The transition of the sequencing of family life events in Europe: a cross-regional perspective

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Abstract

This article analyzes the evolution of the sequencing of family life events in Europe during the second half of the 20th century using individual data from the European Social Survey and from the Generation and Gender Program. Considering the four events 'leaving the parental home', 'first cohabiting union', 'first marriage', and 'first parenthood', we hypothesize a transition from a traditional standard event order characterized by a high degree of synchronization between the first three events towards a new standard whose features are a high degree of de-synchronization between first cohabitation and first marriage and a reversal of the traditional order between first marriage and first parenthood. We also hypothesize cross-regional differences in the timing and in the shape of the transition from one standard to another. Applying specifically developed tools to visualize and analyze event sequences, we show important regional variation in the evolution of the sequencing of family life events. Hardly any change can be observed in Southern Europe, where the sequencing behavior of family events has remained highly standardized and rooted in the traditional standard. In Eastern Europe where family event sequences have become less standardized and where a particular sequence characterized by the reversal of the traditional order between leaving home and family formation has been observed, the hypothesized transition is still in its very beginning. In Western Europe the transition is clearly on its way, but no re-standardization towards a new standard can be observed as for now. As expected, the transition is most advanced in Northern Europe, where evidence for a certain re-standardization process in the sequencing of family life events has been found.

Keywords: Family-life events; Transition to adulthood; Second demographic transition, Event sequences

Introduction

For the last three decades, sociologists and demographers alike have extensively studied the transition of the life course during the post-war era in Western societies. This process has been described by most scholars as the transition from a standard life course, characterized by norms about the proper age and sequencing of events relating to family life, education and work, towards a de-standardized life course that can be characterized as a series of events that are clearly less age-related and whose temporal order is now subject to substantial individual variation (Elder, 1975; Modell, Furstenberg & Hershberg, 1976; Kohli, 1985).

The process of pluralization of family life trajectories and occupational careers has been studied in different perspectives. In a demographic perspective, the increasing diversity in the

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family life course in general and the decreasing age-relatedness of family events in particular can be understood as the consequences of the second demographic transition (SDT) (Lesthaeghe & van de Kaa, 1986; van de Kaa 1994; Lesthaeghe 2010). Starting in the 1960's in Northern Europe and the United States, the SDT has mainly brought about changes in the timing, type, frequency and stability of unions as well as in the level and pattern of fertility. The proportions married started declining due to the rise of age at marriage, pre- and postmarital cohabitation and divorce. Fertility, the less and less confined to marriage due to rising parenthood within cohabitation, declined to structural sub-replacement levels because of efficient contraception and increasing postponement of first parenthood (Lesthaeghe 2010). Therefore, the SDT has transformed the process of family formation into a more and more complex sequence of events, given that formerly scarce demographic phenomena such as unmarried cohabitation and extra-marital parenthood have become frequent and widely accepted.

In a life course perspective on the transition from youth to adulthood, numerous studies have shown how family life trajectories and occupational careers of young adults have become increasingly diverse during the last few decades (Rindfuss, Swicegood & Rosenfeld 1987; Kerckhoff, 1990; Kiernan, 1991; Liefbroer & de Jong Gierveld, 1995; Billari & Ongaro 1998). This increasing diversity has often been summarized under the concept of individualization (Buchmann, 1989; Beck & Beck-Gernsheim 1994), meaning that individuals have gained greater control over their lives. Alternative descriptive and interpretative concepts have been suggested recently to address the changes in the transition process to adulthood. Brückner and Mayer (2004) have distinguished the concepts of de-institutionalization (referring to the process by which normative, legal or organizational rules on the social and temporal organization of life weaken), de-standardization (referring to the process by which states, events and sequences in the life course become less universal and less uniform), and differentiation (referring to the process during which the number of distinct life course states increases).

Recent research has focused on these various dimensions of the diversification of young adults' life courses. De-institutionalization has mainly been addressed by means of timing analyses of family life events such as leaving the parental home, first union and first parenthood (Corijn & Klijzing, 2001; Billari, Philipov & Baizan, 2001; Billari, 2004; Schumacher, Spoorenberg & Forney, 2006), whereas de-standardization and differentiation in the sense of Brückner and Mayer (2004) are increasingly analyzed through sequence analysis and in particular through specific indicators designed to measure complexity and variation within and between individual trajectories (Elzinga & Liefbroer 2007; Widmer & Ritschard, 2009; Robette, 2010). Although the changing order of events in the transition to adulthood has been a major concern in early papers (Hogan, 1978; Marini, 1984; Rindfuss, Swicegood & Rosenfeld, 1987), in recent studies the sequencing of life course events has attracted much less attention than the timing of transitions and the sequencing of life course states (Liefbroer & Billari, 2010). The changing order of life course transitions has been addressed only rarely (Rindfuss et al., 2010) and if so, analyses have mostly been confined to pairs of coupling (synchronized) and de-coupling (de-synchronized) events (Corijn & Klijzing, 2001; Billari, Philipov & Baizan, 2001; Billari & Liefbroer, 2010).

Rather than looking at two-by-two combinations of life course events, our analysis focuses specifically on sequences of family life events in young adults' life courses. The aim of this study is threefold. First, we extend the study of de-standardization in the life course to the order of family life events in the transition to adulthood. Using data from the European social survey (ESS), we follow the sequencing of the four events 'leaving the parental home', 'first cohabiting union', 'first marriage' and 'first parenthood' across three cohorts and assess to what extent the sequencing of these particular events has become less standardized over time.

We also specifically address the question whether re-standardization can be observed in recent cohorts, as it has been asked recently (Elzinga & Liefbroer, 2007; Billari & Liefbroer, 2010). Second, our study analyzes cross-national differences in the evolution of the event sequence under study. Recent research has given evidence for important between-country variation in the transition to adulthood and has focused on institutional and cultural factors associated with cross-national differences (Corijn & Klijzing, 2001; Billari, 2004; Gauthier, 2007; Elzinga & Liefbroer, 2007; Billari & Liefbroer 2010). In our study we describe geographic differences in the sequencing of the four family life events and in the evolution of this event order comparing 4 groups of European countries. Last but not least, we present an innovative tool to visualize event sequences and show how to measure their degree of uniformity in a given group.

Hypotheses on temporal and geographic variation in family life event sequences

Towards a new standard sequence of family life events?

