. Clustered SEs. For detailed estimates see Appendix B5, Tables B5.2 and B5.3.

5.5. Discussion

Between 2014 and 2018, Germany became the principal destination among Western countries for refugees from Syria and Afghanistan (OECD, 2017). Hundreds of thousands of young Syrians and Afghans fled their countries of origin, experiencing major life disruptions—and, for those passing through transit countries, a series of additional challenges—that likely disturbed their social networks and partnership trajectories. Rebuilding networks in a new cultural context, markedly different from that of their countries of origin and characterized by skewed sex ratios within co-ethnic groups, constitutes an additional challenge. In this study, we examined the availability of female social networks among young male refugees from Syria and Afghanistan and investigated how romantic aspirations toward these female contacts varied with cultural similarities between the refugees and the women in their networks. In addition, we examined whether this association was amplified by perceived parental preferences for cultural similarity. We drew on unique ego-centric network data to explore romantic aspirations within the actual social networks of refugees.

A substantial share of our sample (42%), of whom 23% are single anchors, did not report any female contacts in their network (apart from the immediate family). Being highly religious and predominantly Muslim—more so than those refugees who reported female contacts—this group of male refugees also scored lower on integration and socio-economic indicators compared to those who reported at least one woman. This group may therefore constitute a potential risk group with limited prospects on the partner market.

We hypothesized that cultural homophily is of high importance in shaping romantic aspirations. Results showed that sharing the same religion with women was associated with a higher score in imagining a relationship compared to relationships with inter-religious women (Hypothesis 1a). Moreover, when a male refugee had both co-religious and inter-religious

female contacts, scores were significantly higher for co-religious women when a respondent had to report imagining a relationship with them (Hypothesis 2a). Although the imagined relationship score was highest when the refugee and the woman shared both the same religion and origin, the independent contribution of the shared origin indicator was minimal. Support for Hypotheses 1 and 2 was therefore limited only to religious homophily, but not to homophily based on country of origin. Given the considerable sex imbalances in the analyzed groups and the fact that most adult co-origin women arrived in Germany already married (Paiva Lareiro & Schwarzmüller, 2021), this finding is unsurprising: respondents may simply have few or no co-origin, unmarried women in their networks with whom they could imagine a relationship. By contrast, the number of single women sharing the same religion may be relatively larger, reflecting the presence of a sizable Muslim community in Germany.

Second, we argued that perceived parental preferences for religious and origin-based homogamy in their sons' partnerships may intensify the respondents' aspirations toward a partner sharing the same religion and country of origin (Hypothesis 3), reflecting parental influence (Berry et al., 2011; Cavalli-Sforza & Feldman, 2020; Kalmijn, 1998; Maddox, 2019; Topgül, 2015). Our results did not support this hypothesis, suggesting that parents exert minimal, if any, influence at the stage when romantic aspirations first emerge. At this point, when individuals first meet, their interactions may exist as an independent dyad, without overlapping ties to familial networks. This relative autonomy may shield the relationship from parental influence during its most unstable early phases, consistent with Thomas', (2020) findings on online dating.

Several limitations of our study warrant exploration in future research. Given the rarity of ego-centric network data in migration research, cross-sectional data on actual social networks of male refugees represent an advance over previous studies. However, longitudinal data are required to provide further insight into whether any romantic aspiration eventually develops

into partnerships. A longitudinal approach would also enable tracking the dynamics of refugees' networks and romantic aspirations over time, particularly among those who initially had no female contacts. Our results suggest that this group—more religious and conservative, with a higher proportion identifying as Muslim—may exhibit an even stronger aspiration for cultural homophily compared to those who reported female contacts. However, the nature of our data does not allow us to determine whether the exclusion of women from their networks is primarily driven by structural disadvantages, such as lower education levels, more traditional values, or limited labor market integration, or by a personal choice, such as not currently seeking a relationship or recently ending a long-term partnership. The absence of reported female contacts also implies that they may lack ties to women from their country of origin with whom they could maintain cross-border online contact. Given this precarious position on the partner market, along with their generally lower levels of integration, future research should examine this group more closely. From a policy perspective, they may be at heightened risk of social isolation and insufficient integration in the host society.

Another limitation concerns the nature of the outcome variable—imagining a relationship with a woman from one's network. It remains unclear whether such imagined relationships translate into actual partnerships in the absence of longitudinal data on relationship formation. Similarly, our measure of parental influence on religious and origin-based homophily relies on self-reports and reflects respondents' perceptions. Moreover, refugees' own homophily norms may be shaped by parental socialization, implying that some parental influence may already be embedded in this indicator.

Our data did not include information on the sexual orientation of the anchors. Given the strong religiosity of the sample and the sensitivity surrounding parental influence, reporting a queer identity may be particularly challenging for male refugees from Syria and Afghanistan. Moreover, the sample was predominantly Syrian, with only a small proportion of Afghan

refugees. Sensitivity analyses indicated that excluding Afghan respondents did not substantially alter the results; however, the findings cannot be generalized to the broader Afghan male refugee population. Finally, our study lacks data on female refugee networks, which represents an important direction for future research.

Overall, our study highlights the importance of access to homophilous potential partners. Some male refugees may be able to realize their aspirations for finding a culturally similar partner, whereas such aspirations may represent a significant constraint for others, in particular for highly religious and conservative refugees—who often did not report any female contacts in our sample. Their prospects on the partnership market may be limited, rendering them a risk group for adverse outcomes in several domains, and an important target for investigation in future research.

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5.7. Appendix

Appendix A5. Data structure and Sample selection

Table A5.1. Number of (non-)reported ego-alter dyads by woman category

	Number of dyads
Anchor – 0 Woman contacts	474
Anchor – 1-3 Woman contacts	1655
Anchor – Woman contact 1	665
Anchor – Woman contact 2	556
Anchor – Woman contact 3	434

Source: PARFORM data, W1 2022-2023. *N* are number of anchor-alter dyads. For the category "Anchor – 0 Woman contacts" of those who did not report any women contacts, number of anchor-alter dyads equals number of anchors.

