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Institutional Change and Family Formation: The Reunification of East and West Germany in 1989

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Biographical Information

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Abstract

This article uses the German reunification in 1989 to study how institutional change impacts two aspects of women's family formation: *standardization* - the degree to which women's family formation is similar, and *pluralization* - the development of new family formation patterns. In view of the Second Demographic Transition (SDT), institutional, economic, and ideational explanations for family behavior are discussed. The study proposes a new sequence analytical approach to calculate within and between group differences in family formation trajectories. Findings from the German Life History Study (GLHS) show a rapid de-standardization of family formation among East German women after the reunification. With the breakdown of the communist regime, East German women shifted away from a traditional early marriage pattern to alternative family forms. In contrast, West German women's family formation is more standardized after the reunification than before. They polarize into either a traditional or a delayed family formation pattern. As a result, East and West German women's family formation is just as different in the decades following the reunification as it was in divided Germany. The findings support that de-standardization and pluralization of family formation are transitional features of the SDT with a re-standardization of new family forms, once societies have passed through the SDT.

The 'Second Demographic Transition' (SDT) is one of the most debated propositions in family demography over the past decades (e.g. Lesthaeghe, 2010; van de Kaa, 1997; Coleman, 2004). The core empirical regularities suggested in the SDT are a (1) decline and (2) delay of fertility, and a (3) de-standardization of family formation; where de-standardization refers to family formation becoming less similar for different people (Brückner and Mayer, 2005; Elzinga and Liefbroer, 2007, Bras, Liefbroer, Elzinga, 2010; Shanahan, 2000, Lesthaeghe 2010: 211). Empirical family demography has mainly focused on shifts in the timing and quantity of single transitions, primarily fertility and marriage (e.g. Kohler, Billari, and Ortega, 2002; Myrskilä, Kohler, and Billari, 2009). This type of analysis is well-suited for analyzing the decline and delay component of the SDT but has limitations for studying the de-standardization component. As a result, theoretical proposition about the de-standardization of family formation are not as clearly spelled out, and it has received far less empirical attention.

Standardization can be understood as the process "by which specific states or events and the sequences in which they occur become more universal for given populations" (Brückner and Mayer, 2005:32). Conversely, *de-standardization* means that life states, events and their sequences "become experiences which either characterize an increasingly smaller part of a population or occur at more dispersed ages and with more dispersed durations" (Brückner and Mayer, 2005:32,33). De-standardization is often associated with a pluralization of family forms, where pluralization is understood as the development of new types of family formation patterns, for example parenthood in cohabiting relationships (Brückner and Mayer, 2005; Brüderl, 2004). *Pluralization* is defined as an increase in the synchronous number of family states in a given population (Zapf, 1987; Brückner and Mayer, 2005). Whereas de-standardization captures a

quantitative aspect of changing family formation (*how* dissimilar is family formation?), pluralization captures a qualitative aspect, i.e. the content of family formation patterns (*in which way* is family formation different for different people?). Both standardization and pluralization are relational and dynamic concepts: they refer to differences between individual family formation trajectories that evolve over time.

This study has two main analytical benefits. First, I use the German reunification in 1989 as a particularly suitable case to explore institutional, economic and ideational explanations for a de-standardization of women's family formation. The East German sub-society went from high institutional control during communism to a less regulative democratic system after the reunification. At the same time, East German women consistently displayed more secular values than West German women, and were subject to a severe economic crisis in the transition turmoil (e.g. Diewald, Goedicke, and Mayer, 2006; Goldstein and Kreyenfeld, 2011). Second, I conceptualize family formation as a holistic trajectory and propose a new methodological approach for measuring similarity of family formation trajectories within and between groups using sequence analysis and bootstrap re-sampling methods. This allows an improved measurement of the de-standardization and pluralization of family formation before and after the reunification *within* the two German sub-societies. In addition, I specify sequence distances as between-group differences to quantify the difference *between* East and West German women's holistic family formation trajectories before and after the reunification.

PREVIOUS RESEARCH

Research on the de-standardization of family formation is scarce compared to the well-documented decline and delay of fertility across Western societies in the past decades (Billari and Kohler, 2004; Myrskilä, Kohler, and Billari, 2009), and in Eastern Europe after the collapse of the communist regimes (Billingseley, 2010; Frejka, 2008; Sobotka, 2003). Studies that addressed de-standardization emphasized the sequential nature of family formation trajectories and pathways to adulthood. They reported considerable historical and cross-national variation in the degree of standardization and pluralization of early life courses and family formation (Assve, Piccarreta, and Billari, 2007; Buchmann and Kriesi, 2011; Bras, Liefbroer, and Elzinga, 2010; Billari, 2001; Brüderl 2004; Brzinsky-Fay, 2007; Cook and Furstenberg, 2002; Corijn and Klijzing, 2001; Elzinga and Liefbroer, 2007; Huinink 2011; Lesnard, Cousteaux, Chanvril and Le Hay 2010: Sobotka, 2003).

Bras et al (2010) used historical registry-based data for the Netherlands to show a standardization of pathways to adulthood in the second half of the nineteenth century. They argue that industrialization, increasing institutionalization of the labor market, and improving economic conditions enabled young people to establish more standardized normative pathways to adulthood. In line with the tenets of the SDT, studies that focus on the second half of the twentieth century indicate a reverse trend toward de-standardization of early life courses and family formation, albeit with great cross-national variation in the onset and timing of de-standardization (Brüderl, 2004; Elzinga and Liefbroer, 2007; Lesnard et al. 2010).

Comparative studies broadly locate the onset of the SDT in the 1960s for Scandinavian and Western European countries, about ten to twenty years later in the Southern European countries,

and only after the collapse of the communist regimes in Eastern Europe (Brüderl, 2004; Sobotka, 2003; Lesthaeghe, 2010). Several studies show that life courses were highly standardized under the regulative communist regimes in Eastern Europe, with a trend toward de-standardization and pluralization only after the collapse of the communist regimes (Diewald et al., 2006; Elzinga and Liefbroer 2007; Freijka, 2008; Sobotka, 2003). For instance, Elzinga and Liefbroer (2007) used the Fertility and Family Survey to compare family life trajectories of women born between 1945 and 1964 in 19 Western and Eastern European countries. They find a de-standardization of women's family life trajectories across cohorts for all countries, except for Latvia, Poland, Lithuania and the Czech Republic under the communist regimes.

Evidence on de-standardization of early life courses and family formation across welfare regimes is mixed. Elzinga and Liefboer (2007: 245) reported that differences between the social-democratic, liberal, and conservative welfare regime are generally small in contrast to southern and post-communist countries, and that variation is almost as high within as across regimes. In contrast, Lesnard et al. (2010) found that pathways to adulthood cluster to a considerable extent in established welfare regime typologies and that pathways to adulthood converged within Europe over time.

One point of debate in the SDT literature is, which conditions mark the completion of this 'transition' (Coleman, 2004). This calls into questions whether de-standardized family formation is a stable, steady-state outcome of the SDT, or a transitional by-product where family formation re-standardizes into new patterns after the transition is completed. If de-standardization of family formation is a transitional feature of the SDT, a subsequent re-standardization of family formation could be one hallmark of a completed SDT, next to stable sub-replacement fertility (Lesthaghe,

2010). Several recent studies reported a re-standardization of family formation in countries that were among the first to experience the SDT (Elzinga and Liefbroer, 2007; Brüderl, 2004; Huinink, 2011, Lesnard et al., 2010). For instance, Brüderl (2004) used data from the German Family Survey to show a pluralization of family forms for West German women born before the 1960s but a reversal of this trend for younger cohorts. Elzinga and Liefbroer's (2007) findings showed similar trends in Sweden and the Netherlands.

To disentangle the contextual factors that generate such patterns of de-standardization and re-standardization of family formation requires contextualized analyses that take into account the historical and geographical locations family formation processes are embedded in. This article uses the German reunification to derive historically specific hypotheses on the de-standardization and pluralization of family formation in the two German sub-societies before and after the reunification.