During the postwar era the structure of the family life course has undergone important changes. The postponement of first marriage and first parenthood have lengthened the transition process to adulthood, while the rising social acceptance and diffusion of unmarried cohabitation and non-marital fertility have resulted in complex life courses, characterized by sequences hitherto hardly observed. Although the changes the SDT has brought about can be associated with higher individual diversity in young adults' life courses, Billari and Liefbroer (2010) have recently hypothesized that the new demographic behavior may lead to a new dominant pattern in the transition to adulthood. Rather than expecting further de-standardization, they have argued that the changes observed in the life course of young adults since the 1960's can be seen as the shift from a pattern dominant in the 1950's and 1960's to a new ideal-typical pattern of transition to adulthood. Whereas the first can be characterized as 'early, contracted, and simple', the latter can be defined as 'late, protracted, and complex'. In the 1950's and 1960's the transition to adulthood was early in the sense that most events relating to that transition process occurred at relatively young ages. As a consequence, the time span between the first and the last event was short, and the transition process contracted. The pattern may have also been simple, given that the comparatively few transition events usually occurred in a standard temporal order. The new pattern Billari and Liefbroer hypothesize can be characterized as late in the sense that many events of the transition process occur at higher ages. Given the long time span between the first (typically leaving home) and the last transition (usually first marriage or first parenthood), the transition process is also protracted rather than contracted. It may also be considered complex in the sense that the new process pattern consists of many events, some of which are also repetitive.

Following the idea expressed by Billari and Liefbroer, we hypothesize in this article that also the ordering of family life events in the life course of young Europeans is shifting towards a new standard event sequence. We expect to observe a transition from a standard that was dominant prior to the onset and diffusion of the SDT to a new standard spreading along with this second wave of demographic change. Figure 1 illustrates graphically the shift we expect to observe in the event sequence of the four family life events 'leaving home' (LH), 'first cohabiting union' (FU), 'first marriage' (FM) and 'first parenthood' (FP).

Given the low prevalence and social acceptance of unmarried cohabitation and extra-marital fertility in the 1950's and 1960's, we expect the traditional standard event sequence to be characterized by a high degree of synchronization among the first three events and by a clear order between marriage and parenthood, the former preceding the latter. In particular, we expect to observe synchronization between first union and marriage, and, to a lesser extent and depending on the geographic context, between leaving home, first union and marriage. In the

first step of the hypothesized transition from a traditional to a new standard event sequence, we expect to find de-synchronization between first cohabiting union and marriage. Although reliable data on the timing of the onset and the speed of the diffusion of unmarried cohabitation across Europe is lacking, we hypothesize that the rise of cohabitation precedes the diffusion of first parenthood within unmarried unions. A recent study on the social norms on demographic behavior in the Netherlands has indeed shown that about 82 % of the population deliberately approve unmarried cohabitation, whilst only about 54 % do so for having a child without being married (Liefbroer & Billari, 2010). In the second step finally we expect to observe a tendency towards a reversal of the traditional order between first marriage and first parenthood, as well as further de-synchronization between leaving home and first union (Corijn & Klijzing, 2001). The trend towards a new sequential order between first marriage and first parenthood is to be awaited when looking at the level of extra-marital fertility in Northern Europe where the SDT is most advanced (Sobotka & Toulemon, 2008). As an important feature of the SDT, the rising aspiration to individual autonomy should lead to further de-synchronization between leaving home and first union. To sum up, in the new standard order of family life events in young adult's life courses we expect to observe in our analysis, leaving home is followed by the transition to unmarried cohabitation and then by the transition to first parenthood. Depending on whether cohabitation represents a prelude or an alternative to marriage (Rindfuss & VandenHeuvel, 1990; Heuveline & Timberlake, 2004), first parenthood may or may not be followed by first marriage.
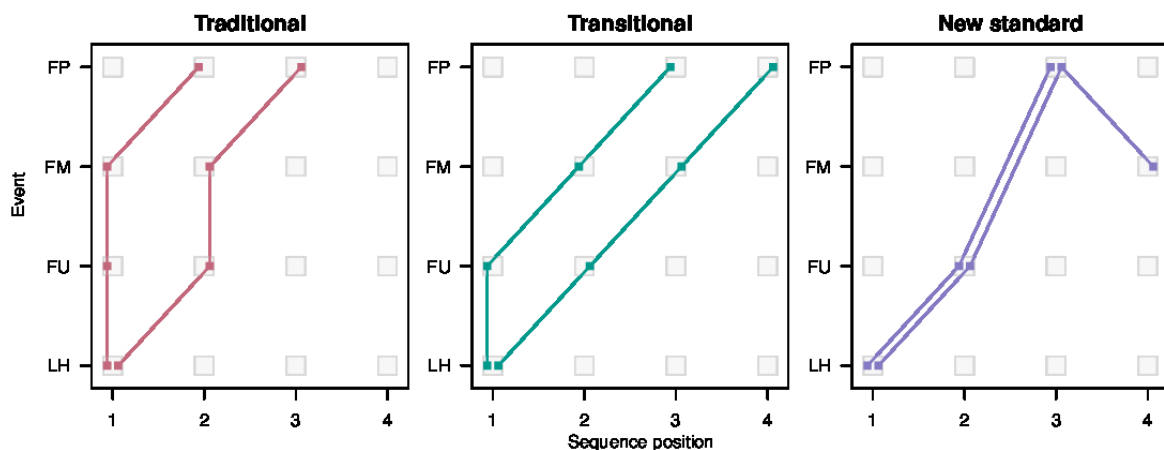

Figure 1: Expected shifts in European family event sequences

Hypotheses on cross-national differences

In our study of family life event sequences we expect to observe geographic differences in the timing and the shape of the transition from a traditional to a new standard sequence. Differences in the timing of the decline in the traditional standard as well as in the emergence of a new standard sequence are to be expected given the spatial pattern demographers have observed in the diffusion of the SDT (Lesthaeghe 2010; Sobotka 2008). The demographic changes that have later been associated with the second demographic transition were first observed in the late 1950's in the United States and in Scandinavia and then spread to Western Europe. Until the end the 1980's, however, the SDT seemed to be limited to Northern and Western European countries (including European populations across the oceans), as cohabitation and extramarital fertility were nearly absent in Southern Europe, whereas in Central and Eastern Europe early marriage and fertility patterns were still clearly predominant. After the collapse of communism in 1989, several features of the SDT emerged simultaneously in the countries of Central and

Eastern Europe. In Southern Europe where the trend towards postponement of union formation and fertility started already in the 1970's, extramarital fertility started to rise only after the turn of the millennium, whilst non marital cohabitation remained low. Given these regional differences in the timing of the SDT, we thus expect the transition of the sequencing of family life events to be most advanced in Northern Europe, less advanced in Western Europe and only in its beginning in Eastern and Southern European countries.

