Childhood Family Structure and Complexity in Partnership Life Courses

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ABSTRACT

This study investigated the associations between childhood living arrangements and *complex* partnership trajectories. The authors defined the dissolution of the first union as the kick-off event for complexity in partnership life courses, and measured the level of complexity deploying a weighted cumulative index of subsequent partnership episodes. The analyses were based on a representative sample of German population born in 1971-73 from the German Family Panel and multivariate hurdle models for the probability of starting a complex trajectory and the level of complexity. Results showed that respondents not growing up with both biological parents (i.e. an *alternative* family structure) followed more complex partnership trajectories beyond the greater likelihood to experience the dissolution of the first union. These associations varied across types and levels of stability of (alternative) family structures during childhood. This study contributes to our understanding of intergenerational associations in family behavior, beyond the reproduction of union dissolution.

Keywords: childhood family structure, partnership behavior, linked lives, union dissolution, complexity index

INTRODUCTION

Contemporary societies have endured decreased rates in the stability of marital unions for four decades, leading to growing shares of children growing up without both biological parents across several generations. Extending ideas of intergenerational transmission of (dis-)advantage in the realm of family behavior, social science research postulated that part of the present-day adult population are reproducing family constellations other than child living with the biological mother and father –what we call an *alternative* family structure– that they already were exposed to as children. The associated empirical research confirmed that the persistence of family behavior across generations runs through the family. A well-established research finding of this literature is that parental separation and the exposure to an *alternative* family structure during childhood are associated with higher-than-average union instability in adulthood (Amato, 1996, Amato and DeBoer, 2001, Diekmann and Engelhardt, 1999, Diekmann and Schmidheiny, 2013, Dronkers and Härkönen, 2008, Lyngstad and Engelhardt, 2009).

The contributions of extant research in unraveling key patterns in childhood background and the partnership behavior of parents and adult children are undisputable, particularly since the intergenerational transmission of partnership instability has been linked to the reproduction and accumulation of greater socio-economic disadvantage (McLanahan, 2004, McLanahan and Percheski, 2008). Research has been less systematic on deciphering the consequences of parental separation and the resultant *alternative* family structures during childhood for repeated partnership behavior and continued partnership instability over the adult life course that emerge in contexts of increased union instability. Those who experienced the dissolution of an own union do increasingly follow *complex* partnership trajectory patterns that feature less stability in subsequent partnership episodes as they engage in additional transitions in and out partnerships over the life course (Hiekel and Fulda, 2018, Lichter and Qian, 2008). Given that little stability in the adult partnership trajectory can aggravate earlier disadvantages, it is relatively urgent to examine the enduring importance of family of origin for complex partnership trajectories, beyond the dissolution of the first union. To this end, we address the following research question:

Does the experience of an alternative family structure during childhood associates with the accumulation of complexity in the sphere of intimate relationships over the adult life course?

We note that scholars recently argued in favor of extending the research focus beyond effects of parental separation, and address the heterogeneous exposures to the specific types of family

structure that evolve in the life of children upon parental dissolution to achieve a more nuanced understanding of these associations (Härkönen, et al., 2017). Examples of this heterogeneity includes a range of household arrangements such as single parent and stepfamily households. Emphasizing the importance of stability, other scholars suggested that the number of transitions in the family structure matters (Fomby and Cherlin, 2007). We thus formulated a second research question:

Does the extent to which alternative family structure during childhood associates with the accumulation of greater complexity in adult partnership trajectories differ by the type of alternative family structure and the number of transitions in the childhood family structure?

To understand the role of family of origin for complexity in the partnership life course it is particularly relevant to consider holistic partnership trajectories, i.e. the complete and structured set of partnership episodes in (early) adulthood. Studying long-term partnership trajectories contributes to the existing literature as it grasps the intergenerational transmission of partnership behavior beyond the exact matches of events and thereby it acknowledges changes in the patterns of partnership behavior across generations. Following contributions of research on life course trajectories, we propose that *complexity* in an individual's partnership trajectory is gained through a combination of the number, duration and sequencing of partnership episodes over time. In addition, we account for the social meaning of a complex trajectory is attributed in each specific context (i.e. whether the associated partnership transitions are deemed advantageous or disadvantageous in a given society). To this end, we propose a weighted complexity index that combines empirical and theoretical accounts of partnership complexity in one measure. In this study, we take the dissolution of the first union (marital or not) as the defining event for setting on a *complex* partnership trajectory. In addition, further episodes of relationship instability or arguably less stable relationship types contribute to the accumulation of even more complexity in one's partnership trajectory.

The existing knowledge and evidence on complexity in partnership trajectories and their associations with the families of origin has predominantly been conducted in the United States (e.g. Hofferth and Goldscheider, 2010, Ryan, et al., 2009, Valle and Harker Tillman, 2014, Wolfinger, 2003). This national context is often argued to display distinct partnership and family patterns than other national contexts with comparable levels of material wellbeing, and thus, findings from this context are not generalizable to other contexts (Cherlin, 2009). In this research,

we contribute to the literature by addressing the German case, which differs from the US in a number of key features of partnership life courses. Already for the cohort studied here, the vast majority of first unions started by unmarried cohabitation rather than direct marriage (Hiekel and Fulda, 2018). Cohabiting unions at any order are more likely to be transformed into a marriage than to end in separation (ebd.), unlike the US context (Lichter, et al., 2010, Lichter and Qian, 2008).

For the empirical analyses, we use nine annual waves of the German Family Panel *Pairfam* collected between 2008 and 2016 and data on n=1,398 women and men from three cohorts born between 1971-73 who reached age 40 before the end of observation. Building on the *precarity index* of Ritschard *et al*. (2018), we construct a time-varying, continuous measure of complexity for the individual partnership life course. We use hurdle regression models to examine the links between childhood family structure and complexity in adult partnership life courses. These models enable to sequentially address the determinants of starting a complex partnership trajectory –in our study this is the dissolution of the first union– and the accumulation of complexity thereafter –i.e. with further partnership episodes. Our results show, among others, that the exposure to alternative family structures during childhood is linked to the accumulation of greater partnership complexity in adulthood. These and further related findings of this research support our understanding of the reproduction of social inequality via family behavior, which is increasingly being referred as a core mechanism preventing to break the cycle of disadvantage.

COMPLEXITY IN PARTNERSHIP TRAJECTORIES

The last decades have seen a whole array of changes in people's partnership and family behavior as a manifestation of the so-called *Second Demographic Transition* (Lesthaeghe and van de Kaa, 1986, van de Kaa, 1987): (1) the decreasing popularity of marriage and the rise of unmarried cohabitation, displayed in declining marriage rates and postponement of marriage (European Commission, 2015), (2) increases in non-marital fertility (Perelli-Harris, et al., 2012), and (3) increasing relationship instability displayed in rising divorce (and separation) rates (e.g. Sobotka and Toulemon, 2008).

The life course approach has been instrumental to the accumulation of knowledge about increasingly complex partnership trajectories. Family scholars predominantly applied

methodologies for examining the *timing, duration or repetition of single events* in partnership trajectories, such as the time to first marriage or divorce, the transition from cohabitation to marriage and determinants of repartnering. Increasing sources of longitudinal data and methodological innovations in life course analysis enables researchers to obtain a holistic perspective on individual partnership trajectories. Rather than studying these components of behavioral change independently from each other, partnership trajectories are increasingly conceptualized and examined as *processes* in order to understand how behavioral choices themselves, as well as their timing and sequencing jointly affect life courses as a whole (Elzinga and Liefbroer, 2007, Fasang and Raab, 2014, Perelli-Harris and Lyons-Amos, 2015, Van Winkle, 2018). From this research it is evident that partnership life courses have *de-standardized*: Smaller parts of the population experience certain life states, stages and events, and if so at more dispersed ages and durations (Brückner and Meyer, 2005). As a consequence, increasing shares of the population deviate from the previously "standard" partnership trajectory of early and stable marriage. Less often, it is studied that partnership life courses also have become more *differentiated* (Elzinga and Liefbroer, 2007): Individual partnership trajectories comprise an increasing number of distinct states or stages across the life course (Brückner and Meyer, 2005). It implies that increasing shares of the population experience the dissolution of a first union, less partnered lifetime, and the formation of higher-order relationships, while not being confined to marriage as the union type to choose.