THEORY

According to SDT theory, economic development induces ideational shifts that lead to a postponement and decline of fertility, and a de-standardization of family formation. Foundations of this theory are Maslow's (1954) theory of a hierarchy of needs, and Ingelhart's argument of a shift from traditional and survival values to secular-rational and self-expression values (Ingelhart and Baker, 2000). With increasing economic development, urbanization and post-industrialization, post-material needs of self-realization replace material needs, and self-expression values replace traditional values. As a result, young adults center on self-expression

in their careers and prolonged phases of emerging adulthood (Arnett, 2000). Implications for family formation are delay, decline and de-standardization (Lesthaeghe, 2010).

Due to the empirical focus on fertility in the SDT literature, the theoretical arguments of SDT theory are most clearly elaborated with regard to the delay and decline component of fertility and less so for the de-standardization and pluralization component. De-standardization is a relational concept and therefore a property of a population or a group. One person alone cannot be 'de-standardized'. The units of analysis therefore become populations or sub-groups of a population.

There are three lines of theoretical arguments for explaining the link between contextual factors and the degree of de-standardization of family formation: institutional, economic, and ideational. Rather than regarding them as competing accounts, I conceptualize them as interactions as illustrated in figure 1. Figure 1 shows the expected outcomes for family formation patterns in specific institutional, economic and ideational configurations. Below I indicate how these configurations are reflected in my comparative design of East and West Germany before and after the reunification.

FIGURE 1: Institutional, economic and ideational determinants of the de-standardization of family formation

(1.) The *institutional* argument, originally formulated in the life course and welfare state literature (Mayer, 2004, 2009; Esping-Andersen, 1990), assumes that extensive state regulation generates more continuous and standardized life courses compared to more fluid and de-standardized life courses under restrained government intervention (Mayer and Schöpflin, 1989; Leisering, 2003). Strong, regulative states standardize life courses by conditioning access to resources on behavior that conforms to the underlying state ideology. For example, many Eastern

European communist regimes conditioned access to housing on marriage or parenthood. Conversely, de-standardization of life courses is one of the main tenets of theories of individualization, postindustrialism and postfordism (Beck 1992, 2008; Bell, 1974; Sennett 1998, 2006).

Proponents of SDT theory invoke the institutional argument to explain why the STD has not spread across countries ruled by totalitarian regimes (Lesthaeghe, 2010). “The normative and institutional bases of traditional union formation and household structure will systematically weaken in all societies that adopt egalitarian and democratic systems governed by respect for individual choice.” (Lesthaeghe 2010: 244,245). An egalitarian and democratic system then is a necessary but not a sufficient condition for a de-standardization of family formation. As illustrated in figure 1, I assume that family formation in totalitarian regimes will be standardized in a pattern that conforms to the family ideology of the totalitarian regime. In the comparative design this case is represented by communist East Germany before the reunification.

(2.) The *ideational* argument of SDT theory is relatively straightforward to apply to the outcomes of de-standardization and pluralization of family formation (Lesthaeghe, 2010; Huinink, 2011). Less traditional family values incite a de-standardization of family formation as people transition away from traditional family formation patterns. On one hand, less traditional values will generally favor moderately de-standardized family formation with multiple equally accepted alternative family forms. On the other hand, a massive de-standardization can be expected only in the transition from a traditional to a more secular family formation regime. Ever increasing de-standardization of family formation is impossible, because there is an upper bound on the number of family forms than can be lived in one lifetime, even if this upper bound arguably lies well above

the status quo in most European countries. Massive de-standardization however, can arise from frictions in individual adjustment to changing external conditions. Eventually, family formation will re-standardization into new family forms, albeit possibly on a higher level of de-standardization than before.

(3.) The *economic* explanation is most clearly developed in the literature on the fertility decline in Eastern Europe after the collapse of the communist regimes (Colemann, 2004; Kohler, Billari, and Ortega, 2002). In contrast to the long-term positive economic development underlying a shift from traditional to secular values in SDT theory (Lesthaeghe, Ingelhart, and Baker, 2000) this argument is about sudden economic decline. Sudden economic downturn and insecurity during the system transformation depressed fertility and put family formation on hold in post-communist transition economies (Billingsley, 2010; Sobotka, 2003).

Transferring the economic crisis explanation to de-standardization of family formation is less straightforward. There is no obvious relationship between on average lower fertility rates (TFR's) and the standardization of family formation. Instead, it depends on the wider family formation sequence and the distribution of the timing of fertility and partnership formation across the population, whether low TFR's go along with a high or low standardization of family formation. On the one hand, if sudden economic decline puts family formation on hold completely, this could standardize a uniform delay pattern. On the other hand, economic downturn and insecurity do not affect everyone equally. As a result women possibly seek out individualized strategies to adjust family formation to their specific economic situation, which will vary with education for instance (Kreyenfeld, 2010). In addition, the ideational context and norms of family formation will determine how women adjust their family formation to immediate economic pressures.

Figure 1 illustrates the propositions I make about the interaction between ideational and economic determinants of the de-standardization of family formation in democratic systems. First, economic downturn will induce a standardization of family formation if it coincides with traditional values, but a de-standardization of family formation if it coincides with secular values. On the one hand, when economic downturn coincides with traditional family values, women who are unable to realize economic security in combination with the traditional family ideal, will standardize in a uniform pattern of delayed family formation. In times of economic decline, women will face higher pressures to flexibly adjust to the labor market themselves and there will be fewer marriageable men who can grant economic security in a traditional male-breadwinner arrangement. They will therefore uniformly delay partnership formation and fertility. This case is represented by West Germany after the reunification in the comparative design of this study.

On the other hand, when economic decline coincides with secular values, women will adjust family formation flexibly to economic requirements of the labor market with alternative family forms such as cohabitation and motherhood out of wedlock. They thereby adapt to requirements of a volatile labor market with family behavior that is in accordance with their secular values of family formation, for example by delaying costly elaborated weddings, but not motherhood. The interaction of ideational and economic contexts thereby also highlights how gender inequalities on the labor market play into the determinants of the de-standardization of family formation. This case is represented by East Germany after the reunification in this study.

Second, during times of economic growth, family formation will be fairly standardized both in the context of traditional and secular values, but moderately de-standardized when it

coincides with secular values (see figure 1). Economic growth will lead to stability in educational and employment trajectories that will spill-over into more stable and standardized family formation. In addition, welfare services tend to expand in times of economic growth that stabilize and standardize life courses within categories of welfare transfers (Brückner and Mayer, 2005). Also, the content of salient family formation patterns will vary with ideational factors during times of economic growth. In the context of secular values a moderately de-standardized pattern of alternative family forms, such as cohabitation and parenthood out of wedlock will be most prevalent. In the context of traditional values, a standardized early marriage and motherhood pattern will be most salient. This case is represented by West Germany before the reunification.

THE GERMAN REUNIFICATION

The German reunification in 1989 is particularly well suited to explore how institutional, economic and ideational determinants of the de-standardization of family formation interact. Institutional control over life course and family formation was high under the regulative pro-natalist communist regime in East Germany. The strong regulative state was suddenly replaced by the installment of the democratic West German model after 28 years of separation (Diewald, Goedicke, and Mayer, 2006). Economic pressures intensified after the collapse of the communist regime across all of Germany, but more so in the turmoil of transition in East Germany, than in the former FRG. Values were persistently more secular in the East than in the West before and after the reunification (Goldstein and Kreyenfeld, 2011).