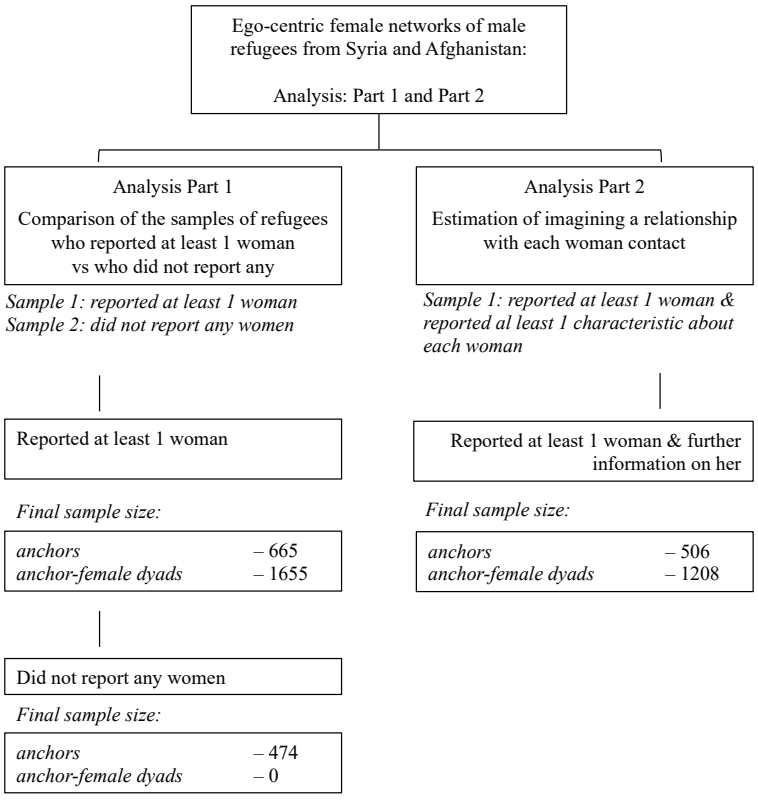

Figure A1. Sample selection flowchart, PARFORM data, W1 2022-2023. Figure: own elaboration.

Table A5.2. Partnership status and imagining a relationship with a woman

Partnership style	Imagine a relationship			Total
	Not or Absolutely not	At least "Maybe"	Missing values	
Single	396	239	274	909
%	43.56	26.29	30.14	100.00
In a relationship	220	145	118	483
%	45.55	**30.02**	24.43	100.00
Married	127	37	54	218
%	58.26	**16.97**	24.77	100.00
Missing values	9	10	26	45
%	20.00	22.22	57.78	100.00
Total	752	431	472	1655
%	45.44	26.04	28.52	100.00

Source: PARFORM data, W1 2022-2023.

Table A5.3. Within variation in the dependent and independent variables

	Number of anchors	Number of anchor-alter dyads
Total sample *ICC (imagine relationship) =42%* *ICC (co-religious) = 36%* *ICC (co-origin) = 49%*	506	1208
Sample 1: all anchors have within-variation in the DV (imagine a relationship)	203	639
Sample 2: all anchors have within-variation in the IV (co-religious)	203	530
Sample 3: all anchors have within-variation in the IV (co-origin)	143	391
Sample 4: all anchors have within-variation in both DV and IV (co-religious)	108	305
Sample 5: all anchors have within-variation in both DV and IV (co-origin)	83	231

Note: Total sample = all male refugees who reported at least 1 woman and have at least one further characteristic reported about those women. DV = dependent variable, IV = independent variable.

Appendix B5. Estimated effects

Table B5.1. Estimated effects of woman being co-religious and co-origin on imagining a relationship

	Model 1: OLS Imagine a relationship		Model 2: FE Imagine a relationship	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Co-religious (ref: share different religion)				
Share the same religion	0.329*	0.133	0.361*	0.142
Co-origin (ref: share different origin)				
Share the same origin	-0.022	0.147	-0.048	0.160
Control variables				
Characteristics of women				
Number of women reported (ref: one)				
Two	-0.849**	0.260		
Three	-1.085***	0.231		
Woman's age	-0.043***	0.007	-0.025**	0.009
Way of contact (ref: in person)				
Internet/Phone	-0.040	0.162	0.256	0.175
Both	0.246	0.149	0.331*	0.165
How met with a woman (ref: main activity)				
Family/Friends	0.322*	0.142	0.232†	0.139
Dating apps/Social media/Other	0.236	0.147	0.046	0.159
Woman's university degree (ref: no university degree)				
University degree	0.195	0.137	0.286	0.149
Demographic components of refugees				
Age	0.058**	0.019		
Years in Germany	-0.043	0.068		
Partnership status (ref: single)				
In a relationship	0.074	0.145		
Married	-0.133	0.192		
Socio-economic components of refugees				
Employment status (ref: not employed)				
In training	-0.152	0.206		
Employed	-0.023	0.166		
German language skills	-0.072	0.087		
University degree (ref: no university degree)				
University degree	-0.225	0.187		
Personality components of refugees				
Anchor sociable	-0.024	0.071		
Anchor's attractivity	-0.042	0.048		
Mental health	-0.114	0.071		

*continued on the next page

Table B5.1 - continued

	Model 1: OLS Imagine a relationship		Model 2: FE Imagine a relationship	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Opportunity structures of refugees				
Number of male friends	0.002	0.005		
Proportion of co-ethnics in the neighbourhood (ref: less than half)				
Half or more	0.037	0.156		
Proportion of co-ethnics in the main activity (ref: less than half)				
Half or more	0.064	0.134		
Parental expectations				
Parental preference for ethnic homogamy (ref: not important)				
Important	-0.062	0.144		
Parental preference for religious homogamy (ref: not important)				
Important	-0.199	0.147		
Constant	3.775***	0.781	2.253***	0.264
N	640		823	