The present study joins the rank of previous work and grasps individual partnership behavior as *trajectories* that evolve over the life course. We incorporate the notions of differentiation by drawing a specific focus on how individuals accumulate more (less) complexity over the course of their partnership trajectory, (1) by entering a greater number of distinct partnership related states (single, cohabiting, married, separated) and (2) by exhibiting less predictability in terms of the duration and sequencing of transitions in and out of partnerships. We will elaborate on the conceptualization and application of the complexity measure conceptualized in the method section of this paper.

LINKING CHILDHOOD FAMILY STRUCTURE TO COMPLEX PARTNERSHIP TRAJECTORIES

Parental separation has become an increasingly salient part of children's lives in many individualized societies. Beyond this, children also experience further transitions in the structure of the family household as a parent's new partner may move in and out, parental re-marriage often bring step- and half-siblings along, or co-residence with grand-parents or other relatives may be temporary solutions as (single-)parents get their lives back on track. In brief, children from separated parents are growing up in a variety of *alternative family structures* –other living arrangements than with both biological parents– and some see change in family structures more often than others through their childhood.

The life course research paradigm of *linked lives* (Elder, 1994) emphasizes the role of the family of origin in shaping earlier and subsequent partnership behavior during adulthood. It could thus be that not growing up with two biological parents contributes to differentiation processes in adult partnership trajectories, that is, an increasing number of partnership episodes and transitions. Prior research has predominantly studied how family structure during childhood – with a focus on the event of parental separation– is associated with single components of partnership trajectories in adulthood: (1) timing and (2) type of union formation, (3) relationship instability, and (4) repartnering. The associated research evidence stem predominantly from the United States and shows that the experience of an *alternative family structure* is associated to earlier home leaving, which is a key predictor of earlier entries into a first union (Fomby and Bosick, 2013, Goldscheider and Goldscheider, 1998, Hofferth and Goldscheider, 2010, McLanahan, et al., 2013, Raab, 2017), and choosing cohabitation rather than marriage as mode of entry into a relationship (Amato and Kane, 2011, Thorsen, 2017). It follows that earlier union formation is a good predictor of union dissolution (Heaton, 1991, Teachman, 2002). However, most research on intergenerational associations of family behavior focused on the reproduction of union dissolution within families, and the key finding is an unconditional association between parental separation and an the dissolution of a union (Amato, 1996, Amato and DeBoer, 2001, Diekmann and Englehardt, 1995, Diekmann and Schmidheiny, 2013, Dronkers and Härkönen, 2008, Lyngstad and Engelhardt, 2009). Only recently, the examination of these intergenerational associations have been extended to the instability of unions outside marriage (Amato and Patterson, 2017) as well as to life courses being characterized by repeated episodes of cohabitation (Lichter and Qian, 2008). This provides some initial evidence for an association

between childhood family structure and the development of complexity in adult partnership trajectories, also beyond the dissolution of the first union.

In the following, we will elaborate why we expect that exposure to alternative family structures during childhood associates with the accumulation of greater complexity in their own partnership biographies.

Cultural and economic perspectives suggest different pathways through which parents influence children's partnership trajectories in adult life. The cultural perspective relates to theories of self-development and focuses on *social interaction and imitation*. As part of their socialization efforts, parents transmit values to their children that refer to specific desirable life goals and serve as standards or criteria in guiding young adults' partnership behavior. Family structure others than two married parents may indicate less traditional value orientations among the parents that is transmitted to children serving as behavioral guidelines for their own partnership behavior. Parents may transmit such behaviors also via the less reflective and purposeful pathways of *social learning* in which parents illustrate a possible course of action to solve relationship problems that children may imitate later in life. It could also be that children from alternative family structure enjoy greater personal freedom to adopt more liberal attitudes to and values on partnership and family emerging in contemporary societies because of their lower exposure to a parental figure (at least one of the biological parents).

The economic perspective focuses on the availability of economic resources, like income and investments into children, hence the *socio-economic standing of the family of origin*. Not growing up with two biological parents is associated with lower economic resources available for the child, as a single parent lacks the additional income of the ex-partner and stepparents tending to invest less in their stepchildren (Uunk, 2004). Lower economic resources in turn are associated with earlier, and less favorable transitions into adulthood, such as lower investments into education, early home leaving and union formation that potentially set on a more complex partnership career.

Some scholars claim that the *type of alternative family struc*ture matter beyond the effect of not living anymore with both biological parents (Magnuson and Berger, 2009). The most prevalent, often succeeding, transitions from living with both biological parents is moving into a single parent household and starting to live with one biological and one stepparent. Contrary to the situation of living with a single biological parent, coresidence of a stepparent may compensate for

economic and cultural resources that were lost or limited in access due to the other biological parent's absence in the household. From these reflections we would thus expect that regarding the complexity of the partnership trajectory accumulated over the life course, those adults who lived with a stepparent during childhood differ less from adults who grew up with both biological parents compared to adults who lived with a single parent during childhood.

Proponents of the *instability hypothesis* (Fomby and Cherlin 2007, Waldvogel et al. 2010) by contrast suggest that children are at least as much affected by disruptions and changes in the family structure than by the type of family structure itself. Exposure to multiple episodes in and out co-residence with parents' new partners or other relatives may have a greater impact on children's own relationship behavior than just experiencing one episode of stable single parenthood or step parenthood after the parental union dissolution. From this perspective, one could expect that less transitions across alternative family structures would mitigate the effect of alternative childhood family structure on adulthood partnership complexity.

METHOD

Data and Sample

Analyses were based on data from nine annual waves of the German Panel of Intimate Relationships and Family Dynamics (pairfam), release 9.0 (Huinink, et al., 2011). Data were collected between 2008/2009 and 2016/2017 and comprise detailed information on childhood family structure and change as well as own partnership and fertility biographies of individuals of three birth cohorts: 1971-73, 1981-83 and 1991-93.[1]

For the analysis, we select respondents from the oldest pairfam birth cohort (1971-73) as it enables us to study partnership trajectories up to age 40. The original sample of this birth cohort consists of 4,054 individuals. We exclude respondents who identify themselves as other than heterosexual (n=55), those not born in Germany or whose parents were not German-born (n=713), and those who failed to participate after wave 1 (n=1,161) –since information on childhood living arrangements was not collected since wave 2. These baseline sample criteria were met by n=2,125 respondents. We additionally excluded those living in an alternative family

[1] Though a supplementary Eastern German oversample exist *(Demographic Differences in Life Course Dynamics in Eastern and Western Germany Demodiff)* these data did not provide information on the type of family structure transition and age at which these transitions occurred. We therefore based our analysis on the original pairfam sample that comprises of 20% Eastern Germans representative for the population ratio at the national level.

structure already at birth (n=85) because of the reduced group size. The fact that this small group never lived with both biological parents preclude us to merge them with those who experienced the transition into an alternative family structure in childhood. We also excluded respondents who did not enter a partnership before the end of the observation window (n=64) because of the reduced group size, and because of their arguably different rationale for following a trajectory of no/low partnership complexity.[2] Last, we excluded observations from individuals with missing information on any model variables in the regression analyses. The analytical sample for our primary analysis amounts to 1,398 respondents contributing n=10,309 observations. In additional analyses that test alternative main predictors, the analytical sample lowers up to 1,070 respondents contributing n=9,010 observations for analytical models. All analyses were replicated using the most restrictive analytical sample, and results from these replications did not change the conclusions drawn from the analyses presented here.