The former German Democratic Republic (GDR) in the East aimed at population growth through pro-natalist family policies that conditioned access to state-regulated resources on marriage and parenthood.[1] There was a strong social norm for women to have children in their early twenties encouraged by generous child benefits and facilitated by access to almost universal and daylong child-care (Huinink, Mayer, Diewald, Solga, Sørensen, Trappe, 1995). In the Federal Republic of Germany (FRG), the former West, the main breadwinner model was the core organizing principle of family and housing policies (Brückner, 2004). Tax-splitting among spouses further reinforced incentives for marriage and a male breadwinner/female homemaker specialization. Foreseeing women in the role of homemakers and caretakers, the infrastructure for public childcare was limited, particularly for children under the age of three. Women's employment was lower than in East Germany and often only part-time. As a result, West German women were much more economically dependent on a male breadwinner to sustain themselves and their children. More salient Christian values than in the communist East additionally reinforced a strong norm that children should only be born into legally secured marriages (Engelhardt, Trappe, and Dronkers, 2002).

Even though East Germany was instantaneously absorbed into the West German model in 1989, neither the economic situation nor attitudes and values have converged among East and West German sub-societies as initially expected (Conrad, Lechner, and Werner, 1996; Goldstein and Kreyenfeld, 2011; Kreyenfeld 2003). Goldstein and Kreyenfeld (2011) assembled a wide range of indicators on the ideational and economic situation in East and West Germany in 1990, 2000, and 2008 and concluded that there was little change. East Germany continues to have much

[1] There was also broad support for unwed mothers that favored access to housing and parental leave, which set incentives for premarital births and a delay of marriage for the one-year period of these provisions (Huinink et al. 1995).

poorer economic conditions with higher unemployment, persistently lower wages, and less private property ownership than in the West (Goldstein and Kreyenfeld, 2011; Brenke and Zimmermann, 2009). The communist regime all but eradicated religion as a part of everyday life and left East Germany as one of the currently most secularized areas in the world (Pollack 2002). In 2008, 74 percent of East Germans reported to have no religious affiliation while this was only the case for 16 percent of West Germans (Goldstein and Kreyenfeld, 2011:457). Similarly, the proportion of full-time employed mothers was still much higher in the East in 2008 (50 percent compared to 19 percent) and it was much more common for children aged 0-3 to be in day care than in the former West (41 percent compared to 12 percent). Overall, ideational and economic indicators hardly changed between 1990 and 2008 in the two German sub-societies with deviations around 2 to 3 percent (Goldstein and Kreyenfeld, 2011:457).

Notwithstanding, in 2008 East and West German fertility had converged to a total fertility rate (TFR) of 1.4 (tempo adjusted TRF of about 1.6) in both parts of the country, from record low period fertility of 0.8 children per woman in the East in 1992 (Eberstadt, 1994). This apparent convergence of TFR's possibly indicates a cross-over of East and West German fertility: East German fertility has been steadily rising in recent years, whereas West German fertility has stalled at a TFR of around 1.4 since the 1970s (Goldstein and Kreyenfeld, 2011: 454). East and West German women still differ widely in the average age of first birth, transitions to second and higher order parities, and the extent of childlessness (Kreyenfeld, 2003; Mayer and Schulze, 2010). Childlessness is and was much more common around 20 percent in West Germany compared to only around 10 percent among East German women (Goldstein and Kreyenfeld, 2011). This article contributes to the debate about a convergence of family

formation in the two German sub-societies with a holistic approach that directly measures similarity in family formation trajectories.

STUDY DESIGN AND HYPOTHESES

Figure 2 illustrates the historical comparative cohort design used to analyze the difference in family formation within and between the German sub-societies before and after the reunification. The x-axis shows historical time. The grey bars locate the observed family formation trajectories of the study cohorts in historical time. I compare family formation trajectories between age 15 and 33 of women born in the 1950s in East Germany (1951-1953) and West Germany (1954-1956) to East and West German women born 1971. The cohorts born in the 1950s experienced family formation in divided German sub-societies. Women born 1971 were just beginning their active family formation in a reunified Germany in 1989 (figure 2).[2] I specify four hypotheses on the de-standardization of family formation that correspond to four comparisons before and after the reunification. Expected implications for the pluralization and the content of family formation patterns are elaborated below (see also figure 1).

FIGURE 2: Comparative cohort design of women's family formation between age 15 and 33 before and after the reunification in East and West Germany

Hypothesis 1: massive de-standardization of family formation in East Germany (within-group comparison of East Germany before and after the reunification). This massive de-standardization of family formation will go along with a shift away from a traditional early

[2] The East German sample of the cohort born 1971 includes women who where born in the GDR and living in East Germany in 1990.

marriage and motherhood pattern to alternative family forms including cohabitation and motherhood out of wedlock. During communism the regulative totalitarian state exerted high institutional over life courses and set strong incentive for a standardized traditional family formation pattern. After the reunification and the installment of the democratic West German model, secular values coincided with the economic crisis in the turmoil of transition. East German women will form individual strategies of 'muddling through' (Moen and Roehling, 2005) economic turmoil. They will adopt family formation strategies that are in accordance with these secular values of family formation depending on their individual economic situation (Kreyenfeld, 2010). De-standardization of family formation will appear particularly drastic against the benchmark of highly standardized family formation under the totalitarian communist regime.

Hypothesis 2: moderate re-standardization of family formation in West Germany (within-group comparison of West Germany before and after the reunification). This moderate re-standardization of family formation will go along with a shift from tradition family formation to delayed family formation as the most salient pattern. In the West, a relative economic downturn in the 1990s, albeit far less drastic than in the East, coincided with persistently traditional values of family formation (Goldstein and Kreyenfeld, 2011). Had the economic downturn been more drastic in West Germany as well, I would assume more drastic re-standardization. Family formation will re-standardize into a delay pattern, because family formation is put on hold, if a traditional family ideal cannot be reconciled with economic pressures of the labor market. This re-standardization might be reinforced by a general time trend that is unrelated to the reunification. West Germany was one of the first countries to experience the SDT. If de-standardization is a transitional by-product of the SDT that leads to eventual re-standardization, West Germany should

be among the first societies to re-standardize into new family formation patterns (Brüderl, 2004; Huinink, 2011).

Hypothesis 3: stable standardization of family formation across all of Germany (within group comparison of Germany before and after the reunification). Standardization of family formation across all of Germany is a compositional outcome of the relative strength of de-standardization and re-standardization in the two German sub-societies (hypotheses 1 and 2). More sizeable de-standardization in the smaller East German population and moderate re-standardization in the larger West German population will average to about stable standardization across Germany.

Hypothesis 4: stable difference between East and West German women's family formation (between-group comparison of East and West Germany before and after the reunification). Given that economic conditions, ideational orientations, and gender inequalities have not notably converged in the German sub-societies (Goldstein and Kreyenfeld, 2011:457), I hypothesize that family formation will be equally different between East and West German women in the period immediately following the reunification as before the reunification.

DATA

The data come from the German Life History Study (GLHS) (Mayer, 2008). The study uses retrospective life history data for women born 1951-1953 in East Germany collected in 1991/1992, and for women born 1954-1956 in West Germany collected in 1988/1989. The data for women born 1971 in East and West Germany was collected between 1996 and 1999. They were followed up again with a panel in 2005 (Matthes, Lichtwardt, and Mayer, 2004). I only include women from the 1971 cohort for whom panel information is available. When information was inconsistent in

the basic survey and the panel follow-up, I use information from the basic surveys, because it is less prone to recall error. There were few deviations and in most cases there was only a few months difference in the timing of a change in partnership status.