Note: Data are from PARFORM, W1 2022-2023. *N* represents total number of observations (person rows). Imagine a relationship is measured on a scale from 1—"Absolutely not" to 5—"Absolutely yes". Model 2 (FE) controls only for time-variant characteristics—women's characteristics. Clustered SEs.
† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table B5.2. Estimated effects of woman being co-religious on imagining a relationship by parental preference for religious homogamy

	Model 3: OLS Imagine a relationship		Model 4: FE Imagine a relationship	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Co-religious (ref: share different religion)				
Share the same religion	0.324	0.204	0.232	0.228
Parental preference for religious homogamy (ref: not important)				
Important	-0.202	0.171		
Interaction				
Share the same religion# Religious homogamy important for parents	0.007	0.235	0.190	0.267
Constant	3.776***	0.785	2.274***	0.265
N	640		810	

Note: Data are from PARFORM, W1 2022-2023. *N* represents total number of observations (person rows). Imagine a relationship is measured on a scale from 1—"Absolutely not" to 5—"Absolutely yes". Model 3 controls for the same set of control variables as Model 1 from Table 5.1: 1) characteristics of women—if woman is co-origin, number of women reported, woman's age, way of contact with a woman, how met with a woman, woman's university degree; 2) demographic characteristics of refugees—age, years in Germany, partnership status; 3) socio-economic components of refugees—employment status, university degree; 4) personality components of refugees—if anchor is sociable, attractive according to interviewer's evaluation, mental health; 5) opportunity structures of refugees—number of male friends, proportion of co-ethnics in neighborhood, proportion of co-ethnics in the main activity; and parental preference for ethnic homogamy. Model 4 (FE) controls only for time-variant characteristics—woman's characteristics—if woman is co-origin, woman's age, way of contact with a woman, how met with a woman, woman's university degree. Clustered SEs.

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table B5.3. Estimated effects of woman being co-origin on imagining a relationship by parental preference for ethnic homogamy

	Model 5: OLS Imagine a relationship		Model 6: FE Imagine a relationship	
	Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Co-origin (ref: share different origin)				
Share the same origin	0.098	0.163	-0.167	0.167
Parental preference for ethnic homogamy (ref: not important)				
Important	0.076	0.181		
Interaction				
Share the same origin# Ethnic homogamy important for parents	-0.302	0.246	0.256	0.301
Constant	3.736***	0.777	2.164***	0.257
N	640		813	

Note: Data are from PARFORM, W1 2022-2023. *N* represents total number of observations (person rows). Imagine a relationship is measured on a scale from 1—"Absolutely not" to 5—"Absolutely yes". Model 5 controls for the same set of control variables as Model 1 from Table 5.1: 1) characteristics of women—if woman is co-origin, number of women reported, woman's age, way of contact with a woman, how met with a woman, woman's university degree; 2) demographic characteristics of refugees—age, years in Germany, partnership status; 3) socio-economic components of refugees—employment status, university degree; 4) personality components of refugees—if anchor is sociable, attractive according to interviewer's evaluation, mental health; 5) opportunity structures of refugees—number of male friends, proportion of co-ethnics in neighborhood, proportion of co-ethnics in the main activity; and parental preference for religious homogamy. Model 6 (FE) controls only for time-variant characteristics—woman's characteristics—if woman is co-religious, woman's age, way of contact with a woman, how met with a woman, woman's university degree. Clustered SEs.