Measures

Partnership complexity

We deploy sequence-based methods to generate our outcome measure, which is a continuous measure for individual's complexity in the partnership life course. We use available information on the dates (i.e. month and year) and types of union (i.e. cohabiting and married) that were formed or dissolved between age 16 and age 40. This enables us to build sequences of ordered monthly states that consist of the following relevant partnership situations: "Never partnered", "Cohabiting", "Married" and "Previously partnered". The "Never partnered" state includes episodes of single living before entering a first union (either a cohabitation or marriage). "Cohabiting" or "Married" states refer to relationship episodes of any order, though most of them are first order. Because the data is ordered in partner episodes, we can identify whether respondents separate temporarily. For the sake of simplicity, we decided to omit separation episodes that end by respondents getting back together with the same partner. Additionally, the data allow us to assert that any "Cohabiting" state in our sample followed by a "Married" state in the following month refers to respondents marrying their cohabiting partner. The "Previously

[2] In our analysis we generate a partnership complexity measure that takes the value 0 for respondents who do not experience episodes of partnership instability. This includes respondents who entered a stable marriage, eventually after cohabiting first with their spouse, but also respondents who never entered a partnership. These trajectories are however qualitatively different and should not be mingled. Our results however are identical when including these respondents in our sample.

partnered" consist mostly of separated people –from a cohabitation or a marriage– and a few widowers (less than 3 percent).

Most applications of sequence analysis consider the comparison between individuals of sequence qualities such as the occurrence, order and timing of role transitions using algorithmic techniques. Such comparisons allow clustering individual sequences in groups that are useful to assess continuity with or departures from the standard life course sequence in a population. In this research, we are additionally interested in assessing within-individual sequence qualities, or put differently, the accumulation of partnership experience and instability within the sequence at time t (i.e. at a given age). Previous research has proposed measures such as the *complexity index* (Gabadinho, et al., 2010) or the *turbulence index* (Elzinga, 2010, Elzinga and Liefbroer, 2007) that quantify the degree of *differentiation* within individual life courses. Individual sequences with many episodes, odd sequencing and high variability in episode duration get higher index scores, as they are more instable or complex. Such measures have already found an application in studies on employment trajectories (Biemann and Wolf, 2009, Manzoni and Mooi-Reci, 2011) and family trajectories (Elzinga and Liefbroer, 2007, Van Winkle, 2018).

Building on the *complexity index* (Gabadinho, et al., 2010), we define index *C(s)* for partnership sequences as follows:

$$\mathrm{c}(s) = \sqrt{\frac{\mathrm{h}(\mathrm{s})}{\log(\mathrm{n}_a)} * \frac{nt_s}{(l_s - 1)}}$$

Where *C(s)* is the geometric mean of two components of complexity in sequences: (i) the partnership state distribution in the sequence measured by the longitudinal sequence (or Shannon) entropy *h(s)* –interpreted as the 'uncertainty' in predicting the states in a given sequence, where uncertainty is higher with more states and uniform durations of states in a sequence– normalized by the logarithm of the number of possible states n_a (in our application is 4); and (ii) the order of partnership episodes in the sequence measured by the number of transitions nt_snormalized by the length of the sequence minus 1 $l_s - 1$. The index *C(s)* ranges from 0 to 1.[3]

[3] The value 0 of *C(s)* can be obtained for a sequence that contains no partnership transitions. The value 1 of *C(s)* can be obtained for a sequence that either (i) contains all partnership states with uniform durations, or (ii) where the number of transitions across states is equal to the length of the state sequence minus 1.

As is, one shortcoming of this complexity index *C(s)* proposed by the above-referenced literature is that it grasps the degree of volatility of (e.g., employment or partnership) episodes in a sequence rather than the quality or substantive meaning of any sequence. That is, two sequences with a similar episode structure can obtain the same index value despite one being considered advantageous –such as continued upward transitions to better paid jobs in an occupational career– and the other being negative or disadvantageous –such as continued moves in and out of employment. Two recent studies therefore suggested to use correction factors to the complexity index that penalize or reward the score depending on theoretically-based qualities of (e.g., employment) transitions (Manzoni and Mooi-Reci, 2018, Ritschard, et al., 2018). We extend this to the study of partnership trajectories, and develop a weighted complexity index that addresses deviations from traditional, socially desirable partnership paths, particularly if deviations are associated with social disadvantage. Research indicates that stable partnerships, particularly marriages, are normatively desirable and result in better economic, social and health outcomes than remaining unpartnered, separating or being in many relationships over the life course (Dush and Amato, 2005). Therefore, we consider entering a first partnership (cohabitation or marriage) as a potentially advantageous transition that does not add complexity to the partnership trajectory. In addition, premarital cohabitation has become the normative standard union formation behavior in many European societies, and practiced by the vast majority of the birth cohort of German men and women studied here (Hiekel and Fulda, 2018). In line with this, we consider marrying (a cohabiting partner), hence institutionalizing a union, as a potentially advantageous transition that does not add or alleviate partnership trajectory complexity. In contrast, we consider the first episode of union instability as the onset of a complex partnership trajectory. Accordingly, entering higher order partnerships followed by further separations are regarded as potentially disadvantageous transitions that add complexity in the partnership trajectory. Table 1 shows which partnership state transitions add complexity or not to the partnership trajectory, based on existing knowledge on their potentially advantageous and potentially disadvantageous consequences.

Table 1. Partnership state transitions that contribute (or not) to the accumulation of partnership trajectory complexity in the study context

Potentially advantageous / do not add complexity	Potentially disadvantageous / add complexity

Never partnered → Cohabiting	Cohabiting → Previously partnered
Never partnered → Married	Married → Previously partnered
Cohabiting → Married	Married → Cohabiting
Previously partnered → Married	Previously partnered → Cohabiting

Notes: The transition Cohabiting → Married is with the same partner. The transition Married → Cohabiting is with a different partner.

Building on a weighted complexity index proposed by Ritschard et al. (2018), we propose a weighted partnership complexity index *wC(s)* that consider the above adjustments and can be written as:

$$\mathrm{wc}(s) = \mathrm{c}(s)^{\alpha}(1 + \mathrm{q}(s))^{\beta}$$

where $\mathrm{c}(s)$ is the complexity index of the sequence and $(1 + \mathrm{q}(s))$ is a non-negative correction factor.[4] The element q(s) of the correction factor is defined as the difference between proportion of potentially disadvantageous transitions and the proportion of potentially advantageous transitions in the sequence. When potentially disadvantageous transitions outweigh potentially advantageous transitions in a sequence, the value of the correction factor is over 1 and the $\mathrm{wc}(s)$ score increases. When potentially advantageous transitions outweigh potentially disadvantageous transitions, the value of the correction factor is below 1 and the $\mathrm{wc}(s)$ score decreases. Last, when potentially advantageous transitions equal potentially disadvantageous transitions, the value of the correction factor is 1 and the $\mathrm{wc}(s)$ score is not affected by the correction factor. The non-negative tuning parameters α and β are weights for the unweighted C(s) index and the correction factor, respectively. We set α equal to 1, and β larger than 1 to strengthen the correction given that the proportion of partnership transitions is rather low in a sequence based on monthly states. Results are presented using a β equal to 1.5, but analyses using smaller or larger β rendered similar results. In our sample, the index wC(s) ranges between 0 and 0.38, with a mean of 0.04 and a standard deviation of 0.07. Disregarding sequences with zero score, the wC(s) average is

[4] The original weighted complexity index by Ritschard et al. (2018) also corrects for the positive or negative meaning attached to the initial state of the sequence. In our research, the initial state is "never partnered", as relationships in a cohabitation before age 16 are generally very rare and non-existent in our sample. Thus, no correction for the initial state was required. However, it is possible to find repondents in other initial states depending on the definition of relationships and the datasets, and then, such correction might be considered.

0.12 and the standard deviation is 0.06. Overall, our empirically valid and sensitive as well as theoretically grounded index wC(s) *(1)* scores zero for sequences that follow a standard ordering of partnership episodes (i.e. do not experience partnership instability), *(2)* scores higher with increasing number of partnership states for sequences that feature non-standard partnership episodes; and *(3)* scores higher with equal durations across partnership states.