When looking at the extensive literature on persisting regional variation in the structure of the family life course of young Europeans (Corijn & Klijzing, 2001; Billari, 2004; Gauthier, 2007; Elzinga & Liefbroer, 2007; Sobotka & Toulemon, 2008; Billari & Liefbroer 2010), we must also expect to observe differences in the shape of the transition from a traditional standard event sequence to a new standard. Oppositions between Northern and Southern Europe on the one hand, and between Western and Eastern European countries on the other hand have often been associated with differences in institutional regulation (Buchmann, 1989; Breen & Buchmann, 2002), in particular with welfare state policy (Esping-Andersen, 1990; Iacovu, 2002; Elzinga & Liefbroer, 2007), and with enduring cultural differences rooted in European family history (Hajnal, 1965; Hajnal, 1983; Reher, 1998; Dalla Zuana, 2001; Iacovou, 2010). Relying on Esping-Andersen's typology, authors emphasizing the role of welfare state policy have hypothesized greater de-standardization and differentiation in social-democratic regimes than in liberal and conservative countries, arguing that in societies where social benefits are provided directly by the State, individuals rely less on their family and enjoy therefore of a higher degree of autonomy (Elzinga & Liefbroer, 2007). Based on Esping-Andersen's (1999) idea of a Mediterranean welfare regime and Reher's (1998) hypothesis of historically weak family ties in Northern Europe and strong family ties in Southern Europe, several authors have also hypothesized an opposition between a Southern transition pattern, characterized by a prolonged stay in the parental home and a high degree of synchronization between leaving home, first union and marriage, and a Northern pattern, characterized by the de-synchronization between leaving home and family formation (Cavalli & Galland, 1993, cited by Billari, Philipov & Baizan, 2001; Iacovou 2010a). With respect to differences between Western and Eastern Europe, Billari, Philipov and Baizan (2001) have also pointed to Hajnal's (1965) influential hypothesis of a historical East-West divide in European family systems. According to Hajnal, in the West-European family system, roughly located west of a line connecting Trieste and St. Petersburg, age at marriage has been high since the late Middle ages, proportions of permanent celibacy substantial and households nuclear, whereas in the Eastern-European family system, marriage has been early and almost universal whilst households have often had a complex structure. In a later paper, Hajnal (1983) established a connection between the historically rooted nuclearity of households and the high mean age at marriage in Western Europe on the one hand, and the life-cycle servanthood of youth (Laslett, 1972) on the other hand, which allowed young adults to save the capital necessary to the formation of a new household. Leaving the parental home as a young adult or even as an adolescent to work as a life-cycle servant or as an apprentice has been a characteristic trait of Western European family history and identity (Fauve-Chamoux, 2004). Following Hajnal it can be argued, therefore, that leaving home has been predominantly disconnected from partner formation and marriage in Western Europe, whereas in Eastern Europe where extended households have been common, leaving home did and does not necessarily need to precede partner formation and marriage.

Data

The primary source for this study is the 2006 European Social Survey (ESS) dataset. This choice relates to the Timing of Life module which records our four events of interest through explicit questions and to the broad coverage of the targeted European population. The ESS is

a biennial multi-country survey that has been carried out since 2002. Due to centralized organization and rigorously applied standards ESS data have been recognized for their excellent quality. The collection of the data we use in this study was realized in 2006 and 2007. The dataset contains information on 25 European countries with country-specific case numbers varying between 995 (Cyprus) and 2916 (Germany). Weights to correct for pre- and post-stratification are available for all countries, except for Romania and Latvia. A crucial drawback of the ESS data is the absence of Italy. To fill this important gap we also use information on 4751 Italians drawn from the Generations and Gender Program Survey (Revision 4.1). Although the design of the GGP survey is different from the ESS, it is nevertheless possible to retrieve information on the timing of the four events of interest.

The target information of our analysis is the order in which the four events leaving home (LH), first cohabiting union (FU), first marriage (FM) and first parenthood (FP) occurred. In the ESS data, this information is given by two variables per event, the first indicating whether the respondent experienced the event and the second, provided the first was answered affirmatively, specifying the year that event occurred. Respondents who did not answer at least one of these questions (respondents who answered "no answer") were omitted as the lack of information on one single event makes the event ordering meaningless. In order to standardize individual observation times, we ignored events that occurred after the age of 45 years. As to the Italian GGP data, the definition of the event sequences was less straightforward. Except for the timing of leaving home, the years of occurrence of the three remaining events needed to be extracted using data filters for the provided household grid, the partnership history as well as questions on children living outside the household.

The retrieved years of occurrence of the four events were then converted into event sequences. Event sequences do solely record the individual order in which events occurred. As a consequence, two respondents may have identical event sequences even though some or all four events occurred at different ages. Correspondingly, two individuals with only slightly different event timings may end up with clearly different event sequences. Events that happened in the same year were considered simultaneous as the timing of events is given in full years in the ESS survey. Although it is obvious that events hardly happened at exactly the same time, we believe that our specification still allows a meaningful description of the transformations of family event sequences.

In a next step, the event sequences have been grouped according to the variables birth cohort and region, which represent our two independent variables. We distinguish the three birth cohorts 1930-1939, 1940-1949 and 1950-1959. These cohorts were defined such that sample sizes are meaningful and that respondents were older than 45 years at the time of the survey. As a consequence, respondents born either before 1930 or after 1959 have been excluded from this analysis. Based on our theoretical considerations on cross-national differences in family life event sequences, we also distinguish the four regions Southern Europe, Eastern Europe, Western Europe and Northern Europe. Our definitions of Southern- and Eastern Europe are consistent with the definition applied by the United Nations Statistics Division, and Northern Europe as defined in this study comes up the Nordic Council. Table shows in detail how exactly countries have been grouped into the four regions we retain for this analysis and also gives sample sizes per country and birth cohort.

ESS data users are committed to applying two different types of supplied weights, i.e., design weights and population weights. As we are grouping countries into regions, we apply both weights by simply multiplying one by the other. In order to correct for possible under- and over-representation of country-birth cohorts due to invalid cases, we further apply an additional weight calibration. For each cohort in each country, we compute and apply a correction factor such that the country-specific sums of corrected weights in the final dataset correspond to the sums of original weights in the raw dataset. Finally, we also define weights

for the countries for whom no weights are given in the surveys we used, that is Latvia and Romania (both ESS) as well as Italy (GGP). For these three countries, all design weights were set to 1, whereas population weights have been computed according to total population sizes at the time of the survey. The number of excluded records and the sum of weights per country are shown by Table 1.