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

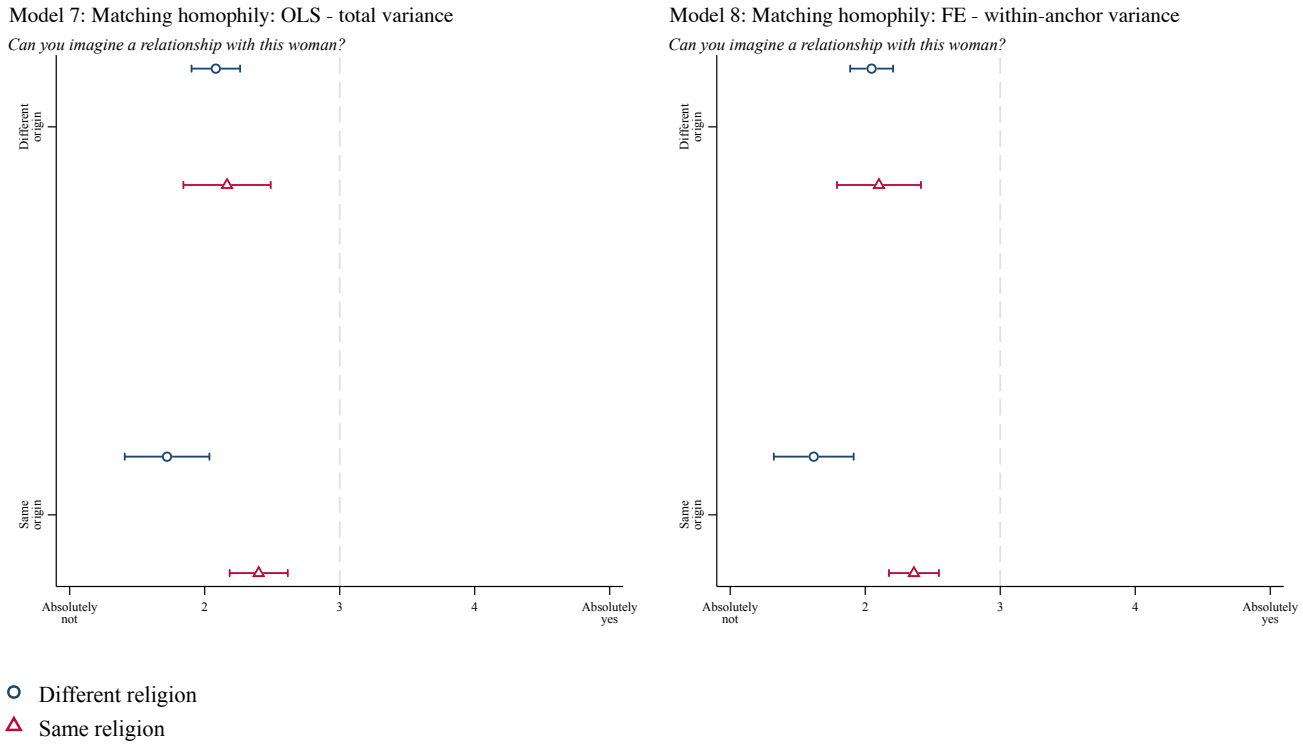

Figure B5.1. Interaction between being co-religious and co-origin on imagining a relationship. Data are from PARFORM, W1 2022-2023. Model 7 (N=640) is an OLS model that represents marginal effects of being co-religious and co-origin with women on imagining a relationship with them (*Do male refugees prefer co-religious or co-origin women in the network compared to inter-religious or inter-ethnic women?*). Model 7 controls for 1) characteristics of women—number of women reported, woman's age, way of contact with a woman, how met with a woman, woman's university degree; 2) demographic characteristics of refugees—age, years in Germany, partnership status; 3) socio-economic components of refugees—employment status, university degree; 4) personality components of refugees—if anchor is sociable, attractive according to interviewer's evaluation, mental health; 5) opportunity structures of refugees—number of male friends, proportion of co-ethnics in neighborhood, proportion of co-ethnics in the main activity; and 6) parental preferences for religious and ethnic homogamy. Model 8 (N=823) is a FE model that represent within-anchor estimation of being co-religious and co-origin with a woman from the network on imagining a relationship her (*Does a male refugee prefer the co-religious or co-origin woman from his network compared to inter-religious or inter-ethnic woman?*). Model 8 controls for woman's age, way of contact with a woman, how met with a woman, woman's university degree. Correlation between co-religion and co-origin = 0.5, VIF = 3.7. Clustered SEs. For detailed estimates—see Appendix B5, Table B5.4.

Table B5.4. Estimated effects for the interaction between being co-religious and co-origin on imagining a relationship

		Model 7: OLS Imagine a relationship		Model 8: FE Imagine a relationship	
		Coefficient	*Clustered SE*	Coefficient	*Clustered SE*
Co-religious (ref: share different religion)					
	Share the same religion	0.083	0.180	0.054	0.196
Co-origin (ref: share different origin)					
	Share the same origin	-0.361†	0.187	-0.429*	0.194
Interaction					
	Share the same religion# Share the same origin	0.596*	0.261	0.688**	0.250
Constant		3.810***	0.777	2.344***	0.266
N		640		823	

Note: Data are from PARFORM, W1 2022-2023. *N* represents total number of observations (person rows). Imagine a relationship is measured on a scale from 1—"Absolutely not" to 5—"Absolutely yes". Model 7 controls for the same set of control variables as Model 1 from Table 5.1: 1) characteristics of women—number of women reported, woman's age, way of contact with a woman, how met with a woman, woman's university degree; 2) demographic characteristics of refugees—age, years in Germany, partnership status; 3) socio-economic components of refugees—employment status, university degree; 4) personality components of refugees—if anchor is sociable, attractive according to interviewer's evaluation, mental health; 5) opportunity structures of refugees—number of male friends, proportion of co-ethnics in neighborhood, proportion of co-ethnics in the main activity; and 6) parental preferences for religious and ethnic homogamy. Model 8 (FE) controls only for time-variant characteristics—woman's characteristics—woman's age, way of contact with a woman, how met with a woman, woman's university degree. Clustered SEs.
† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Appendix C5. Sensitivity analysis