[Figure 1 here]

As an illustration, Figure 1 shows four artificial trajectories and the associated values for the weighted partnership complexity index wC(s) at age 40. The first sequence, composed of a "Never partnered" episode, a "Cohabiting" episode, and a "Married" episode, has a zero wC(s) score because we consider it a standard partnership sequence in the study context. We note that the traditional (unweighted partnership) complexity index C(s) would render a non-zero score, because the transitions from, first, never partnered to cohabitation and, second, from cohabitation to marriage adds additional states in the partnership trajectory. Sequence 2 and 3 have an additional episode of "Previously partnered", and thus, the wC(s) is non-zero because of the potentially disadvantageous transition of separation. The score of Sequence 3 is lower than the score of Sequence 2 because most time is spent in the state "previously partnered", which makes the sequence more predictable in empirical terms. In substantive terms, a separation after a long partnership (Sequence 2) may strongly affect individuals at age 40, while the negative effect of (an earlier) union dissolution may have dissipated over time (Sequence 3). Finally, Sequence 4 features two separations and three partnership episodes. Due to the large number of transitions in and out partnerships, the wC(s) is much larger in Sequence 4 than in any other sequence, despite the last partnership transition concerns the institutionalization of a cohabitating partnership through marriage.

Childhood family structure.

Based on retrospective accounts on childhood living arrangements collected in the second panel wave of the survey, we obtained information on all transitions in childhood family structure from birth up to age 16. From these information, we derive our main variables of interest in order to test our hypothesis predicting the accumulation of complexity in the partnership trajectory during adulthood by different aspects of family structure during childhood.

To estimate the average effect of alternative family structure on partnership complexity in adulthood, we distinguish respondents who lived with both biological parents during all childhood years (i.e. the reference group) from respondents who experienced any transition from living with both biological parents. In our sample, n=230 respondents (16%) stopped living with both biological parents before turning 16 years old.

To test the moderating effect of *type of alternative family structure*, we categorize those ever living in an alternative family structure into three groups: (1) living with a single parent (who does not repartner) (2) living in a stepfamily (as first transition or after a period of living with a single parent) and (3) other alternative family structure. The latter group comprises family structures without the biological parents, such as living with other family members, in an institution, independently, or with a partner. We could not distinguish the latter group any further because of low prevalence of each subgroup. The most prevalent transition was starting to live with one parent (usually the mother), an experience shared by 60% of the respondents who experienced an alternative family structure. Of them, 23% subsequently experienced the moving in of the new partner of the parent. Overall, over half of all respondents in an alternative family structure during childhood lived with a single parent at some point whereas about one third lived with one biological and one stepparent at one point during childhood. An alternative family structure initiated by the death of a parent was a rare event reported by n=6 respondents.

To address the instability hypothesis –by which the adult partnership trajectory might be more affected by the number of disruptions and changes in the childhood family structure than the alternative family structure itself– we use the information on the number of transitions in the childhood family structure. We created a categorical variable that distinguishes respondents who spent their whole childhood with both biological parents (i.e. the reference group) from those with one transition to an alternative family structure, and those with two or more transitions across alternative family structures.

To investigate whether the associations between family structure and partnership complexity are driven by the event of *parental separation* rather than the subsequent change in the family structure, we use information on parental separation before age 16 collected in wave 6 with specific questions on occurrence and year of parental dissolution.

Model covariates

Respondent's demographic characteristics. First, demographic choices in the partnership sphere are regulated by social norms (Billari, et al., 2003, Madkour, et al., 2014) and therefore shape people's opportunities to find partners, and institutionalize their unions. We therefore include *respondent's age in years* (centered at age 18, as well as its squared term) as a time varying covariate in order to account for potentially non-linear age effects on building more complexity in the partnership life course.

Second, *women and men* differ in partnership behavior with men more strongly postponing union formation and marriage in particular than women increasing women's opportunities to build more complex partnership trajectories.

Third, *children* may be linked to partnership complexity. Research on partnership dissolution and re-partnering has prominently emphasized the role of *biological children* for relationship stability on the one hand and as a marker for opportunities and constraints on the remarriage market on the other. Joint children are viewed as relationship investments signaling commitment on the one hand and raising exit costs from that relationship on the other (Lyngstad and Jalovaara, 2010). Children from previous relationships constrain the opportunities to enter new relationships, particularly for women (Thomson, et al., 2012). We distinguish childless respondents from those with one, two, and three and more biological children. For robustness analysis we use the *number of biological children living in the same household*. Results were identical.

Fourth, and particular to the context studied, *East-West differences* are taken into account. Alternative family structures were more prevalent in the former German Democratic Republic than in the Federal Republic of Germany due to earlier age at childbearing, higher non-marital fertility, higher marital instability, lower religiosity and higher female labor force attachment – differences that persist more than 25 years after the German reunification (Huinink, et al., 2012, Klüsener and Goldstein, 2016, Kreyenfeld, et al., 2011).

Finally, leaving the parental home is often considered the precondition to experience other demographic markers of the transition to adulthood and strong age norms are attached to it (Aassve, et al., 2013, Billari and Liefbroer, 2007). *Leaving the parental home before age 18* (i.e. the legal age of maturity in Germany), thus earlier than general age norms prescribe, may be strategy to escape an unfavorable situation in the parental household, such as crowded housing or

parental conflict. Linked to early union formation, early home leaving may increase the risk of instability and (multiple) repartnering, thus increasing complexity in the partnership life course.

Respondent's cultural and economic resources. As a cultural resource we account for respondents' *attitudes towards the institution of marriage* resulting from anticipated benefits and rewards of demographic behavior in the partnership sphere (Ajzen, 1991). Positive (negative) attitudes towards being married or experiencing divorce guide people's behavioral choices in the partnership sphere (Hiekel and Žilinčíková, 2018) and may thus also be related to partnership complexity accumulated over the life course. We obtained the mean score of respondent's level of (dis)agreement towards three statements ranging from 1 "not all traditional" to 5" very traditional". The statements concerned attitudes towards the importance of marriage "You should get married if you permanently live with your partner." and "Couples should marry at the latest after a child is born." as well as an attitude towards divorce "Marriage is a lifelong union which should not be broken".

We included respondent's *level of educational attainment* as a time varying covariate as partnership behavior of different socio-economic groups differ with highly educated being more likely to partner and less likely to experience union dissolution in many contemporary Western societies (Härkönen and Dronkers, 2006) We distinguish (1) primary and lower secondary education from (2) higher secondary, non-university education) and (3) university education.

Second, global societal transformations increased labor market uncertainties that, in turn, shape partnership behavior (Mills and Blossfeld, 2013). In the so-called globalization framework, partnership life courses have arguably become more volatile as people's ability to make long term commitments have decreased. We included a binary, time-varying covariate grasping the respondent's labor force status by distinguishing *full- and part-time employment* from other types of employment (marginal, self-employment) and non-employment, respectively (school enrollment, vocational training, unemployment, homemaker, etc.).

Parents' cultural and economic resources. Childhood family structure may affect the accumulation of partnership complexity in adulthood via other possible pathways related to parental characteristics.

First, we included the *years of education of the respondent's parent* with the higher level of education. In the economic view, the transmission of socio-economic status of the family of

origin links to demographic behavior because parents with higher socio-economic standing invest in human capital of their children that affect their earning potential and actual income. At the same time, they tend to encourage their children to postpone costly and hard to reverse family transitions (Barber, 2000, Billari, et al., 2015). Higher social standing of parents has also been linked to greater efficiency in fostering children's life course agency, hence to realize behavioral intentions (Elder, 1994, Elder, et al., 2003, Hitlin, 2007, Hitlin and Elder, 2006, Macmillan, 2006). Finally, more wealthy parents have more financial means to support their children to make costly life transitions.

Second, *mother's age at birth of respondent* relates to the timing of onset of mother's partnership career. Just like unions formed at earlier ages, respondents with a younger mother may be more prone to experience parental instability. Earlier age at parenthood has also been associated with less socio-emotional skills to support the child (Shapiro and Mangelsdorf, 1994). Using the same data and a similar analytical sample, Raab (2017) found that younger mother's age at birth was positively associated with experiencing parenthood earlier, but also events typically preceding childbirth, such as leaving the parental home, and entering a first union.

Analytical strategy

The empirical analyses proceed in two steps. First, we present sample summary statistics of the weighted complexity index for adult partnership trajectories as well as their bivariate associations with indicators of family structure during childhood. Second, we conduct a multivariate regression analysis of the predictors of the weighted partnership complexity index.