Table 1: Data overview

	Observations					Weights	Structure
	Omitted	Total	1930-39	1940-49	1950-59	Total	Women
Southern Europe	**167**	**7416**	**1060**	**3228**	**3128**	**3576.3**	**56%**
Cyprus	30	412	94	147	171	26.8	56%
Italy (GGP data)	0	4751	305	2318	2128	1695.2	55%
Portugal	96	940	304	342	294	398.3	63%
Slovenia	23	640	170	206	264	77.3	56%
Spain	18	673	187	215	271	1378.6	53%
Eastern Europe	**607**	**6550**	**1781**	**2163**	**2606**	**9859.9**	**59%**
Bulgaria	57	675	174	253	248	332.5	63%
Estonia	20	645	193	204	248	50.1	59%
Hungary	25	736	214	256	266	405	60%
Latvia	92	626	198	192	236	72	65%
Poland	23	673	143	207	323	1303.4	53%
Romania	72	879	230	315	334	811.4	50%
Russian Federation	158	859	243	283	333	4686.8	65%
Slovakia	47	591	121	180	290	162.4	53%
Ukraine	113	866	265	273	328	2036.2	63%
Western Europe	**276**	**6854**	**1709**	**2440**	**2705**	**8878.8**	**53%**
Austria	70	809	152	276	381	227.8	54%
Belgium	12	741	203	233	305	365	53%
France	10	873	210	316	347	2108.9	53%
Germany	70	1216	304	411	501	3106.1	49%
Ireland	56	599	149	213	237	122.7	52%
Netherlands	18	804	210	304	290	580	54%
Switzerland	10	805	204	291	310	274.6	55%
United Kingdom	30	1007	277	396	334	2093.6	55%
Northern Europe	**40**	**3124**	**715**	**1209**	**1200**	**894**	**51%**
Denmark	11	721	154	304	263	214.6	51%
Finland	12	872	228	329	315	202.8	52%
Norway	12	700	145	241	314	151.9	49%
Sweden	5	831	188	335	308	324.8	52%
Total	1090	23944	5265	9040	9639	23209.05	55%

Methods

In order to study the transition from a traditional sequencing pattern of family life events to a new standard in a cross-national perspective, we apply a three-step analytic strategy. In a first step we describe and compare the most frequent event sequences in each cohort and region using the decorated categorical parallel coordinate plot of Bürgin & Ritschard (2014). This descriptive analysis will allow us to get a first insight into the hypothesized transition and its

cross-regional peculiarities. In a second step we specifically address the hypothesis of a generational shift in the standard family event sequence by estimating the frequencies of the hypothesized standard event sequences by cohort and region. In the last step finally we analyze the evolution of the degree of standardization in sequencing behavior by looking at cumulative probability functions of the most frequent sequences in each cohort and region. In this section, we shortly describe the logics of the categorical parallel coordinate plot and the cumulative probability function.

The categorical parallel coordinate plot of Bürgin & Ritschard (2014) is a graphical tool for visualizing event sequences. The plot is similar to the time series plot (Tufte, 2001) which has also been known as the parallel coordinate plot (Yang, 2003). The categorical parallel coordinates plot visualizes each distinct event sequence pattern as a line with squared markers in a scatter plot. For each position in the sequence (x-axis), the marker is placed vertically (y-axis) in regard of the event occurring at that position and the line connects the successive markers of the pattern. The marker sizes and line widths of a given event sequence pattern are proportional to its weighted frequency in the represented sample. Any given event sequence can be read out by following its line from the left to the right and by reading the event category at each marker. Vertical lines represent simultaneous events. To emphasize frequent event orders, only those with a frequency exceeding a threshold of 5 % are colored and the most frequent among them are labeled with their frequency weight. All remaining event sequences are bleached out and put in the background of the plot. Respondents who experienced none of the four events until the age of 45 years are represented by a marker at the bottom left.
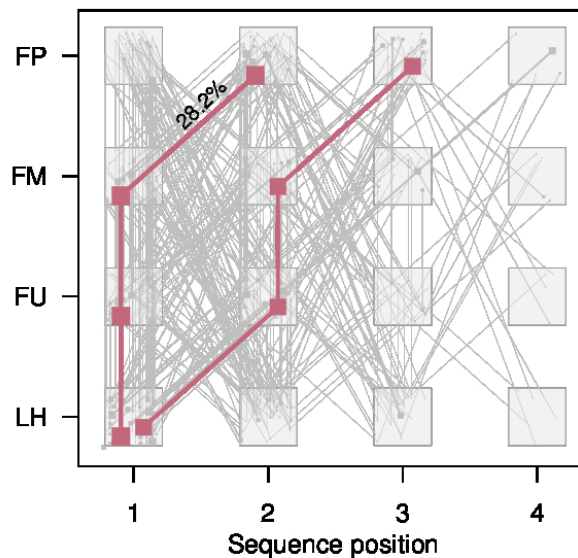

Figure 2: Categorical parallel coordinates plots on family life sequences on the whole analysis sample.

Figure 2 shows the categorical parallel coordinate plot for the 23944 event sequences retrieved from the 26 national samples. Only two lines have been colored (in pink), which means that at this very aggregate level there are only two event sequences with a total sample frequency of more than 5 %. The first colored line, the one being slightly left-shifted, starts with a vertical segment with markers for leaving home, first cohabiting union and first marriage at position 1. Afterwards the line continues to the event first parenthood at position 2. This sequence represents one of the traditional event order patterns in which the events leaving home, first union and marriage occur in the same year and in which first parenthood is observed

the following year or later (LH+FU+MA->FP). The line at the right also represents a traditional event sequence in which first cohabitation and marriage occur more or less simultaneously one or several years after leaving home, and first parenthood is observed in the last step (LH->FU+MA->FP). This second sequence is less frequent than the first one, as its line is thinner and its markers are smaller.

The cumulative probability $F^\pi(k)$ of the k most frequent sequence patterns is a statistic we use to measure the degree of standardization in the sequencing of the four family life events. The function $F^\pi(k)$ is a curve indicating the proportion of individuals in a given population who experienced one of the k most frequent event sequences. Let $\pi_i, (i = 1, \ldots, K)$ be the probability of observing the sequence pattern s_i. Sorting the probabilities π_i in decreasing order and denoting as $\pi_{(j)}$ the probability at the jth rank, $F^\pi(k)$ can formally be defined as $F^\pi(k) = \sum_{j=1}^{k} \pi_{(j)}$.

$F^\pi(k)$ can be estimated by first calculating the relative (weighted) frequency of each possible event sequence. These frequencies must then be ranked from the most to the least frequent one and then cumulated along this rank order. Represented in a scatter-plot, the estimated $\widehat{F^\pi}(k)$ appear as curves starting with the frequency of the most frequent event sequence at $k = 1$ and increasing monotonously until the total number of possible sequences is reached. The degree of standardization in a given population is then depicted by the shape of the according curve. The faster the curve increases, the higher is the degree of standardization in a given population.

Results

In this section we describe the results of our three-step analysis of the transition of family life event sequences in different European regions during the post-war era. In a first step, we describe the evolution of event order patterns in four European regions across three cohorts using categorical parallel coordinate plots. In a second step, we examine the evolution of the prevalence of the hypothesized traditional, intermediate and new sequencing standards. In a last step, finally, we study the evolution of the degree of standardization across the three cohorts in each region under study.