The analysis sample consists of 485 women born 1954-1956 in West Germany, 287 women born 1951-1953 in East Germany, and 474 women born 1971, of which 132 were born in East Germany and 342 were born in West Germany. I conceptualize family formation trajectories as a series of sequentially linked states. The sequence of family formation becomes the unit of analysis, instead of single elements of this process. The sequences are cut at an equal length of 207 months, which corresponds to 17 years between age 15 and 33 that can be observed for all cohorts. The alphabet of family formation states is specified as follows: S = 'single'; CNC=cohabiting, no child; CC = 'cohabiting, with child', MNC = 'married, no child', MC = 'married, with child'; and DW = 'divorced/widowed'.[3] 'Single' refers to not married and not cohabiting in this analysis, since the data does not contain information on non-cohabiting relationships for all cohorts. Two hypothetical family formation sequences with this alphabet of states would be:

Age	20	21	22	23	24	25	26	27	28	29
ID 1	S	S	S	CNC	CNC	CNC	CC	CC	CC	CC
ID 2	S	MNC	MNC	MC	MC	MC	MC	MC	MC	MC

The woman represented by ID 1 is single until age 23, then she cohabits without having a child until age 26 when she has a child in a cohabiting relationship. The woman represented by ID 2 is

[3] Divorced and widowed are combined to one family formation state, because widowhood occurs very rarely given the women in the sample are relatively young.

also single at age 20. She marries without prior cohabitation at age 21 and has her first child at age 22. She then remains in the state 'married with child' from age 23 until age 29. Note that I analyze monthly and not yearly sequences. The yearly intervals were simply chosen for ease of illustration in this example.

METHODS

This study uses sequence analysis to measure the standardization and pluralization of family formation. Optimal Matching was the first form of sequence analysis that made inroads into the social sciences (Abbott, 1995; Abbott and Forrest, 1986; see MacIndoe and Abbott, 2004 for an introduction). Optimal Matching was originally developed in the natural sciences to analyze sequences of DNA. It is based on the idea that the distance between two sequences can be represented as the 'cost' of turning one sequence into another in a pairwise comparison of all sequences with every other sequence. This sequence alignment is performed with two transformation operations: substitution of states and insertion/deletion of states at some point in the sequence. The transformation operations are assigned a 'cost' by the researcher. The distance between two sequences is given by the total 'cost' of turning one sequence into another, where the Optimal Matching algorithm finds the cheapest possible alignment of two sequences.

Initial critics questioned its applicability to social science research questions (Levine, 2000; Wu, 2000; Elzinga 2003). This criticism triggered a 'second wave' of technical innovations, both within the Optimal Matching framework and through the development of new sequence techniques tailored at social science research questions (Aisenbrey and Fasang, 2010; Brzinsky-Fay and Kohler, 2010; Gauthier et al., 2010). I use Lesnard's dynamic OM distance

that offers an improved account of the timing of transitions within a process (Lesnard, 2008, 2010). Lesnard's dynamic OM distance is a variant of Optimal Matching that employs only substitution operations, no insertion/deletion operations. It accounts for non-linear dependencies of processes on time with time point-specific substitution costs.[4] Substitution costs between two income types are calculated separately at each time point (Lesnard, 2010), where time refers to the women's age in the subsequent application. At each time point, substitution costs are inversely proportional to the frequency of transition between two family formation states. As a result, substitution of two family formation states is 'cheaper', and thus generates less distance, when transitions between two family formation states are frequent. This yields pairwise distances at each time point that are summed up to an overall distance. Formally, time dependent substitution costs s_t between two states *a* and *b* are defined as the sum of four probabilities (Lesnard 2010: 401):

$$s_t(a,b) = \begin{cases} \left.\begin{array}{l} 4 - [(X_t = a \mid X_{t-1} = b) + p(X_t = b \mid X_{t-1} = a) \\ + p(X_{t+1} = a \mid X_t = b) + p(X_{t+1} = b \mid X_t = a)] \end{array}\right\} & if\ a \neq b \\ 0 & \text{otherwise} \end{cases}$$

Substantively, this means that two family formation trajectories will be identified as similar when they go through the same family formation states at the same pace. They will not be regarded as similar if they go through the same family formation states at different speeds.[5] Recognizing the importance of timing in family formation, Lesnard's dynamic Hamming distance places maximum emphasis on the timing and pacing of family formation sequences to determine sequence

[4] Because the dynamic Hamming measure does not apply indel operations, it can only handle sequences of equal length.
[5] To uncover this type of regularity algorithms with indels or time warping are necessary (Halpin, 2010; Stovel and Bolan 2004).

similarity. The output of Lesnard's dynamic Hamming measure is a pairwise distance matrix in which every family formation trajectory is compared to every other family formation trajectory. The pairwise distances are indictors of de-standardization. Just as the concept of de-standardization (Brückner and Mayer, 2005), pairwise sequence distances capture a relational property - the similarity between trajectories - and not a characteristic of individual sequences.

Within and between group comparisons using sequence distances

Figure 2 shows a schematic example of two sequence distance matrices to illustrate how they are used as indictors for de-standardization and as a measure of similarity between East and West German women's family formation. The distance matrix for the cohorts born in the 1950s is displayed on the left hand side and for the cohort born 1971 on the right hand side. In each distance matrix, the ID's are ordered according to the East and West German subsamples (East1, … , EastN, and West1, … , West N). Each cell of the distance matrix will contain a number that is the calculated dynamic Hamming distance between two women's family formation trajectories. The diagonal is zero, because the distance of each sequence to itself is zero.

FIGURE 2: Example sequence distance matrix to illustrate within- and between-group sequence distances

To examine how the degree of standardization of family formation has changed in the German sub-societies, I compare different areas of the distances matrices for women born in the 1950s and women born 1971 who experienced family formation before and after the reunification (see figure 2). The upper left area of the matrix, shaded in light grey, compares every East German woman to every other East German woman. The mean pairwise distances in

this area show how similar family formation is within East Germany, i.e. the degree of de-standardization among East German women (hypothesis 1). Comparing the dark grey areas of the two matrices shows the standardization of family formation within the West Germany (hypothesis 2). Comparing the entire distance matrix of each cohort shows the change in standardization of family formation across all of Germany (hypothesis 3). Comparing the white areas in the off-diagonals of the two matrices shows the between-group comparison (hypothesis 4). In the white areas every East German women is compared to every West German woman. They shows the difference between East and West German women's family formation trajectories before and after the reunification. For example, if mean distances of the white areas are smaller for women born 1971 than for women born in the 1950s this would indicate a convergence of family formation across the German sub-societies after the reunification.

To explore whether differences in mean sequence distances for the different subgroups are statistically meaningful, I calculate bootstrap confidence intervals (Efron and Tibshirani, 1993). Since sequence distances are calculated between each possible pair of sequences, pairs of sequences become the unit of analysis. The number of possible sequence pairs is given by $\frac{N(N-1)}{2}$. Bootstrapping of sequence distances is more complicated than the usual bootstrap, because the independently observed re-sampling units (the family formation sequences) are different from the values the statistic is calculated from (the pairwise distances). To calculate bootstrap confidence intervals, I draw 1000 random samples from the original sequences with replacement and calculate the respective mean pairwise sequence distance for each sample. The

bootstrap confidence intervals represent the variation of these means.[6] In a second step, I use the sequence distances in a ward cluster analysis to identify substantive family formation patterns and explore a pluralization of family forms after the reunification. All analyses are conducted with the TraMineR package for sequence analysis in R (Gabadinho et al., 2010).

RESULTS

The standardization of family formation

Table 1 shows mean sequence distances as indicators of the degree of standardization of family formation before and after the reunification. They are normalized to vary between zero and one to facilitate comparisons across cohorts. 95 percent bias-corrected and accelerated bootstrap confidence intervals are in parentheses.[7] The far right column shows the percentage difference in the means for the cohorts born in the 1950s and the cohort born 1971. Numbers highlighted in bold indicate statistically significant differences between cohorts. The histograms in figure 4 show the distribution of pairwise sequence distances for each subgroup before and after the reunification. Table A1 in the appendix shows the distribution of raw and normalized pairwise sequence distances.