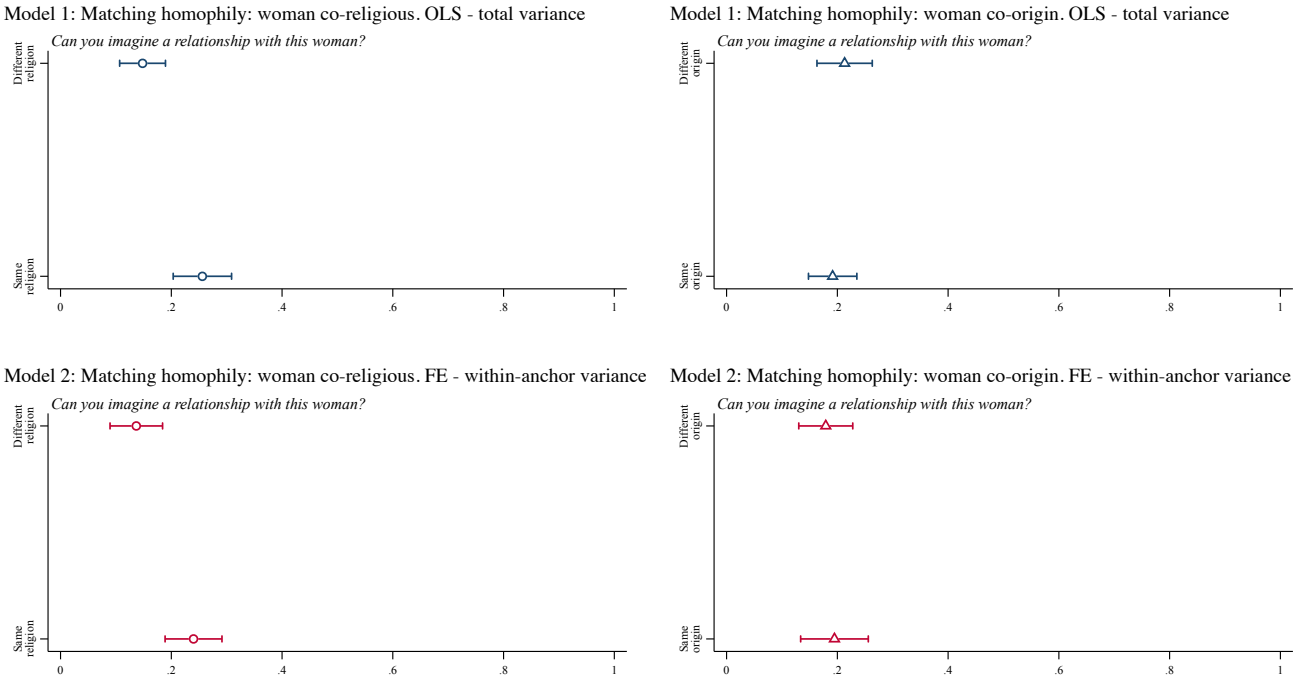

Figure C5.1. Binary outcome. Marginal effects of being co-religious or co-origin with women on imagining a relationship. Data are from PARFORM, W1 2022-2023. Imagine a relationship is coded as 1—"At least maybe", 0—"Otherwise". Model 1 (N=640) is a logistic regression model that represents marginal effects of being co-religious or co-origin with women on imagining a relationship with them (*Do male refugees prefer co-religious or co-origin women in the network compared to inter-religious or inter-ethnic women?*). This model controls for 1) characteristics of women— number of women reported, woman's age, way of contact with a woman, how met with a woman, woman's university degree; 2) demographic characteristics of refugees—age, years in Germany, partnership status; 3) socio-economic components of refugees—employment status, university degree; 4) personality components of refugees—if anchor is sociable, attractive according to interviewer's evaluation, mental health; 5) opportunity structures of refugees—number of male friends, proportion of co-ethnics in neighborhood, proportion of co-ethnics in the main activity; and 6) parental preferences for religious and ethnic homogamy. Model 2 (N=823) is an FE model that represents within-anchor estimation of being co-religious or co-origin with a woman from the network on imagining a relationship her (*Does a male refugee prefer the co-religious or co-origin woman from his network compared to inter-religious or inter-ethnic woman?*). This model controls for woman's characteristics: woman's age, way of contact with a woman, how met with a woman, and woman's university degree. Clustered SEs.

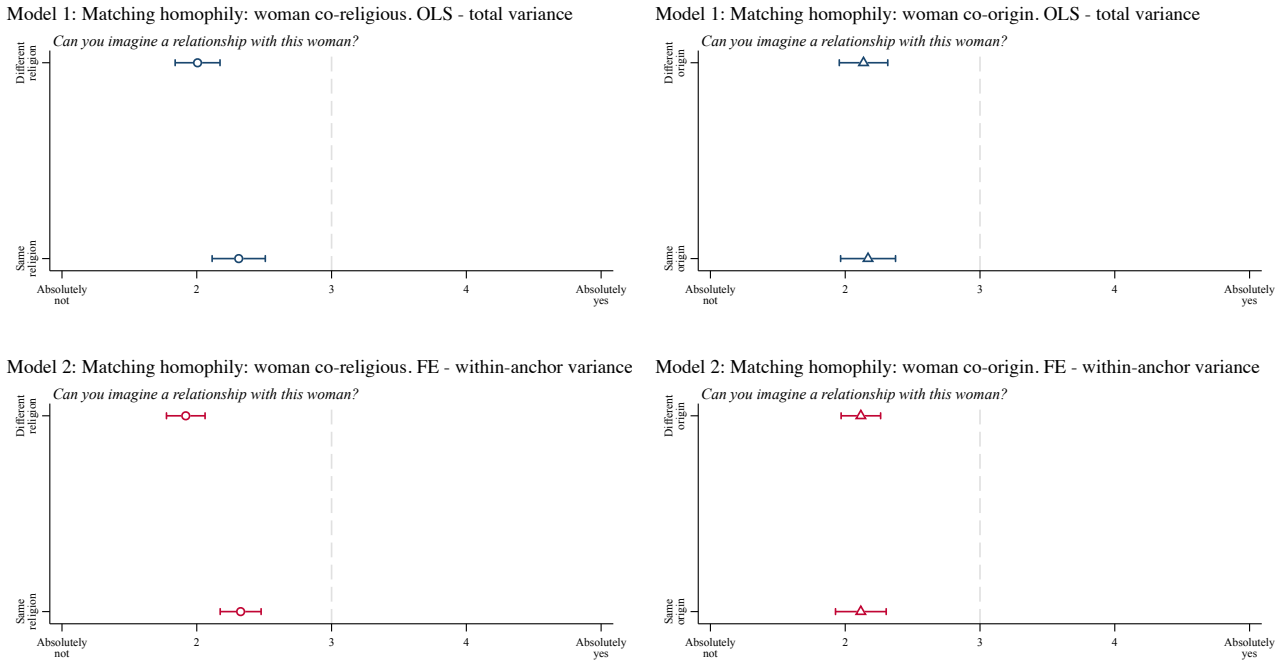

Figure C5.2. Without Afghan anchors. Marginal effects of being co-religious or co-origin with women on imagining a relationship. Data are from PARFORM, W1 2022-2023. 61 anchors who are Afghan were deleted. Model 1 (N=600) is an OLS model that represents marginal effects of being co-religious or co-origin with women on imagining a relationship with them (*Do male refugees prefer co-religious or co-origin women in the network compared to inter-religious or inter-ethnic women?*). This model controls for 1) characteristics of women—number of women reported, woman's age, way of contact with a woman, how met with a woman, woman's university degree; 2) demographic characteristics of refugees—age, years in Germany, partnership status; 3) socio-economic components of refugees—employment status, university degree; 4) personality components of refugees—if anchor is sociable, attractive according to interviewer's evaluation, mental health; 5) opportunity structures of refugees—number of male friends, proportion of co-ethnics in neighborhood, proportion of co-ethnics in the main activity; and 6) parental preferences for religious and ethnic homogamy. Model 2 (N=758) is an FE model that represents within-anchor estimation of being co-religious or co-origin with a woman from the network on imagining a relationship her (*Does a male refugee prefer the co-religious or co-origin woman from his network compared to inter-religious or inter-ethnic woman?*). This model controls for woman's characteristics: woman's age, way of contact with a woman, how met with a woman, and woman's university degree. Clustered SEs.