Figure 3 consists of a four times three panel grid of categorical parallel coordinates plots. The columns distinguish the three birth cohorts, whereas the rows separate the four European regions. Event sequences with frequencies higher than 5 % are represented as colored lines, whilst all other sequences appear in light grey. Sequences that are part of the traditional standard are colored in pink (if their frequency is higher than 5 %), sequences belonging to the intermediate standard are colored in cyan and event orders of the new standard in violet. Frequent sequences that do not belong to one of the hypothesized standards are colored in olive. Inscribed percentages refer to the most frequent sequence, i.e. to the thickest line.

The family event sequences of the three Southern European cohorts are shown in the top row of Figure 3. The countries belonging to this region have been greatly dominated by a traditional event sequence characterized by the concomitance of leaving home, first cohabiting union and marriage and by a first parenthood posterior to these three events (LH+FU+MA->FP). In all three cohorts about 50 % of the sampled individuals followed this event sequence. Although the frequency of this dominant pattern has decreased across cohorts, the decline has been too small to be considered a real change. The second most frequent event sequence (around 14 % in all three cohorts) we observe in this region also belongs to the family of the traditional standard and is characterized by the concomitance of first union and marriage (LH->FU+MA->FP). Except these two sequences, only one other has passed the threshold of 5 %, an event order in which all four family life events occur in the same year (LH+FU+MA+FP).
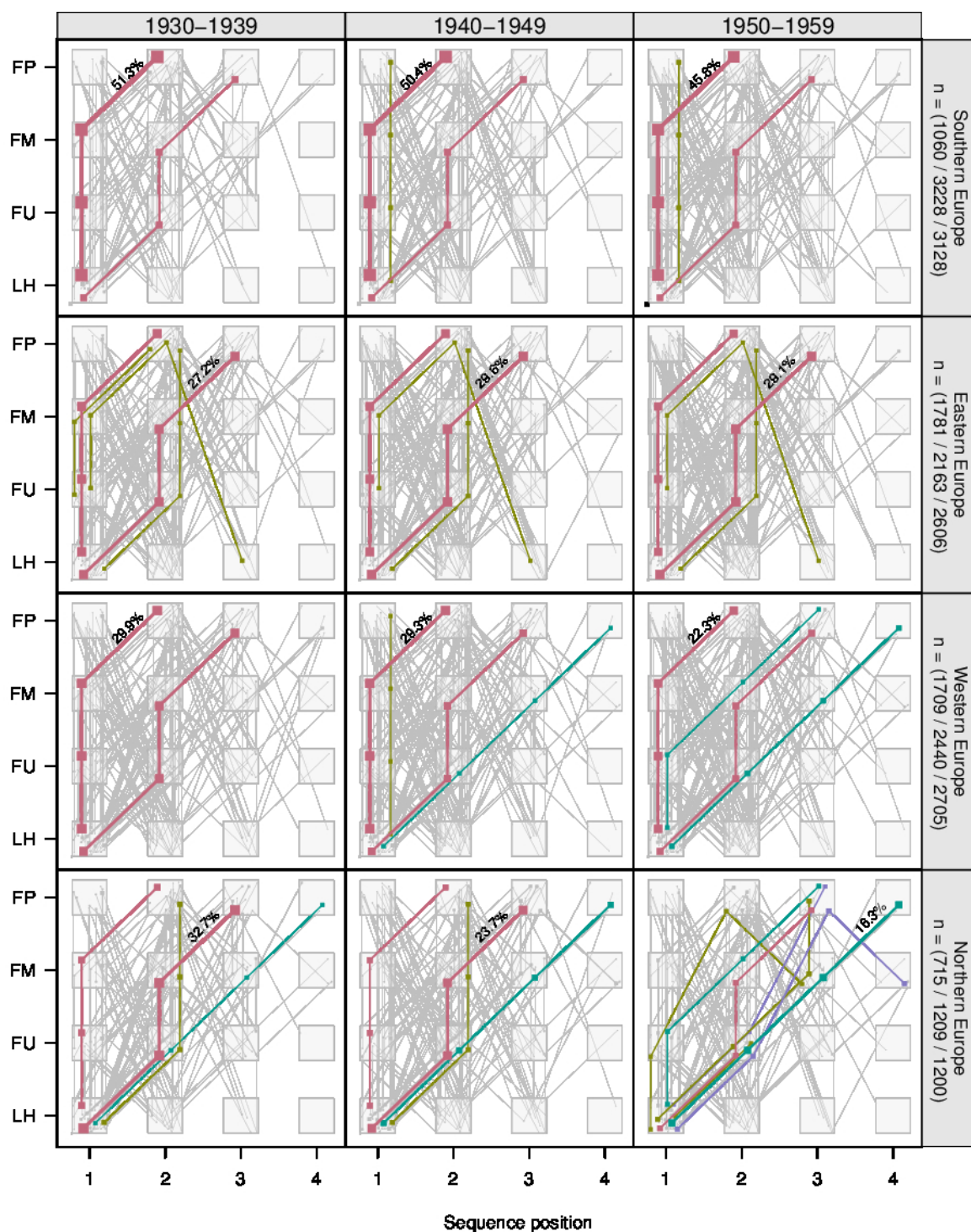
Figure 3: Categorical parallel coordinate plot grid on family life sequences by cohort and regions.

The categorical parallel coordinate plots shown in the second row of Figure 3 refer to three Eastern European cohorts. Similar to Southern Europe, Eastern Europe has also been dominated by two traditional event sequences. The most frequent event order in all three cohorts with about 27 to 30 % is the one in which leaving home is followed by first union and marriage which occur simultaneously and then by first parenthood (LH->FU+MA->FP). The

second most frequent event sequence is characterized by the concomitance of leaving home, first cohabiting union and marriage and represents about 14 % in all three cohorts (LH+FU+MA->FP). Except these two traditional event patterns and one other that can be associated with the traditional standard (LH->FU+MA+FP), another particular sequence passes the 5 % threshold. In all three cohorts we observe the sequence (FU+MA->FP->LH) in which leaving home occurs in the last place. This means that it has not been uncommon for young Eastern Europeans to get married and found a family while still living with their parents.

While Southern and Eastern Europe have remained characterized by the traditional standard sequencing of family life events throughout the period under study, Western and Northern Europe have clearly undergone substantial change. In the West European countries whose event sequence patterns are shown in the third row, the onset of the transition from the traditional standard to the intermediate standard sequencing can be observed. Whereas in the first birth cohort of individuals born 1930-1939 only the two traditional event sequences (LH+FU+MA->FP) and (LH->FU+MA->FP) pass the 5 % threshold, the sequence (LH->FU->MA->FP) of the intermediate standard can be observed with a frequency of nearly 6 % in the second birth cohort and this proportion reaches almost 10 % in the last cohort of individuals born 1950-1959. With the sequence (LH+FU->MA->FP) a second event order of the intermediate standard appears in the last birth cohort with a frequency of 6 %. Although the traditional event sequence (LH+FU+MA->FP) remains the most frequent pattern across the three cohorts, its frequency clearly decreases over time, while the proportion of transitional sequences undoubtedly increases.