To examine complexity in partnership trajectories, an initial key distinction between zero score values (i.e. non-complex trajectories) and positive values (i.e. complex trajectories) of the partnership complexity index wC(s) is necessary. Not accounting for this distinction is empirically and substantively problematic for two reasons. A partnership complexity index wC(s) of zero is structurally different from non-zero positive values and thus not adequately captured in a linear model specification. Additionally, a linear model does not account for the potentially skewed distribution of the measure, given that a large fraction of the sample might not be following a complex partnership trajectory. The different structural source for complex and non-

complex trajectories is evidenced by research on relevant antecedents of and individual' selection into union dissolution (Lyngstad and Jalovaara, 2010).

To address the above mentioned issues, for the multivariate analysis of the complexity index we apply double hurdle models (Cragg, 1971, Wooldridge, 2010). These models are extensions of bounded dependent variable models where some observations are categorically excluded from passing a hurdle, in our case this hurdle is a non-zero score of the wC(s) index equivalent to experiencing a first union dissolution as a precondition to potentially build a complex partnership trajectory. Two equations are estimated. In the first equation a probit model predicts the probability of a non-zero score of the wC(s) index and determines if a partnership trajectory is complex or not. In the second equation a tobit model estimated linear predictions the level of wC(s) given that the observation has a non-zero score and determines the level of complexity of the partnership trajectory after the dissolution of the first union. Despite its similarity with Heckman selection models (Heckman, 1979), double hurdle models are advantageous because first, they do not require an exclusion criterion for the first equation and second, those who do not build a complex partnership trajectory are not disregarded in the second equation that predicts the degree of partnership complexity for everybody who *potentially* dissolves a first union. For the analysis we use repeated observations from each individual overtime, and thus, our complexity index is a time-varying measure that is updated each survey wave. To account for the nested structure of repeated observations over time, we estimate cluster bootstrap standard errors using the *bootdhreg* command in Stata 14.0 (Engel and Moffatt, 2014).

Results from the multivariate analyses are used as initial evidence of the determinants, in particular the family structure during childhood predictors, of complexity in partnership trajectories. Our main interest relies on the estimated coefficients for childhood family structure of the second equation of the hurdle model, as these refer to predictions of the accumulation of partnership complexity overtime. However, results from the first equation are also relevant, as these offer additional evidence on the role of childhood family structure for experiencing a first union dissolution. We predicted separately the association between the four measures of childhood family structure (i.e. alternative family structure until age 16, type of family structure until age 16, parental separation by age 16, number of transitions across alternative family structure by age 16) to assess what features add to the accumulation of complexity in partnership trajectories.

RESULTS

Descriptive findings

In our analytical sample, 59 percent of the respondents have a zero score in the continuous measure of partnership complexity: wC(s). That is, the majority of our analytical sample did not follow a complex partnership trajectory, but entered a stable relationship, still intact at the end of observation. Among the sample minority with a non-zero score in wC(s) the mean value is 0.11, which is equivalent to having entered at least two partnerships before age 40. The distribution of non-zero score values of wC(s) is slightly right-skewed, with more respondents scoring under than over the mean score (see Figure A1 in the appendices). A more elaborate description of the typical partnership trajectory clusters of the birth cohort under study have been published elsewhere (see *Author identifying reference*).

Bivariate associations show that complexity in partnership trajectories is higher among respondents who did not live continuously with both parents from birth to age 16 (*Alternative family structure*) than among respondents who did (*Traditional family structure*). We find that 52 percent of respondents from an alternative family structure in childhood had a non-0 score in the wC(s) index, while the percentage only amounts to 39 percent for respondents from a traditional family structure in childhood. Among those with non- zero scores, a mean score in wC(s) of 0.13 is higher for respondents from an alternative family structure than for respondents from a traditional family structure who scored on average 0.10. The difference is statistically significant, and is equivalent to an additional partnership break-up among respondents from alternative family structures during childhood. The bivariate associations between other model variables and our measure of complexity in family trajectories can be consulted in Table A1 in the appendices.

Multivariate findings

For the multivariate analysis, we deploy hurdle regression models and examine whether living in an alternative family structure during childhood is associated with complexity in adult partnership trajectories in sequential steps, with the estimation of two equations. In a first step we examine whether living in an alternative family structure during childhood is associated with the initiation of a complex adult partnership trajectory as the dissolution of a first union. Results are

presented in Table 2 as predicted probabilities of a non-zero score in the wC(s) index. Conditional on passing the hurdle of initiating a complex partnership trajectory, we examine in a second step whether living in an alternative family structure during childhood is associated with the level of (or a greater) complexity in the adult partnership trajectory. Results are presented in Table 3 as linear predictions of the wC(s) index with zero censoring. Four sets of model specifications examine associations between the complexity measure and family structure during childhood using different strategies to operationalize the latter. All models include the set of relevant respondent's and parental characteristics that affect the study associations. The effects are presented as average marginal effects that reflect the increase (decrease) in the probability of occurrence of a complexity episode (Table 2) or the level of complexity (Table 3) when the predictor increases by one unit (when continuous) or from the reference category to another (when categorical) while all other predictors in the model are fixed at their mean.

In Model 1 of Tables 2 and 3 we distinguish respondents who lived with both biological parents until age 16 (i.e. the reference group) from respondents who entered an alternative family structure at some point during childhood. Results from Model 1 in Table 2 show a higher probability to initiate a complex trajectory when experiencing an alternative family structure in childhood. The predicted probability is 0.24 greater ($p < 0.001$) for a respondent who experienced an alternative family structure in childhood than for a respondent who did not. Results from Model 1 in Table 3 show a significant association of alternative family structure in childhood with the accumulation of greater partnership trajectory complexity in adulthood. Conditional on initiating a complex trajectory, the level of partnership complexity as per the wC(s) index is 0.03 units higher ($p < 0.001$) for a respondent who experienced an alternative family structure in childhood than for a respondent who did not. These associations are robust to controlling for relevant variables such as respondent's socio-demographic characteristics and resources as well as parental resources. The associations of these variables with partnership complexity are also interesting, and in some cases these are relevant for predicting the dissolution of the first union but not for accumulating further complexity in the partnership trajectory. For instance, the predicted probability of dissolving the first union is two times higher for having none or one child (ref. 2 children) or leaving the parental home before age 18 than for living in an alternative family structure in childhood. However, the level of complexity does not increase with any of the model covariate as much as for living in an alternative family structure in childhood.

[Table 2 about here]

In Model 2, we investigate whether the association between family structure and partnership complexity is driven by the effect of parental separation. On a subsample of n=1,070 respondents who participated in wave 6 of the panel and contributing n=9,054 panel observations, we ran an identical model to Model 1 but here use as a main predictor a binary variable distinguishing respondents who did not report a parental separation until age 16 (i.e. the reference group) from those whose parents separated (n=128, 12% of the subsample). Results from Model 2 in Table 2 reveal a positive association between parental separation and partnership complexity, though weaker compared to the models presented in Model 1, in which complexity was predicted by family structure. The predicted probability of initiating a complex partnership trajectory is 0.23 higher ($p < 0.001$) for a respondent who reported a parental separation than for a respondent who did not. This is similar to the predicted probability in Model 1 for respondents who entered an alternative family structure in childhood. Results from Model 2 in Table 3 show that, conditional on initiating a complex trajectory, the level of partnership complexity is only 0.008 units higher ($p < 0.05$) for a respondent who experienced parental separation. This linear prediction is substantively less than the one in Model 1 for respondents having experienced an alternative family structure in childhood. The finding suggests that changes in the family structure, above and beyond the event of parental separation is linked to the accumulation of greater complexity in adults' partnership career.[5]

[Table 3 about here]

In two sets of further models, we answer our second research question on whether types of alternative family structure and the number of transitions across alternative family structures

[5] To support this claim, we next estimated the models presented in Model 1 on the same subsample of the analyses just presented in Model 2. Findings are reported in the appendix Table A2. The findings are virtually identical to the models presented in Model 1 and support our claim that family structure transitions, rather than the event of parental separation itself, is linked to greater complexity in the adult partnership biography.