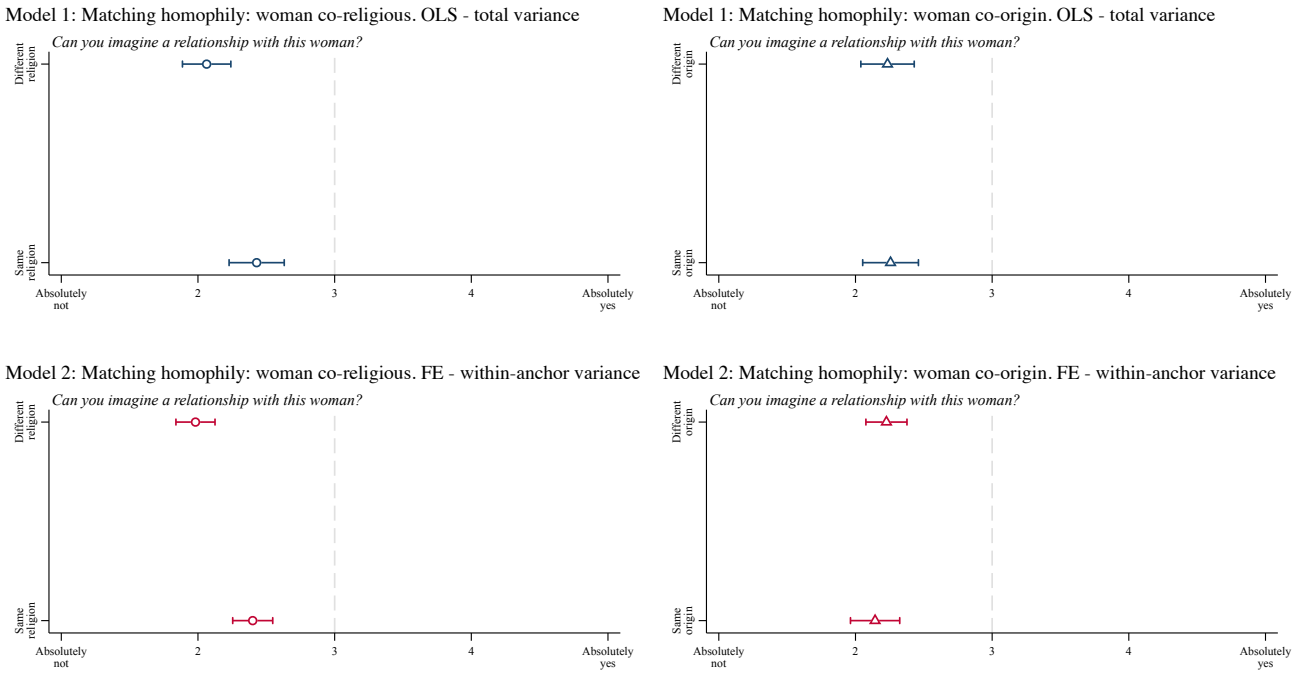

Figure C5.3. Without married anchors. Marginal effects of being co-religious or co-origin with women on imagining a relationship. Data are from PARFORM, W1 2022-2023. 81 anchors who are married were deleted. Model 1 (N=548) is an OLS model that represents marginal effects of being co-religious or co-origin with women on imagining a relationship with them (*Do male refugees prefer co-religious or co-origin women in the network compared to inter-religious or inter-ethnic women?*). This model controls for 1) characteristics of women—number of women reported, woman's age, way of contact with a woman, how met with a woman, woman's university degree; 2) demographic characteristics of refugees—age, years in Germany, partnership status; 3) socio-economic components of refugees—employment status, university degree; 4) personality components of refugees—if anchor is sociable, attractive according to interviewer's evaluation, mental health; 5) opportunity structures of refugees—number of male friends, proportion of co-ethnics in neighborhood, proportion of co-ethnics in the main activity; and 6) parental preferences for religious and ethnic homogamy. Model 2 (N=710) is an FE model that represents within-anchor estimation of being co-religious or co-origin with a woman from the network on imagining a relationship her (*Does a male refugee prefer the co-religious or co-origin woman from his network compared to inter-religious or inter-ethnic woman?*). This model controls for woman's characteristics: woman's age, way of contact with a woman, how met with a woman, and woman's university degree. Clustered SEs.