The most obvious change in the sequencing of family life events can be observed among the cohorts of the Nordic countries. The categorical parallel coordinates plots in the bottom row of Figure 3 show that the traditional event sequences (LH->FU+MA->FP) and (LH+FU+MA->FP) are dominant in the first birth cohort of individuals born 1930-1939, but steadily loose importance in the later cohorts. The sequence (LH->FU->MA->FP) of the intermediate standard already passes the 5 % threshold in the first birth cohort and becomes the most frequent event order in the last cohort after having gained importance among individuals of the second birth cohort. The most important change however becomes visible in the last cohort of individuals born 1950-1959. Among the latter, only a minority of less than 15 % behaved according to a traditional sequence pattern, while about as many sequenced their family life events according to a modern event order.

The categorical parallel coordinate analysis has shown that a majority of the studied subgroups have remained dominated by sequences belonging to the traditional standard. In contrast, sequences belonging to the transitional and new standards are rather recent phenomena and are essentially observed in Western- and Northern Europe. As hypothesized, it has also shown a high degree of synchronization between leaving home, first cohabitation and marriage in Southern Europe, a high degree of de-synchronization of leaving home and marriage in the Nordic countries, and a substantial number of Eastern Europeans who left home after having found a family.

In the first part of this paper, we have hypothesized that the frequency of the traditional sequence patterns decreases across cohorts and that the frequencies of the transitional and new sequencing standards increase over time with the new standard lagging behind the intermediate pattern. We have also expected to found Northern Europe most advanced in this transition, followed by Western Europe, and then by Eastern- and Southern Europe. In the following step of our analysis, we test these hypotheses by estimating the frequency of the three hypothesized patterns as well as the cumulative frequency of all remaining event orders (called other) for each birth cohort of each region. It should be noted that although the category of other event patterns is shown for the sake of completeness, it should not be considered as statistical noise. Figure 3 has shown that this category includes a significant number of frequent event orders

such as the sequences observed in Eastern Europe in which leaving home occurs after marriage and first parenthood. The frequencies of the four sequencing patterns are shown by Figure 4. For each European region, the estimated frequencies (on the y-axis) are plotted against the birth cohort (on the x-axis). For each frequency, a 95% bootstrap confidence interval has been computed using the Monte-Carlo resampling method.
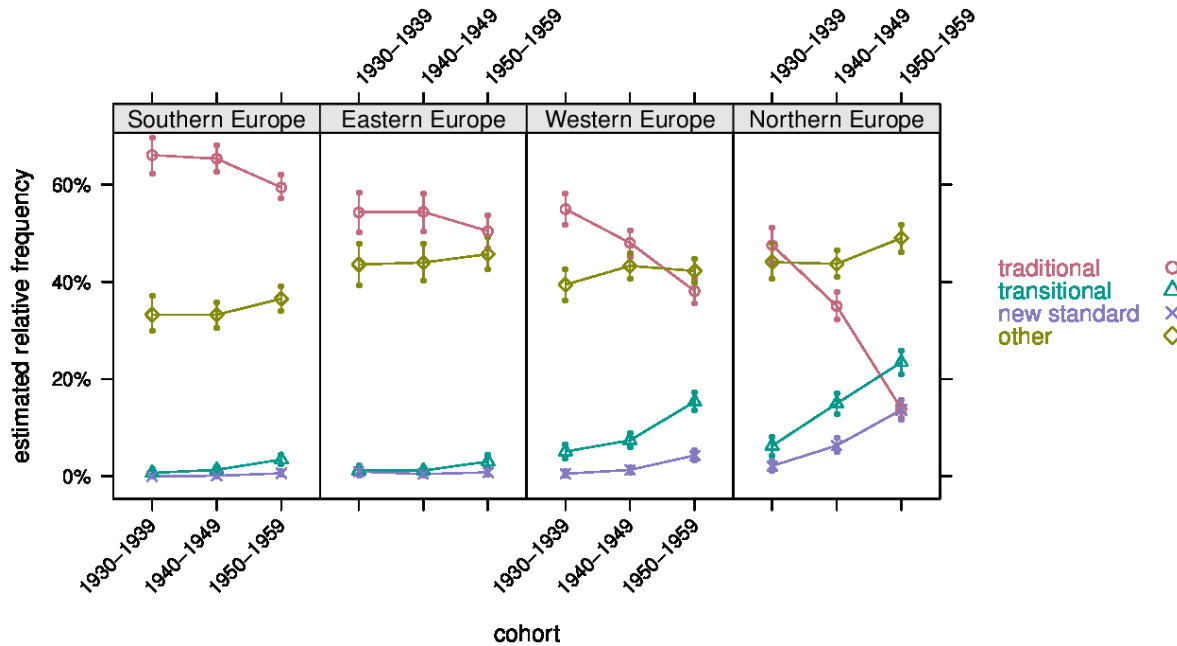

Figure 4: Estimated frequencies of the hypothesized event order patterns.

As it has already been shown by the categorical parallel coordinate plots, the number of individuals sequencing their family life events according to a traditional pattern has substantially decreased in Western and Northern Europe. In the countries of Western Europe, the proportion of traditional event sequences has declined from 55 % in the birth cohort 1930-1939 to 48 % in the following cohort, and has reached 38 % in the cohort of individuals born 1950-1959. In the Nordic countries, where the proportion of sequences belonging to the traditional standard has dropped from 50 % to 14 %, the decline has been even sharper. In Southern- and Eastern Europe, in contrast, where the traditional sequencing pattern has been clearly dominant across the three birth cohorts, a moderate and hardly significant decrease of the sequences belonging to that standard can only be observed in the last cohort of individuals born 1950-1959.