moderates the association between living in an alternative family structure during childhood and greater partnership complexity in adulthood. Acknowledging diversity in family structure and examining whether some types of alternative family structure are associated with more (less) complexity in the adult partnership trajectory than others, we next included in Model 3 a categorical predictor grasping four types of family structure and their association with our complexity measure. We distinguish (1) respondents who lived with both biological parents until age 16 (i.e. the reference group) from (2) respondents who lived with one biological parent only (i.e. hence, the parent did not enter a new co-resident union), (3) respondents who lived with a biological parent and a stepparent, eventually after a period of single parenthood) and (4) respondents in other alternative family structures. We find that the experience of the most prevalent alternative family structures, single parent family and stepfamily, were associated with greater partnership complexity in adulthood compared to a two biological parent-family. Results from Model 3 in Table 2 show that growing up in a single-parent family was associated with initiating a complex trajectory (0.04; $p < 0.001$) while living in a stepfamily was not associated with initiating a complex trajectory (0.01; $p < 0.001$). We thus find evidence that the repartnering of the biological parent and a stepparent moving in would mitigate, in part, the effect of growing up in an alternative family structure since children growing up in a stepfamily are not more likely to initiate a complex trajectory than those growing up with both biological parents. This conclusion is nuanced by the associations with the accumulation of greater complexity. Indeed, results from Model 3 in Table 3 show that growing up in a stepfamily as well as in a single-parent family was associated with a greater accumulation of partnership complexity over the adult life course. However, the linear predication is four times higher for respondents who (partly) grew up in a stepfamily (0.04; $p < 0.001$) compared to those who grew up in a single-parent family (0.01; $p < 0.001$). A Wald test for the comparison of coefficients confirms that the difference in the linear predications is statistically significant. Finally, growing up in another alternative family form was associated with a higher probability of dissolving the first union, but not associated with more complexity in the partnership trajectory. However, it is difficult to make an interpretation of this results as one could imagine that the family structure types mingled here may have different effects that cancel each other out.

In Model 4, we examined whether the effect of childhood family structure on adult partnership complexity differed by the number of transitions in (alternative) family structures by age 16.

Results from Model 4 in Table 2 show that the predicted probabilities of initiating a complex trajectory are higher among respondents experiencing two or more transitions (0.22; $p < 0.001$) than among respondents experiencing only one transition (0.30; $p < 0.001$). We run a Wald test for the equality of the two coefficients, and the associated results make us conclude that the difference is not statistically significant, and, thus, initiating a complex trajectory is not more likely with increasing number of household transitions during childhood. Results from Model 4 in Table 3 lead to similar conclusions with regards to the accumulation of greater complexity. In this case the linear predictions for one transition and two or more transitions across childhood family structures are identical (0.03; $p < 0.001$). Overall these results suggest that, ceteris paribus, there are no differences for complexity in adult partnership trajectories between lower and higher levels of instability with regards to household structure in childhood.

Sensitivity analysis

The reader will recall that the complexity index used in our analyses is not purely empirical but theoretical grounded and therefore "penalizes" potentially disadvantageous transitions and "neutralizes" socially desirable and potentially advantageous partnership transitions. We therefore also test our hypotheses against an unweighted, thus purely empirical complexity index, using a linear regression model with clustered standard errors. The purpose of these analyses is to see how sensitive our findings are to the corrections we impose based on the existing knowledge on the long-term consequences of different types of partnership behavior. The estimated linear predictions of partnership complexity for alternative family structures in childhood from this sensitivity analysis (see Table A3 in the appendix of the paper) are similar to those of Table 3 using the weighted partnership complexity index wC(s), but the associations are weaker. The association between parental separation by age 16 and the unweighted partnership complexity index are not statistically significant. Growing up in a single-parent or other type of family is associated with the unweighted partnership complexity index. Instead, growing up in a step-parent family is not associated with the unweighted partnership complexity index, which confirms our findings in Table 2 in that the probability of following a complex trajectory is not different across growing up in step-parent family and two-biological-parent families. Two or more transitions across alternative family structures is positively associated with the unweighted

partnership complexity index, while only transitioning once into an alternative family structure is not. All in all, the main conclusion that alternative family structures matters remain.

CONCLUSIONS AND DISCUSSION

Increased rates of union dissolution, the lowering centrality of marriage and the emergence of alternative, less stable union forms have dramatically undermined the time people spent in their first (marital) union in recent decades. At the same time, an inherent complexity in an individual's partnership trajectories has emerged, with increasing transitions across diverse partnership situations and time spent with several partners (and between the partners) over the life course. This study adds to the understanding of how the complexity in contemporary partnership life courses is built by investigating some key intergenerational associations. With the onset of these societal changes dating back to the late 1960's, increasing shares of the contemporary adult population grew up in a single-parent or a step-parent household during their childhood. We inquired whether childhood exposure to alternative family structures (to the traditional nuclear family consisting of the two biological parents and children) is associated with building up greater complexity in the own adult partnership trajectory, and if so, whether the association was moderated by type and stability of alternative family structures.

To answer these questions, we used rich prospective and retrospective longitudinal data from the German Family Panel (pairfam) to reconstruct family structure trajectories from birth to age 16 and adult partnership trajectories from age 16 to age 40. We innovated by proposing a holistic measure of complexity that accounts for accumulated experience in the partnership trajectory. To this end, we built a time-varying, continuous index that takes into account empirical (i.e. number of transitions in and out or across partnerships, and the duration of each partnership situation) as well as theoretical aspects (i.e. whether partnership transitions are deemed advantageous or disadvantageous in a given society) of complexity in an individual partnership life course. We considered that complexity in an individual's partnership trajectory starts with the event of first union dissolution, and build up higher-order partnership formation and dissolution. We formulated hypotheses on the links between dimensions of childhood family structure and the accumulation of complexity in adult partnership life course. We used hurdle regression models to simultaneously examine whether childhood family structure associates with starting a complex trajectory, on the one hand, and building greater complexity thereafter, on the other hand.

A set of key findings provide evidence for the long arm of childhood in shaping adult life courses. First, we find that the exposure to an alternative family structure by age 16 associates with a higher probability of starting a complex partnership trajectory, and with a greater accumulation of complexity thereafter. This supports our underlying hypothesis that not growing up with two biological parents contributes to differentiation processes or complexity in adult partnership trajectories. This finding extends previous studies by showing that the potential impacts of childhood family structure on (marital) separation persists in subsequent higher-order partnership behavior. Our findings lead to the conclusion that the exposure to an alternative family structure in childhood leads to roughly one additional union dissolution in adulthood, on average. It is worth noting that this is not a trivial "effect" given the relatively low numbers of second-order union dissolutions in our sample. In fact, the exposure to an alternative family structure in childhood was a better predictor of greater complexity in the adult partnership trajectory than any other model predictor. In contrast, own biological children and an early age at parental home leaving were better predictors (and others were equally good predictors) of the first union dissolution than an alternative family structure in childhood.

Second, we find that a parental separation by age 16 strongly relates to the separation of the own first union, but weakly associated with greater complexity in the own partnership trajectory thereafter. While there are no substantive differences in the associations of alternative family structure and parental separation in childhood with starting a complex trajectory, the associations with the level of complexity were substantively lower for parental separations. We take this as evidence for an effect of separation related changes in the childhood family structure above and beyond the event of parental separation on the accumulation of greater accumulation of complexity in partnership trajectory.

Third, we find some heterogeneity in the general associations when we investigated the specific types of and the number of transitions across alternative family structures. This partly supports the underlying hypotheses that the diversity and changes in family structures moderate the study associations, in line with ideas of prior research (Härkönen, et al., 2017). The most prevalent transitions from living with both biological parents is moving into a single parent household, which is strongly associated with starting a complex trajectory but moderately associated with accumulating greater complexity thereafter. The second most prevalent transition is starting to live with one biological and one stepparent which is unrelated to starting a complex trajectory but

strongly associated with accumulating greater complexity thereafter. We take the later result as partial evidence for that exposure to a step-parent family in childhood, in part, alleviates complexity in partnership trajectories given that only a minority in the sample starts a complex trajectory. We argued that coresidence of a stepparent may compensate for economic and cultural resources that were lost or limited in access due to the other biological parent's absence in the household.