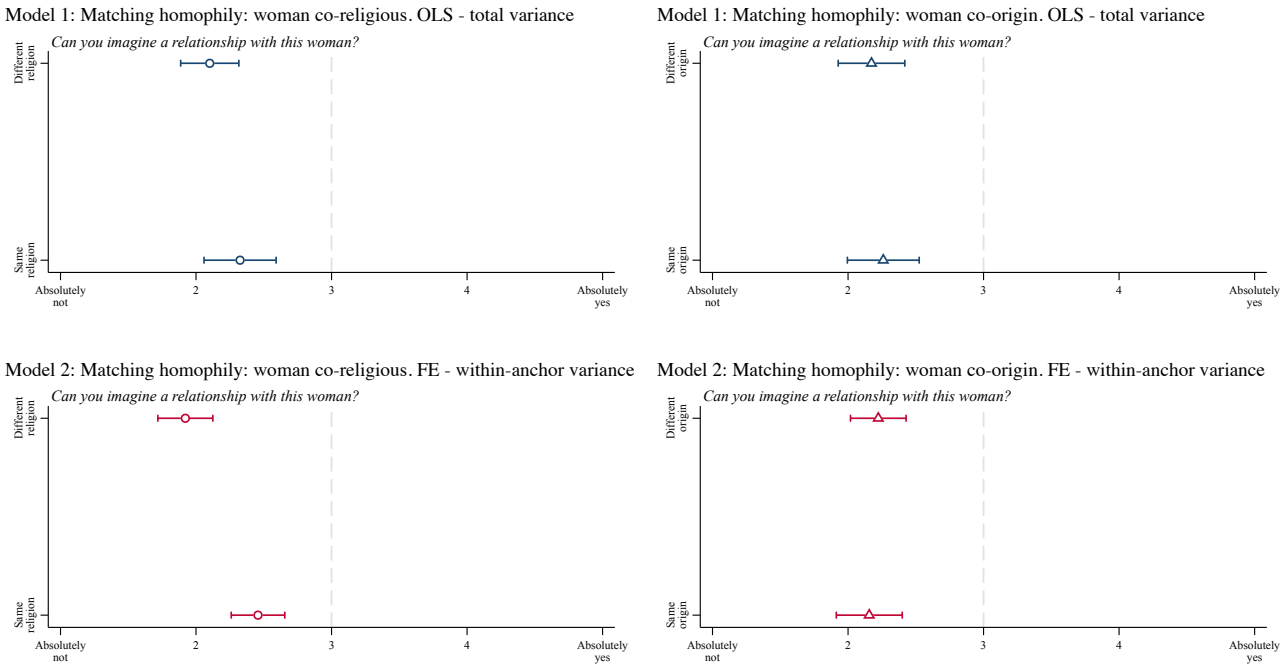

Figure C5.4. With single anchors only. Marginal effects of being co-religious or co-origin with women on imagining a relationship. Data are from PARFORM, W1 2022-2023. 272 anchors who are married or in a relationship were deleted. Model 1 (N=342) is an OLS model that represents marginal effects of being co-religious or co-origin with women on imagining a relationship with them (*Do male refugees prefer co-religious or co-origin women in the network compared to inter-religious or inter-ethnic women?*). This model controls for 1) characteristics of women—number of women reported, woman's age, way of contact with a woman, how met with a woman, woman's university degree; 2) demographic characteristics of refugees—age, years in Germany, partnership status; 3) socio-economic components of refugees—employment status, university degree; 4) personality components of refugees—if anchor is sociable, attractive according to interviewer's evaluation, mental health; 5) opportunity structures of refugees—number of male friends, proportion of co-ethnics in neighborhood, proportion of co-ethnics in the main activity; and 6) parental preferences for religious and ethnic homogamy. Model 2 (N=446) is an FE model that represents within-anchor estimation of being co-religious or co-origin with a woman from the network on imagining a relationship her (*Does a male refugee prefer the co-religious or co-origin woman from his network compared to inter-religious or inter-ethnic woman?*). This model controls for woman's characteristics: woman's age, way of contact with a woman, how met with a woman, and woman's university degree. Clustered SEs.