The number of individuals sequencing their family life events according to a transitional or new standard has been increasing in all four regions. Obviously it is in the countries of Western- and Northern Europe where the rise in this type of event sequences has been most visible. In the Nordic countries the increase has been sharp and steady across the three cohorts, with the proportion of transitional sequences rising from 6.3 % in the first birth cohort to 23 % in the last. In Western Europe, the increase was moderate between the first and the second cohort, but clearly accelerated in the last birth cohort among which the proportion of transitional event sequences has reached 15 %. In Southern- and Eastern Europe, on the contrary, the rise in the number of sequences belonging to the transitional standard has been very weak in absolute terms, even if statistically significant in relative terms.
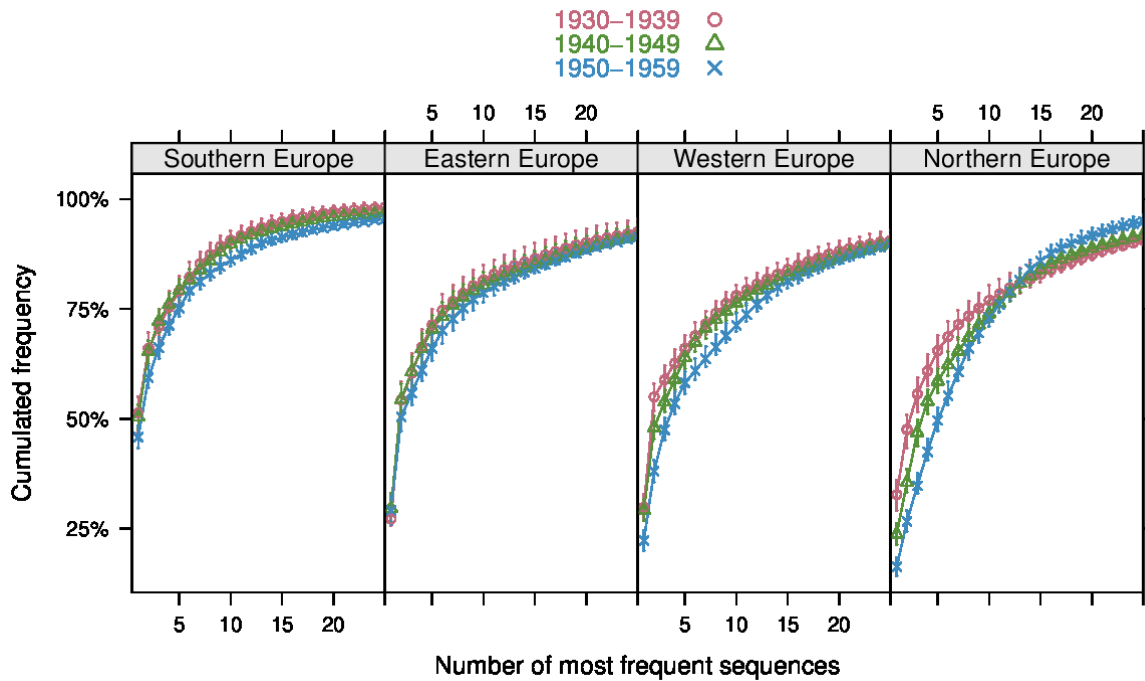
Figure 5: Cumulative frequency of most frequent patterns by region.

As expected, the proportion of sequences of the new event order standard has increased most visibly in the Nordic countries, where the frequency of this type of sequences has grown from 2 % in the first birth cohort to 14 % in the last cohort. The new standard has thus become as frequent as the traditional pattern, and its proportion can be expected to increase further in younger generations. In Western Europe, the diffusion of sequences attributed to the new standard has been much weaker, albeit clearly visible, whereas in Southern- and Eastern Europe no substantial increase in the new sequencing pattern can be observed.

Our hypotheses on the evolution of the three categories of family life event sequences have been confirmed to a large extent by this analysis. The sequences of the traditional standard have very clearly declined in Western- and Northern Europe, and also in Southern- and Eastern Europe a decline has emerged in the last birth cohort. The event sequences of the transitional standard have gained importance in all four regions, while the new event order patterns have only become substantial in the Nordic countries, and to a lesser extent in Western Europe. In all regions, finally, the new standard has been found lagging behind the transitional standard.

In the third and last step of this analysis we examine how standardized the sequencing behavior of the three birth cohorts was in the different regions under study, and address the question of whether the process of de-standardization of young adults' life course has been followed by a process of re-standardization. In order to do so, rather than looking at the quality of event sequences, we focus here on the number of sequences necessary to describe any given proportion of a population. To measure the degree of standardization in the sequencing of family life events, we have computed cumulative frequency functions of the k most frequent sequences with 95 % bootstrap confidence intervals for each cohort and region. A total of twelve curves have been estimated. Figure 5 allows us to compare the three birth cohorts within regions, whereas Figure 6 compares the four regions within each cohort. For the sake of readability, all curves have been cut at k = 25.
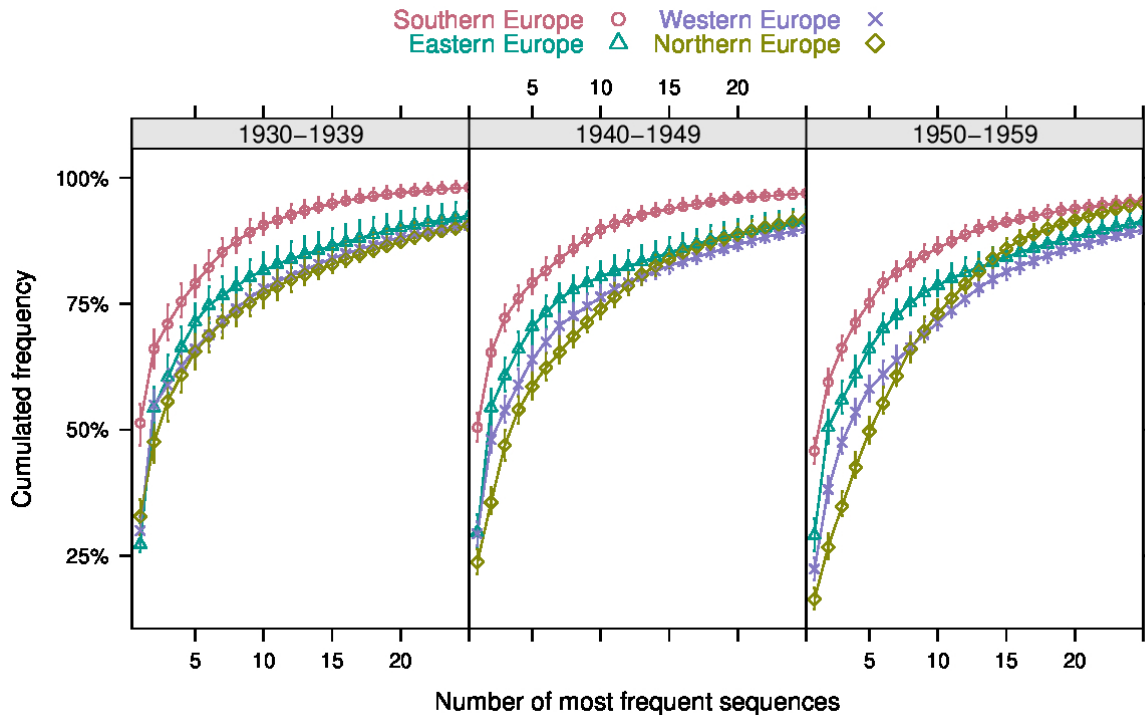
Figure 6: Cumulative frequency of most frequent patterns by cohort.