TABLE 1: Sequence distances as an indicator for the degree of standardization of family formation (dynamic Hamming distance, normalized between 0 and 1)

In support of *hypothesis 1*, table 1 and figure 4 show a massive de-standardization of family formation in East Germany after the reunification. Family formation is less standardized

[6] For Lesnard's dynamic Hamming distance, substitution costs depend on time point specific transition rates between family formation states, which can vary across bootstrap samples. As a result, the absolute transition costs can vary across bootstrap samples, but the principle of deriving them always remains the same.
[7] The bias corrected accelerated method corrects for skewness in the distribution of the statistic when calculating the confidence intervals.

by .169 which corresponds to a 41.8 percent (.573/.404 - 1) decrease compared to communist East Germany. The two top graphs in figure 4 illustrate this massive de-standardization with the breakdown of the institutional control of the communist regime. Sequence distances are right skewed for women born in the 1950s, which indicates that many women are very similar to one another in terms of their family formation. For women born 1971, sequence distances are left skewed, which indicates that many women are very different from one another in terms of their family formation. In line with *hypothesis 2* of a re-standardization of family formation among West German women, table 1 shows a moderate but statistically significant 9.2 percent increase in the standardization of family formation for West German women.

In support of *hypothesis 3*, the cross-over of de-standardization for East and West German women averages in stable standardization of family formation across reunified Germany. The mean normalized distance is .514 for the cohorts born in the 1950s and .527 for the cohort born 1971 (table 3). The confidence intervals of .499-.527 and .515-.541 overlap and therefore indicate that there is no statistically meaningful difference in the degree of standardization of family formation before and after the reunification across Germany. Note how this composite mean across Germany masks diverging trends across the German sub-societies.

In line with *hypothesis 4* and Goldstein and Kreyenfeld's (2011) argument of persistent differences between the German sub-societies, East and West German women's family formation is just as different in the two decades following the reunification as it was in divided Germany. Mean between-group distances between East and West German women born 1971 is even slightly higher at .554 than for women born in the 1950s at .520. The bootstrap confidence

intervals (.512-.595 and .513-.540) overlap and suggest that this difference is not statistically meaningful.

FIGURE 4: Histograms of pairwise sequence distances as an indictor of the standardization of family formation (dynamic Hamming distance, normalized between 0 and 1)

The pluralization of family formation

What is the story behind this de-standardization and re-standardization of family formation among East and West German women? To explore the content of changing family formation patterns, I conduct ward cluster analysis on the sequence distance matrices to construct a typology of family formation patterns before and after the reunification. Table A2 in the appendix shows the Calinski and Harabazs (1974) and Duda-Hart (1973) cluster cut-off criteria. Both criteria are based on contrasting within to between cluster distances for different cluster solutions. Larger values indicate more distinct clustering. For the Duda-Hart criterion, small Pseudo T-square indicate more distinct clustering. They support a four group solution both for the cohorts born in the 1950s and for the cohort born 1971.

TABLE 2: Family formation clusters for the cohorts born 1951-1953, 1954-1956 and 1971

Table 2 summarizes information about the four family formation patterns, as well as the percentage of women with a religious affiliation for each group. Overall, the GHLS data substantiates persistently more secular values than West German women. In East Germany, 32.5 percent of the cohorts born in the 1950s and 30.3 percent of women born 1971 reported a

religious affiliation. In contrast, in West Germany 88.0 percent of women born in the 1950s and 86.8 percent of women born 1971 reported a religious affiliation. The four groups presented in table 2 correspond to four similar family formation patterns for the two cohorts of women: (1) marriage and early motherhood, (2) marriage and late motherhood, (3) alternative family forms, and (4) delay of family formation altogether. Cluster two and cluster three correspond to what Ezinga and Liefbroer (2007) and Lesnard et al. (2010:6) call 'modern and alternative late motherhood' as a new re-standardized pattern in France, the Netherlands and Sweden: a late first union, a long period of non-marital cohabitation followed by motherhood after marriage (modern) or out of wedlock (alternative). The findings in table 2 indicate a similar trend also for Germany, as another country among the first to show the empirical trends described in the SDT.

FIGURE 5: Sequence index plots of family formation clusters

Figure 5 shows a graphical representation of the family formation clusters as sequence index plots (Scherer 2001). Age is displayed on the x-axis and the N of sequences is displayed on the y-axis. Each line represents one woman's family formation trajectory. Different colors indicate different family formation states. Even though family formation of women born in the 1950s and women born 1971 cluster into similar substantive patterns, the prevalence of these patterns varies across cohorts (table 2 and figure 5). Overall, the results do not support a pluralization of family forms in the sense that totally new patterns emerge. Instead, the relative size of existing patterns changes, such that women shift in greater numbers into the less traditional family formation patterns of alternative (3) and delayed family formation (4).

The first group, '*early marriage and motherhood'*, most closely resembles the traditional norm of family formation. Women born in the 1950s who follow this pattern spend an average of 128.9 out of 206 month between age 15 and 33 in marriage and motherhood. For women born in the 1950s, this is the most prevalent pattern (35.8 percent). It is internally very homogeneous with an average within-group distance of .19, and particularly common for East German women (55.8 percent relative to 37 percent East German women for this cohort). This shows the strong standardization of East German women's family formation into a traditional pattern under the regulative communist pro-natalist regime. However, religious affiliation is relatively low for this group compared to the cohort average. This pattern thus clearly is the outcome of the high institutional control and the pro-natalist communist fertility regime and not a manifestation of women's traditional values. For women born 1971 we see a clear shift away from this family formation pattern, with a prevalence of only 20.9 percent. Also it is much more equally distributed among East and West German women born 1971.

The second group, '*late marriage and motherhood'*, is also more prevalent for women born in the 1950s (22.1 percent) than for women born 1971 (16.4 percent). Women who follow this pattern go through extended periods of being single (91.1 and 91.7 months), and spend about half a year more in marriage without having children than their cohort average. This group is a de-celerated version of the 'early marriage and motherhood pattern' where women go through the same process at a slower pace. The ability to identify such regularities where people go through the same patterns at varying speeds is a distinctive feature of Lesnard's dynamic Hamming algorithm. The *'late marriage and motherhood'* pattern is more prevalent for West

German women than for East German women particularly after the reunification. For women born 1971 this pattern shows the highest prevalence of religious affiliation (87.3 percent).

The third group, '*alternative family formation'*, shows a high prevalence of cohabitation, motherhood out of wedlock, and divorce. In line with the ideational argument of the SDT, religious affiliation is lowest for women in this pattern relative to their respective cohort average for the 1971 cohort. For both cohorts of women, it is the most internally heterogeneous group with an average within-group distance of .58 and .50, respectively. Before the reunification, this pattern was more common among West German women, after the reunification it was more common among East German women. This shift away from a homogeneous traditional early marriage pattern during communism towards alternative family forms drives the massive de-standardization of family formation among East German women (table 1, figure 4).

The fourth group, *'delayed family formation'*, includes women who spend about twice the amount of time being single than their cohort average. In this cluster, many women remain childless by age 33. This pattern is far more common among women born 1971 than among women born in the 1950s. In line with the argument that women will delay family formation if they are unable to reconcile traditional family formation with their careers and labor market demands, religious affiliation as an indicator for traditional values is high for this pattern. Because the data is censored at age 33, it is impossible to distinguish, whether this is a quantum or tempo effect of fertility (Boongarts and Feeney, 1998), i.e. whether these women simply delay family formation or forgo marriage and motherhood altogether.

DISCUSSION

This article used the historical case of the German reunification to study the intersection of institutional, economic, and ideational factors on the standardization and pluralization of family formation – to date understudied tenets of SDT theory. I hypothesized a de-standardization of family formation among East German women and a re-standardization of family formation among West German women after the reunification. Given that the economic and ideational context has not notably converged in the two German sub-societies (Goldstein and Kreyenfeld, 2011), I hypothesized that between-group differences between East and West German women's family formation would be equally large after the reunification as in divided Germany. A new approach was proposed to measure within and between group differences between family formation trajectories using sequence analysis and bootstrap re-sampling methods.