Finally, we find no substantive differences in complexity of adult partnership trajectories if there was only one transition from living with both biological parents into an alternative family structure, or if there were additional transitions. The result does not support the instability hypothesis (Fomby and Cherlin 2007, Waldvogel et al. 2010) by which we expected that children are at least as much affected by disruptions and changes in the family structure than the type of family structure itself. We believe that part of the absence of an effect is due to the fact that very few respondents experienced several transitions in childhood, and many of them may have ended in a step-parent family structure that alleviate part of the potential *instability effect*.

We note some potential limitations of our study. While using theory-based weights enabled us to acknowledge deviations from socially desirable partnership paths in our complexity measure, one should keep in mind that these weights are specific to the study context. For instance, the transition to an initial cohabitation is normative in the German context but might be a deviant social behavior in other contexts. That is, the measure is not readily applicable to data from other contexts. Despite this, it is relatively simple to adjust these correction factors to the specificity of other contexts. We also note that our results with a theory-based complexity index do not differ substantively from those using an unweighted, empirical complexity index. It is also worth noting that it was not our focus to test the underlying mechanisms of the study associations, and future research should test the cultural and economic explanations we made reference to in the theoretical framework. We used a number of controls in the multivariate models relating to respondent's socio-demographic characteristics and resources as well as for parental resources. Our results were robust to the inclusion of this controls in the models, which indicates that the associations we find are probably less due to the lower socio-economic standing of the individual and the family of origin often associated to exposures to alternative family structures in childhood. However, further research should use more exhaustive measures than the data used in this research. Despite these limitations, our research adds to our understanding of how

intergenerational associations contribute to the accumulation of family-related disadvantage over the life course.

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TABLES & FIGURES

Figure 1. Example sequences of monthly partnership states (age 16 to 40) and values of the weighted partnership complexity index wC(s) at age 40.

1. 

   wC(1)=0.000

2. 

   wC(2)=0.057

3. 

   wC(3)=0.029

4. 

   wC(4)=0.181

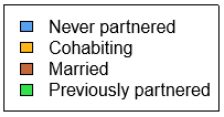


Table 2. Predicted probability for the occurrence of a complexity episode in the partnership trajectory *(average marginal effects)*

	Model 1 AME	Model 2 AME	Model 3 AME	Model4 AME
Family Structure during childhood				
Both biological parents	Ref.			
Alternative family structure	0.244***			
	(0.038)			
Parental separation during childhood				
Parents did not separate		Ref.		
Parents separated		0.225***		
		(0.049)		
Type of Family Structure during childhood				
Both biological parents			Ref.	
Single parent			0.294***	
			(0.057)	
With stepparent(s)			0.066	
			(0.068)	
Another alternative structure			0.792***	
			(0.135)	
Number of transitions across alternative family structures during childhood				
0 (living with both biological parents)				Ref.
1				0.221***
				(0.044)
2 or more				0.301***
				(0.066)
Age	0.069	-0.009	0.080	0.069
	(0.086)	(0.092)	(0.087)	(0.086)
Age squared	-0.001	0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Women (ref. men)	-0.214***	-0.215***	-0.219***	-0.214***
	(0.030)	(0.032)	(0.031)	(0.030)
Number of biological children				0.798***
None	0.796***	0.750***	0.761***	(0.044)
	(0.044)	(0.047)	(0.044)	0.535***
One	0.537***	0.556***	0.527***	(0.035)
	(0.035)	(0.037)	(0.036)	0.069
Two	Ref.	Ref.	Ref.	Ref.
Three or more	0.191***	0.255***	0.153***	0.189***
	(0.041)	(0.043)	(0.042)	(0.041)
Eastern Germany (ref. Western Germany)	0.021	-0.046	0.068	0.022
	(0.035)	(0.038)	(0.036)	(0.036)
Left parental home before age 18	0.630**	0.707***	0.159	0.651**
	(0.199)	(0.203)	(0.231)	(0.200)

Education (ref. Lower)				
Intermediate	0.286***	0.299***	0.317***	0.291***
	(0.069)	(0.073)	(0.073)	(0.069)
Higher	-0.074	-0.120	-0.063	-0.068
	(0.072)	(0.076)	(0.076)	(0.072)
Gainfully employed	-0.179***	-0.158***	-0.178***	-0.178***
	(0.033)	(0.035)	(0.034)	(0.033)
Traditional attitudes to marriage	-0.260***	-0.243***	-0.251***	-0.260***
	(0.013)	(0.014)	(0.014)	(0.013)
Parents' years of education	-0.002	0.002	-0.003	-0.002
	(0.006)	(0.006)	(0.006)	(0.006)
Age of mother at birth of respondent	-0.028***	-0.026***	-0.028***	-0.028***
	(0.002)	(0.003)	(0.003)	(0.002)
Constant	-0.220	0.575	0.153***	-0.222
	(0.936)	(1.017)	(0.042)	(0.936)
R^2	-450.09	-351.26	-390.39	-449.50
Number of observations	10314	9054	9931	10314
Number of respondents	1398	1070	1386	1398

Probit regression for non-zero scores in the W(c) index. First-stage equation of hurdle models. Data: Pairfam (2009-2016, unweighted). Note: Cluster bootstrap standard errors in parentheses. A complexity episode is defined by the dissolution of the first union.

Table 3. Linear predictions of the level of complexity in the partnership trajectory *(average marginal effects)*

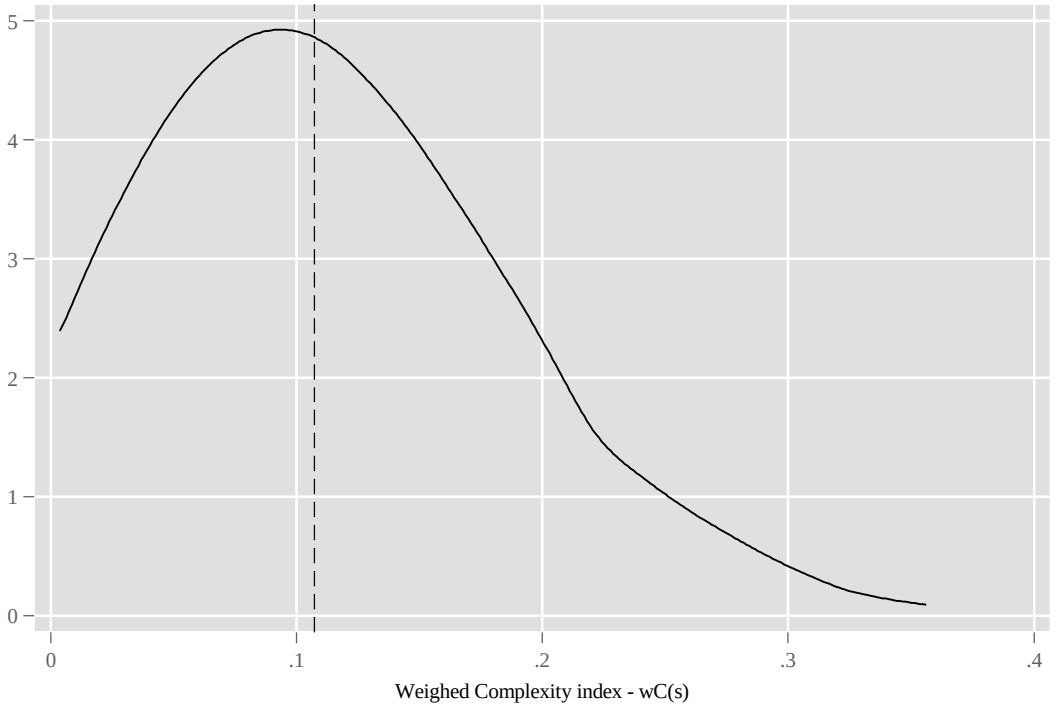
	Model 1 AME	Model 2 AME	Model 3 AME	Model4 AME
Family Structure during childhood				
Both biological parents	Ref.			
Alternative family structure	0.029***			
	(0.003)			
Parental separation during childhood				
Parents did not separate		Ref.		
Parents separated		0.008*		
		(0.004)		
Detailed Family Structure during childhood				
Both biological parents			Ref.	
Single parent			0.014***	
			(0.004)	
With stepparent(s)			0.041***	
			(0.005)	
Another alternative structure			0.008	
			(0.007)	
Number of transitions across alternative family structures during childhood				
0 (living with both biological parents)				Ref.
1				0.029***
				(0.003)
2 or more				0.029***
				(0.005)
Age	-0.001	0.005	-0.001	-0.001
	(0.007)	(0.007)	(0.007)	(0.007)
Age squared	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Women (ref. men)	0.005*	0.004	0.004	0.005*
	(0.002)	(0.003)	(0.002)	(0.002)
Number of biological children				
None	0.008*	0.009*	0.011***	0.008*
	(0.003)	(0.004)	(0.003)	(0.003)
One	0.026***	0.030***	0.024***	0.026***
	(0.003)	(0.003)	(0.003)	(0.003)
Two	Ref.	Ref.	Ref.	Ref.
Three or more	0.009*	0.012**	0.007	0.009*
	(0.004)	(0.004)	(0.004)	(0.004)
Eastern Germany (ref. Western Germany)	0.002	0.001	0.004	0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Left parental home before age 18	0.015	0.036*	0.033*	0.015
	(0.013)	(0.014)	(0.014)	(0.013)