Figure 5 shows the cumulative frequency of the most frequent patterns of the three cohorts separately for each region. After a close inspection of the plot, two different patterns can be observed. A first pattern refers to Southern-, Eastern- and Western Europe, where the first two birth cohorts hardly differed from each other with respect to the degree of standardization in their sequencing behavior. The curves relative to the last birth cohort, however, lie systematically below the curves of the earlier cohorts, which means that a given number k of sequences represents a lower proportion of the population in the youngest generation. Although statistically weak, this evolution can be interpreted as evidence for a less standardized sequencing behavior in the third birth cohort. A second pattern refers to the Nordic countries. Between k=1 and k=7, the three curves run systematically below the one representing the preceding birth cohort, that is the younger the cohort, the lower the curve. After k=13, the curve representing the youngest cohort of individuals born 1950-1959 crosses the two other curves, whereas the curve of the second cohort crosses the one of the first. Rather than explaining this figure by decreasing de-standardization of sequencing behavior, we can interpret this pattern as a fanning out of standard patterns, as the total proportion explained has been rising across cohorts.

In Figure 6 the curves shown in Figure 5 have been rearranged in order to facilitate cross-regional comparison. Two observations have caught our attention. First of all it can easily be seen that in all birth cohorts it was clearly among individuals from Southern Europe that the degree of standardization was highest. Furthermore, it can be seen that while the three curves representing Eastern-, Western- and Northern Europe do not significantly differ from each other in the first birth cohort, they gradually shift apart in the second and third generation. When we compare the regions over time, we can see that the sequencing of family life events has been subject to higher de-standardization in Western- and Northern Europe, even though the case of Northern Europe is particular in that the 25 most frequent sequences cover the largest proportion in the youngest cohort.

Discussion and conclusion

The aim of this paper was to analyze the transition in the sequencing of family life events in four European regions during the postwar era. Building on the extensive literature on the transition from youth to adulthood, we have extended the study of the de-standardization of young adults' life courses to the analysis of family life event sequences. Rather than looking at pairs of synchronized and de-synchronized events, we have deliberately looked at sequences of the four events 'leaving home', 'first cohabiting union', 'first marriage' and 'first parenthood', and analyzed their evolution across three birth cohorts. To do so we have used data from the European Social Survey (2006) as well as from the Generation and Gender Program Survey.

Looking at the demographic changes most European countries have undergone since the middle of the 20th century and following the literature on the recent evolution of the family life course of young Europeans, we have hypothesized a transition from a traditional standard sequence of family life events towards a new standard event order. The traditional event order pattern we have expected to observe is dominant prior to the onset and diffusion of the second demographic transition (SDT) and can be characterized by a high degree of synchronization between leaving home, first cohabiting union and marriage and first parenthood occurring consistently after these events. With the diffusion of unmarried cohabitation and extra-marital parenthood along with the spread of the SDT, we have expected to observe de-synchronization between first cohabitation and marriage in a transitional standard event sequence and then a reversal of the order of first marriage and first parenthood in a new standard event order pattern. Given the regional differences in the timing and the speed of the SDT (Lesthaeghe, 2010), we have expected Northern Europe to be most advanced in the transition of the standard sequence of family life events, followed by Western Europe. In Eastern Europe, and especially so in Southern Europe, where the SDT has started only recently, we have assumed the transition to be least advanced. Following the literature on enduring cultural differences in European family history, we have also hypothesized an opposition between Northern Europe where traditionally weak family ties (Reher, 1998) let us expect pronounced de-synchronization between leaving home and family formation, and Southern Europe where strong family ties have led to a high degree of synchronization between leaving home, first union and marriage. Following the ideas expressed by Hajnal (1965; 1982) on a historical East-West divide in household structures we have also hypothesized a clear disconnection between leaving home and family formation in Western Europe, as well as a sometimes reversed order between family formation and leaving home in Eastern Europe.

In order to test our hypotheses we have applied a three-step analytic strategy based on specifically developed tools to visualize and analyze event sequences. In a first step, we have shown the diversity and evolution of event sequence patterns across regions and cohorts using the categorical parallel coordinates plot. The frequencies of the hypothesized standards have been estimated in a second step, while degrees of standardization of sequencing behavior have been approached through the estimation of cumulative probability functions of the k most frequent sequences in a third step. To address our main hypothesis of a transition from a traditional to a new standard order of family events, we need to consider the results of all three steps. The categorical parallel coordinates plots and the estimated frequencies of the hypothesized standard patterns have shown a very clear decline of the traditional sequencing standard across the three birth cohorts in Northern and Western Europe. In both regions we have also observed a substantial increase of the sequences of the intermediate standard in a first step and then of the new standard in a second step. Naively extrapolating the graphical trends one can depict from Figure 3 for Northern and Western Europe would lead to the virtual disappearance of the traditional standard and to the dominance of both the intermediate and the

new standard. For the moment it is unclear whether the transitional and the new standard will coexist or whether transitional sequences will diminish in future cohorts. The coexistence of these two types of event sequences in the youngest cohorts of Northern- and Western Europe is also the reason why we cannot definitely confirm our implicit hypothesis of a re-standardization of sequencing behavior. As it has been shown by the frequency ranked distribution functions, the degree of de-standardization in the sequencing of family life events has been at least weakly increasing in all four regions, although in Northern Europe this process seems having reached a maximum and a certain re-standardization has become apparent in the youngest birth cohort.

Our results have largely confirmed the hypotheses we formulated about cross-regional differences in the transition of the standard sequencing of family life events. As expected the transition process has been found most advanced in Northern Europe, where in the last birth cohort traditional event sequences have been largely outnumbered by transitional and post-transitional sequences. The process is clearly on its way in Western Europe, whereas hardly any change has been observed in Eastern- and Southern Europe. The countries of Southern Europe have been found most standardized in the sequencing of family life events and as expected the Southern standard is characterized by a high degree of synchronization between leaving home, first cohabitation and marriage. Eastern Europe has been found less standardized. As hypothesized a particular event sequence can be found in the countries of Eastern Europe. In all three cohorts, a significant number of individuals experienced first cohabitation and marriage in the first place, then had a first child and only left home in the last place. In a recent paper, Iacovou (2011) has explained this phenomenon by the habit of young couples to live with the husband's parents until they can set up an independent household. We believe that although the main reason for this behavior may be of financial matter, its social acceptability is largely explained by Eastern European family history.

The promising potential of our event sequence approach has undoubtedly been shown by the so far rather descriptive analyses and results of this paper. The consideration of complete event sequences rather than the mere study of synchronized and de-synchronized events has allowed us to capture the evolution of sequencing behavior of family life events in its whole complexity. Although our main focus has been on the hypothesized event order patterns, the categorical parallel coordinates plot has shown the important diversity in the sequencing behavior of family events. Future research should therefore not only seek to include further explanatory factors such as gender, social background and country-specific peculiarities, but should also look at those sequences we have not studied in detail.

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