The results support that East Germany experienced a massive de-standardization of family formation after the breakdown of the institutional control of the regulative communist regime. Secular values were established during communism but only translated into a de-standardization of family formation when they coincided with the economic crisis of transition. The effects are sizeable with record low period fertility of 0.8 in 1992 (Eberstadt, 1994), and a massive de-standardization of family formation (above 40 percent). East German women responded to the economic turmoil and insecurities of the transition process with de-standardized family formation and a high prevalence of alternative family forms, which was in accordance with their secular family values. An important part of the East German story is the strong

standardization of family formation under the high institutional control of the communist system, against which the de-standardization after the reunification stands in particularly stark contrast.

The results for West Germany suggest a trend towards re-standardization in societies that where among the first to pass through the SDT. This is in line with Elzinga and Leifbroer's (2007), Brüderl's (2004) and Lesnard et al.'s (2010) argument that new standards may be emerging in a process of re-standardization in countries that have completed the SDT. This study substantiates such a re-standardization of family formation also for West Germany. The new standard is a polarization into either a traditional marriage and motherhood pattern on the one hand, or a delay of family formation on the other hand. This polarization is driven by structural difficulties to combine a career and a family, tax incentives for a main breadwinner specialization, and persistent traditional family values in West Germany. Family formation will likely re-standardize in country-specific patterns that reflect country-specific adjustments as they pass through the SDT. This resonates with Blossfeld, Klijzing, Mills, and Kurz's (2001) argument that universal pressures of globalization are filtered through national institutions and lead to country-specific outcomes. This should be investigated in future research that complements quantitative average indicators on family formation with holistic approaches to include the qualitative content of family formation patterns.

This study substantiates previous research that shows stable differences instead of convergence of East and West German women's family behavior after the reunification. Similar to Goldstein and Kreyenfeld's (2011) finding of a cross-over rather than convergence of TFR's, the results show a cross-over in the degree of de-standardization of family formation before and after the reunification for the two German sub-societies that leads to a stable average

standardization across all of Germany. This forcefully illustrates the added value of complementing average indictors of isolated family events, such as TFR's, with a more comprehensive perspective on the larger process they are embedded in. Even though it may seem politically obsolete or even unjustified to regard East and West Germany as separate sub-societies more than 20 years after the reunification, the empirical reality of such persistent differences suggests otherwise - particularly given complex cross-over effects that are masked in overall averages.

This study has several limitations. The data has obvious advantages by covering several cohorts in a longitudinal design, but unfortunately it is censored at age 33 and does not allow for a more detailed specification of family formation states. It would have been desirable to include same-sex relationships, adopted and step families, and living-apart-together (LAT) relationships that may be concealed behind the delay patterns. Depending on the distribution of LAT relationships across the German sub-societies, this could also affect the comparison between sub-societies. Possibly, young women in West Germany shy away from more institutionalized commitments such as cohabitation, marriage and motherhood, but not from intimate relationships altogether.

In concluding, I return to the interaction of institutional, economic, and ideational factors as determinants of family formation. It is important to isolate the impact of single context effects, especially when we are interested in evaluating the effects of specific policies on fertility and family formation. This study makes a case in point that theorizing about multiple-way interactions between different contextual factors is a promising additional approach to understand life course patterns in general and family formation patterns in particular.

APPENDIX

TABLE A1: Distribution of raw and normalized sequence distances

		Raw			Normalized		
	N	Mean	Min	Max	Mean	Min	Max
Cohorts 1951-53 and 1954-56							
Within East Germany	41,041	313.55	0	739.52	.404	0	.953
Within West Germany	117,370	423.42	0	775.99	.546	0	.999
All of Germany	297,606	398.92	0	775.90	.514	0	.999
Between East and West Germany	139,195	403.19	0	775.88	.520	0	.999
Cohort 1971							
Within East Germany	8,646	444.27	0	739.87	.573	0	.953
Within West Germany	58,311	388.10	0	727.18	.500	0	.937
All of Germany	112,101	409.26	0	738.73	.527	0	.952
Between East and West Germany	45,144	429.83	0	738.72	.554	0	.952

TABLE A2: Cluster cut-off criteria

	Cohorts 1951-1953 & 1954-1956		**Cohort 1971**	
Cluster No.	Calinski/Harabasz Pseudo F	Duda/Hart (Pseudo T-Square)	Calinski/Harabasz Pseudo F	Duda/Hart (Pseudo T-Suqare)
1		.9457 (44.19)		.9897 (4.93)
2	44.19	.9951 (2.41)	4.93	.9879 (3.61)
3	23.29	.9847 (5.88)	4.24	.9926 (1.31)
4	**17.57**	**.9962 (0.74)**	**3.28**	**.9970 (0.52)**
5	13.34	.9347 (8.81)	2.58	.8385 (23.11)
6	12.33	.9943 (1.57)	6.20	.9925 (0.73)
7	10.57	.9964 (0.66)	5.30	.8678 (13.56)
8	9.16	.9792 (1.38)	6.31	.9981 (0.11)
9	8.22	.9899 (1.36)	5.52	.9951 (0.38)
10	7.48	.9989 (0.13)	4.96	.9981 (0.12)
11	6.74	.9945 (0.97)	4.46	.9996 (0.04)
12	6.23	.9131 (7.62)	4.05	.9106 (3.04)
13	6.46	.9919 (0.48)	3.88	.9487 (2.32)
14	5.98	.9747 (1.35)	3.74	.8622 (4.32)
15	5.67	.9997 (0.02)	3.77	.9909 (0.38)

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TABLES

TABLE 1: Sequence distances as an indicator for the standardization of family formation (dynamic Hamming distance, normalized between 0 and 1)

	Before the reunification Cohort 1951-53/ 1954-1956	**After the reunification Cohort 1971**	**Difference (percent)**
East Germany	.404	.573	**.169**
	(.375-.439)	(.556-.597)	**(41.8)**
West Germany	.546	.500	**-.046**
	(.532-.562)	(.488-.516)	**(9.2)**
Germany	.514	.527	.013
	(.499-.527)	(.515-.541)	(2.5)
East-West Difference	.520	.554	.034
	(.513-.540)	(.512-.595)	(6.5)

Note: 95 percent bias-corrected and accelerated bootstrap confidence intervals in parentheses. Differences in bold indicate non-overlapping bootstrap confidence intervals

TABLE 2: Family formation clusters for the cohorts born 1951-1953, 1954-1956 and 1971

	Women born 1951-1953 and 1954-1956					Women born 1971				
Family formation cluster	All 1950s	Marriage, early child	Marriage, late child	Alternative	Delay	All 1971	Marriage, early child	Marriage, late child	Alternative	Delay
N	772	276	185	194	117	474	99	79	122	174
(%)	(100.0)	(35.8)	(23.9)	(25.1)	(15.2)	(100.0)	(20.9)	(16.7)	(25.7)	(36.7)
East German (%)	37.2	55.8	36.8	22.1	18.8	27.9	27.3	16.4	40.9	24.1
Within cluster distance		.19	.32	.58	.13		.30	.25	.50	.26
Mean duration (months)										
single	90.8	58.6	91.1	77.2	189.1	115.3	58.1	91.7	92.5	174.4
cohabiting, no child	13.1	3.3	8.7	36.7	4.3	29.5	18.1	17.9	56.6	22.3
cohabiting, with child	3.3	.9	3.4	7.3	2.2	8.7	3.8	3.1	22.7	4.2
married, no child	23.9	13.2	30.1	45.3	3.4	17.9	19.5	26.4	25.3	7.9
married, with child	68.9	128.9	69.7	20.7	5.7	43.9	116.1	76.7	17.3	6.6
divorced/widowed	5.0	.16	1.9	17.7	.3	.74	.5	.2	1.6	.5
Religious affiliation (%)	67.4	61.3	69.2	68.6	76.9	71.1	69.7	87.3	60.7	71.8