Education (ref. Lower)				
Intermediate	0.002	0.004	0.005	0.002
	(0.006)	(0.006)	(0.006)	(0.006)
Higher	0.016*	0.014*	0.020**	0.016*
	(0.006)	(0.007)	(0.007)	(0.006)
Gainfully employed	0.005	0.005	0.008**	0.005
	(0.003)	(0.003)	(0.003)	(0.003)
Traditional attitudes to marriage	-0.003*	-0.004**	-0.003**	-0.003*
	(0.001)	(0.001)	(0.001)	(0.001)
Parents' years of education	-0.001	-0.000	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Age of mother at birth of respondent	0.001*	0.001***	0.000*	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.125	0.041	0.103	0.124
	(0.077)	(0.082)	(0.075)	(0.077)
LL	-450.09	-351.26	-390.39	-449.50
Number of observations	10314	9054	9931	10314
Number of respondents	1398	1070	1386	1398

Tobit regression of scores of the W(c) index with zero censoring. Second-stage equation of hurdle models. Outcome is a non-zero score in the W(c) index. Data: Pairfam (2009-2016, unweighted). Note: Cluster bootstrap standard errors in parentheses.

APPENDICES

Fig A1. Distribution of the weighted partnership complexity index.



Notes: Pairfam 2009-2016. Density function of the weighed Complexity wC(s) index. Respondent averaged wC(s) index scores across observation were used for calculations. Respondents with averaged 0 scores were omitted. Higher values of the index denote more complexity in partnership trajectories. The density functions have been smoothed using a Kernel estimator. The horizontal line is the mean coefficient of the wC(s) index.

Table A1. Means and proportions of model variables and associations with complexity in partnership trajectories - wC(s) index.

	Proportion	Complex trajectories % of non-0 wC(s)	Complexity score for non-0 wC(s)
Parental separation before age 16			
Yes	0.89	37.20	0.113
No	0.11	45.85	0.130
Types of family structure before age 16			
Two biological parents (only)	0.86	36.07	0.112
Single parent	0.06	49.68	0.132
One step-parent	0.05	44.04	0.146
Other structures	0.03	58.66	0.115
Transitions across family structures before age 16			
One	0.12	46.16	0.134
Two or more	0.05	54.26	0.136
Gender			
Men	0.43	37.24	0.117
Women	0.57	38.82	0.116
Children			
No child	0.16	53.09	0.113
One child	0.26	48.74	0.129
Two children	0.39	27.80	0.11
Three and more children	0.19	28.78	0.108
Educational attainment			
Below secondary	0.04	44.39	0.109
Secondary education	0.56	41.70	0.114
Tertiary education	0.40	32.58	0.123
Employment			
Other or non-employed	0.27	39.42	0.114
Full- or part-time employee	0.73	37.65	0.118
Region			
Eastern Germany	0.21	41.18	0.116
Western Germany	0.79	37.30	0.117
Left parental home			
Before age 18	0.01	57.89	0.138
After age 18	0.99	37.49	0.116
	Mean (st. Dev)	Correlation with non-0 wC(s) indicator	Correlation with wC(s) for non-0 wC(s)
Age (years)	39.74 (2.66)	0.05	-0.09
Attitudes to marriage	2.74 (1.11)	-0.20	-0.05
Parental education (years)	12.24 (2.54)	-0.02	0.01
Age of mother at birth (years)	26.39 (5.72)	-0.10	0.02

Data: Pairfam (2009-2016, unweighted).

Table A2. Comparisons of Model1 of tables 2 and 3 across full and restricted samples *(average marginal effects)*

	Probit Full sample AME	Probit Restricted sample AME	Tobit Full sample AME	Tobit Restricted sample AME
Family Structure during childhood				
Both biological parents	Ref.	Ref.	Ref.	Ref.
Alternative family structure	0.244***	0.233***	0.029***	0.027***
	(0.038)	(0.041)	(0.003)	(0.003)
Constant	-0.220	0.611	0.125	0.046
	(0.936)	(1.013)	(0.077)	(0.081)
LL	-450.09	-301.57	-450.09	-301.57
Number of observations	10314	9054	10314	9054
Number of respondents	1398	1070	1398	1070

First (probit) and second-stage (tobit) equation of hurdle models. Data: Pairfam (2009-2016, unweighted). Note: Cluster bootstrap standard errors in parentheses. Full sample according to Model 1 in tables 2 and 3. Restricted sample according to Model 3 in tables 2 and 3.

Table A3. Linear predictions of the level of the unweighted complexity index *(average marginal effects)*

	Model 1 AME	Model 2 AME	Model 3 AME	Model4 AME
Family Structure during childhood				
Both biological parents	Ref.			
Alternative family structure	0.006**			
	(0.002)			
Parental separation during childhood				
Parents did not separate		Ref.		
Parents separated		0.004		
		(0.003)		
Type of Family Structure during childhood				
Both biological parents			Ref.	
Single parent			0.007*	
			(0.003)	
With stepparent(s)			0.006	
			(0.004)	
Another alternative structure			0.010*	
			(0.005)	
Number of transitions across alternative family structures during childhood				
0 (living with both biological parents)				Ref.
1				0.004
				(0.002)
2 or more				0.010**
				(0.003)
Age	-0.002	-0.001	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)
Age squared	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Women (ref. men)	-0.002	-0.002	-0.002	-0.002
	(0.001)	(0.002)	(0.001)	(0.001)
Number of biological children				
None	-0.002	-0.004	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)
One	0.006***	0.007***	0.006***	0.006***
	(0.002)	(0.002)	(0.002)	(0.002)
Two	Ref.	Ref.	Ref.	Ref.
Three or more	-0.002	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Eastern Germany (ref. Western Germany)	-0.002	-0.003	-0.001	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Left parental home before age 18	-0.003	0.000	-0.007	-0.002
	(0.008)	(0.007)	(0.009)	(0.008)

Education (ref. Lower)				
Intermediate	0.001	0.001	0.003	0.001
	(0.003)	(0.004)	(0.003)	(0.003)
Higher	0.001	0.001	0.002	0.001
	(0.003)	(0.004)	(0.003)	(0.003)
Gainfully employed	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Traditional attitudes to marriage	-0.002***	-0.002***	-0.002***	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)
Parents' years of education	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Age of mother at birth of respondent	-0.000**	-0.000*	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.119***	0.116***	0.116***	0.119***
	(0.014)	(0.013)	(0.014)	(0.014)
Number of observations	10309	9010	9951	10309
Number of respondents	1398	1070	1386	1398

Linear regression of scores of the unweighted complexity index. Data: Pairfam (2009-2016, unweighted). Note: Cluster standard errors in parentheses.