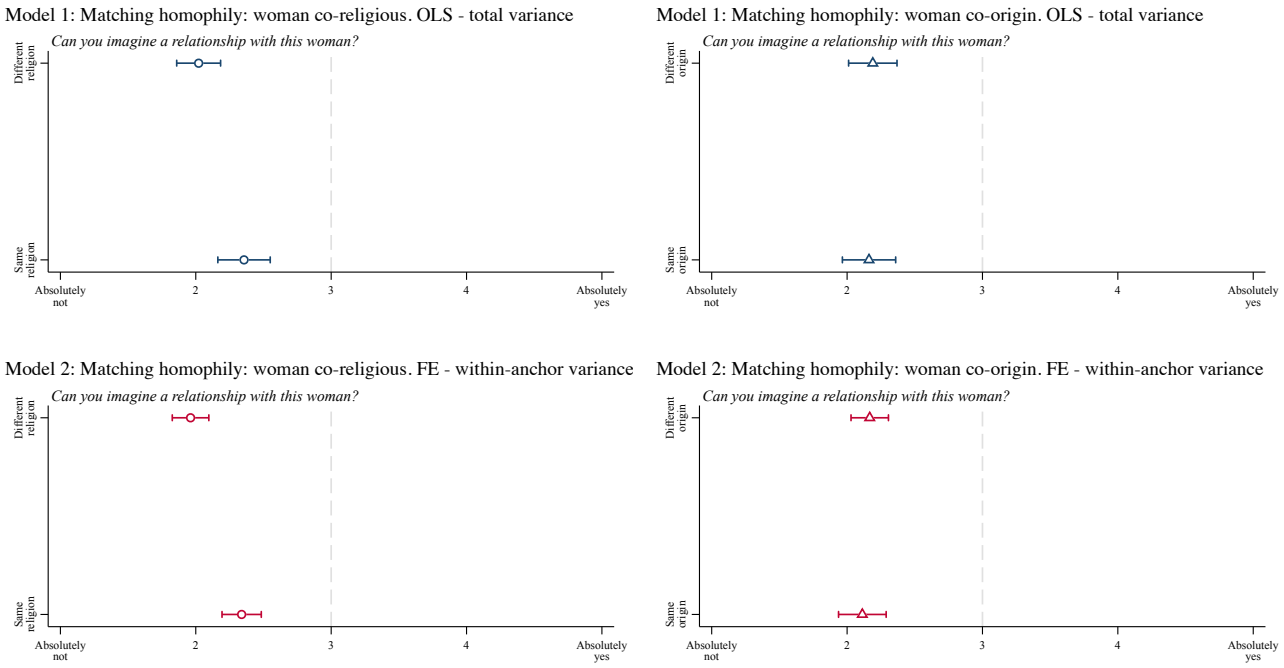

Figure C5.5. Without women whose age is more than 60. Marginal effects of being co-religious or co-origin with women on imagining a relationship with them. Data are from PARFORM, W1 2022-2023. 9 anchors who have women aged over 60 in their network were deleted. Model 1 (N=634) is an OLS model that represents marginal effects of being co-religious or co-origin with women on imagining a relationship with them (*Do male refugees prefer co-religious or co-origin women in the network compared to inter-religious or inter-ethnic women?*). This model controls for 1) characteristics of women—number of women reported, woman's age, way of contact with a woman, how met with a woman, woman's university degree; 2) demographic characteristics of refugees—age, years in Germany, partnership status; 3) socio-economic components of refugees—employment status, university degree; 4) personality components of refugees—if anchor is sociable, attractive according to interviewer's evaluation, mental health; 5) opportunity structures of refugees—number of male friends, proportion of co-ethnics in neighborhood, proportion of co-ethnics in the main activity; and 6) parental preferences for religious and ethnic homogamy. Model 2 (N=809) is an FE model that represents within-anchor estimation of being co-religious or co-origin with a woman from the network on imagining a relationship her (*Does a male refugee prefer the co-religious or co-origin woman from his network compared to inter-religious or inter-ethnic woman?*). This model controls for woman's characteristics: woman's age, way of contact with a woman, how met with a woman, and woman's university degree. Clustered SEs.

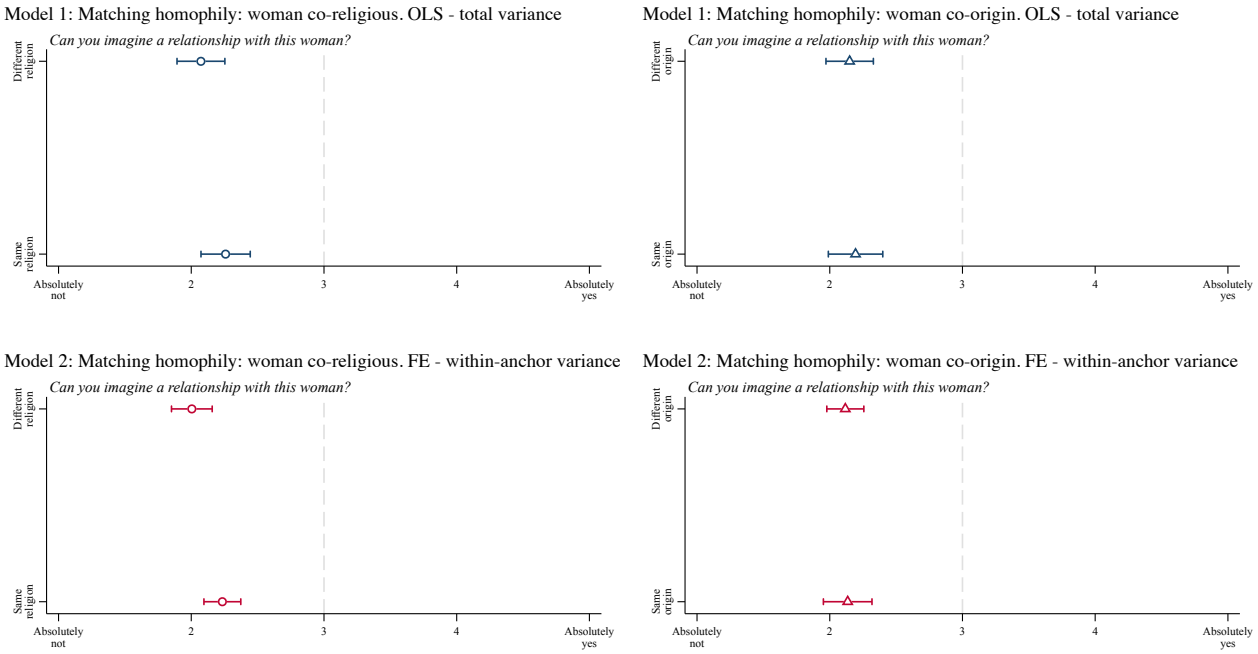

Figure C5.6. An anchor and a woman are co-religious if any kind of Islam confession is reported. Marginal effects of being co-religious or co-origin with women on imagining a relationship with them. Data are from PARFORM, W1 2022-2023. The variables "co-religious" was coded as 1 if an anchor and woman shared the same confession of Islam, or were both Christian, or both shared Hinduism, or Judaism, or Other religion, or No religion. Data are from PARFORM, W1 2022-2023. Model 1 (N=640) is an OLS model that represents marginal effects of being co-religious or co-origin with women on imagining a relationship with them (*Do male refugees prefer co-religious or co-origin women in the network compared to inter-religious or inter-ethnic women?*). This model controls for 1) characteristics of women—number of women reported, woman's age, way of contact with a woman, how met with a woman, woman's university degree; 2) demographic characteristics of refugees—age, years in Germany, partnership status; 3) socio-economic components of refugees—employment status, university degree; 4) personality components of refugees—if anchor is sociable, attractive according to interviewer's evaluation, mental health; 5) opportunity structures of refugees—number of male friends, proportion of co-ethnics in neighborhood, proportion of co-ethnics in the main activity; and 6) parental preferences for religious and ethnic homogamy. Model 2 (N=823) is an FE model that represents within-anchor estimation of being co-religious or co-origin with a woman from the network on imagining a relationship her (*Does a male refugee prefer the co-religious or co-origin woman from his network compared to inter-religious or inter-ethnic woman?*). This model controls for woman's characteristics: woman's age, way of contact with a woman, how met with a woman, and woman's university degree. Clustered SEs.