Figures

FIGURE 1: Institutional, economic and ideational determinants of the de-standardization of family formation

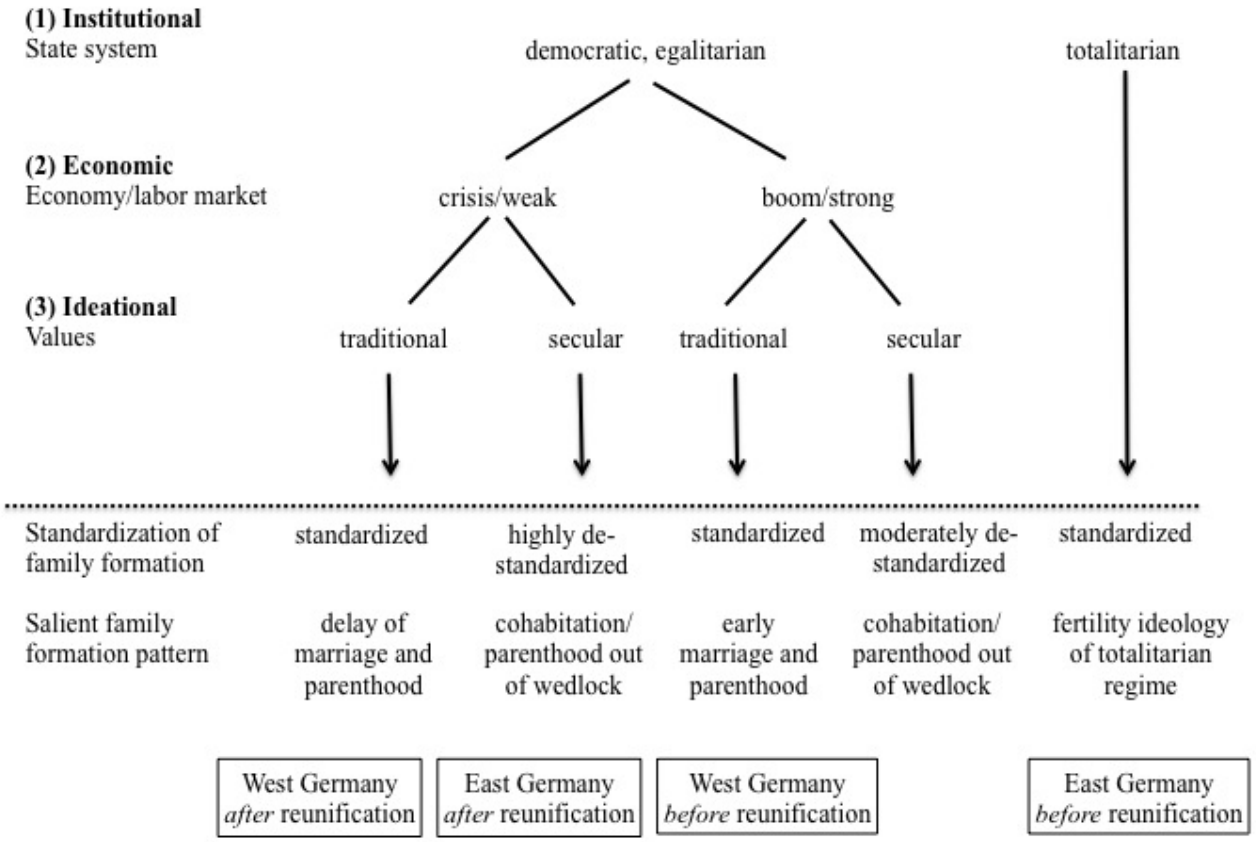


FIGURE 2: Comparative cohort design of women's family formation sequences between age 15 and 33 before and after the reunification in East and West Germany

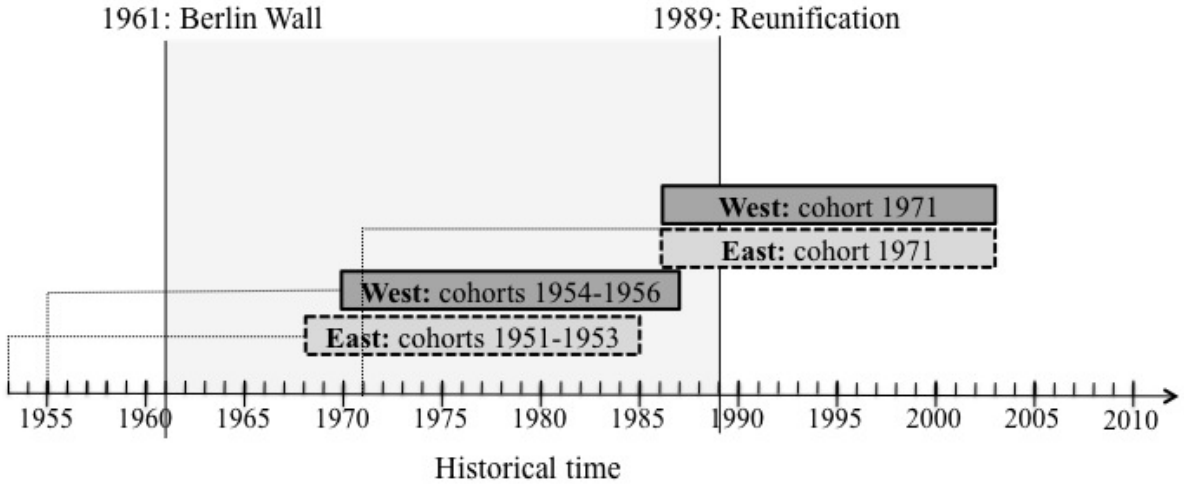


FIGURE 3: Example sequence distance matrix to illustrate within- and between-group sequence distances

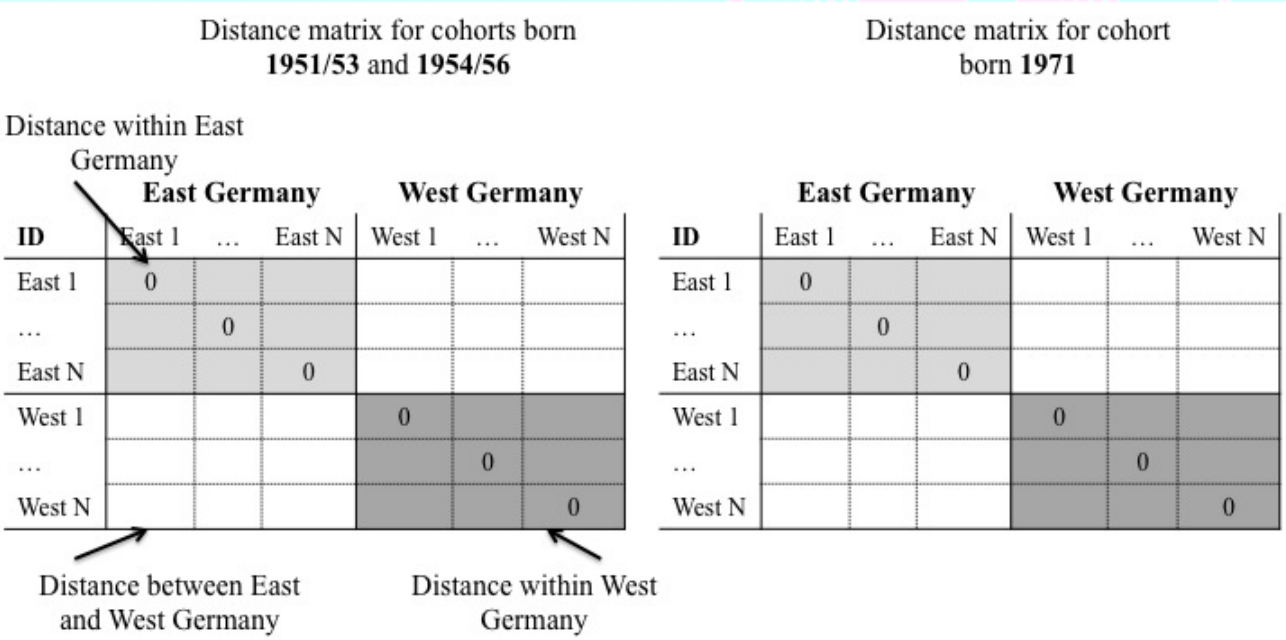


FIGURE 4: Histograms of pairwise sequence distances as an indictor of the standardization of family formation

(Dynamic Hamming distance, normalized between 0 and 1)

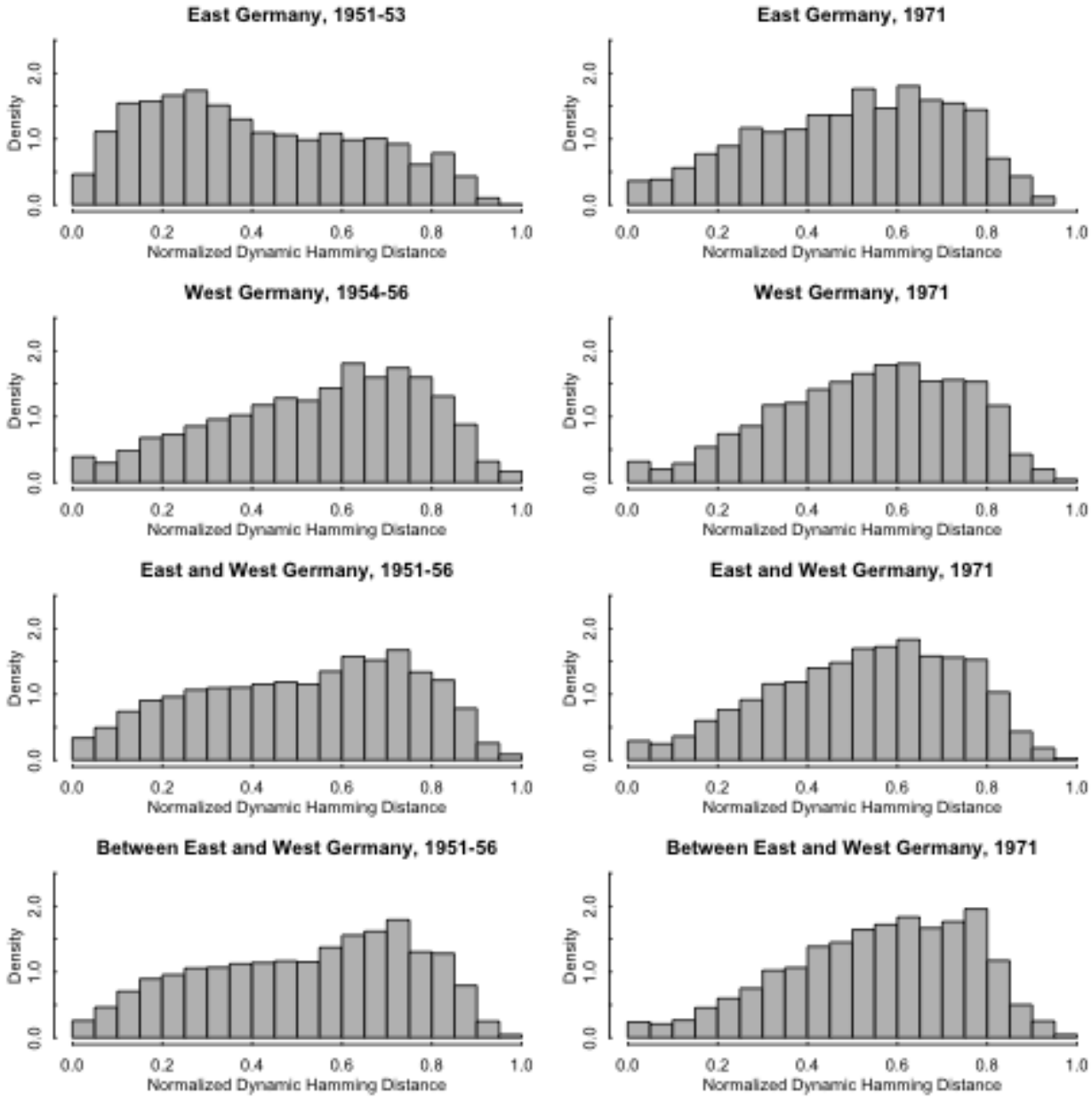
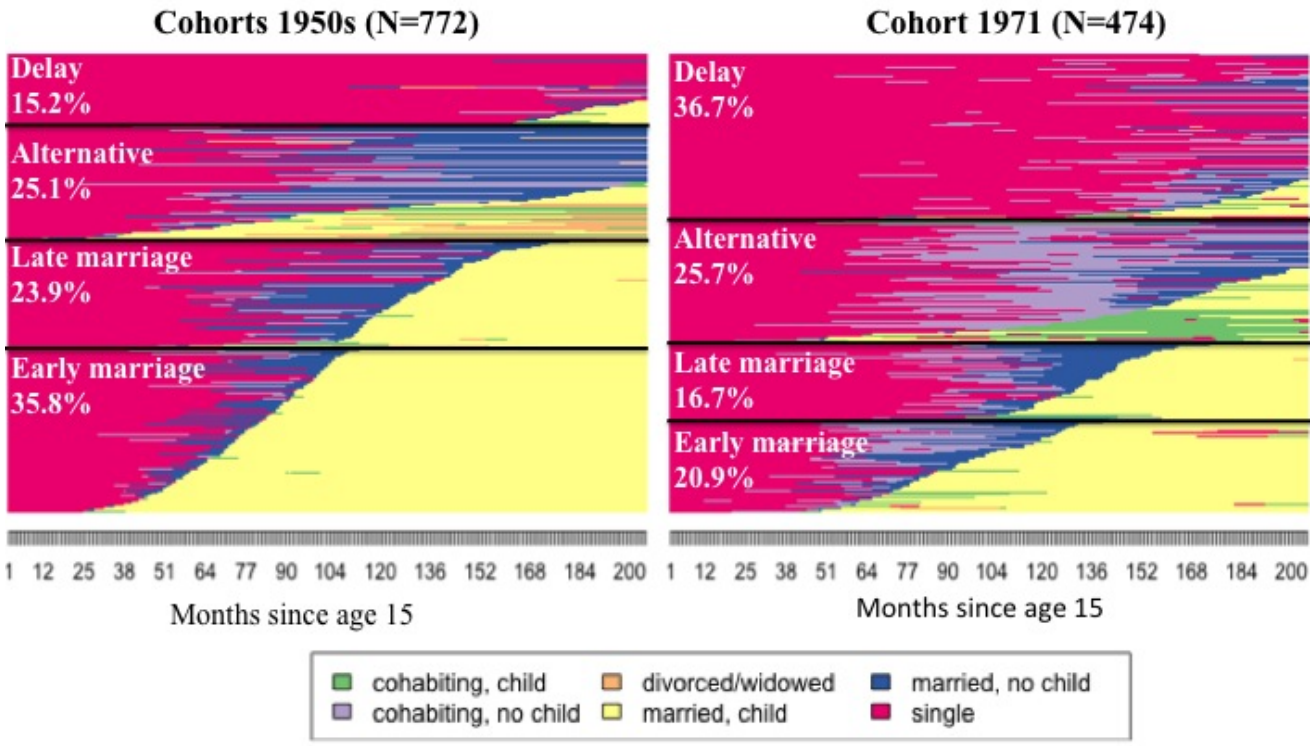


FIGURE 5: Sequence index plots of family formation clusters



Note: sequences sorted by cluster membership and age of first birth