

HISTORICAL LIFE COURSE STUDIES

VOLUME 4
2017



MISSION STATEMENT

HISTORICAL LIFE COURSE STUDIES

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Editors: Koen Matthijs & Paul Puschmann
Family and Population Studies
KU Leuven, Belgium
hislives@kuleuven.be

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Sequence Analysis of How Disability Influenced Life Trajectories in a Past Population from the Nineteenth-Century Sundsvall Region, Sweden

Lotta Vikström

Helena Haage

Erling Häggström Lundevaller

Umeå University

ABSTRACT

Historically, little is known about whether and to what extent disabled people found work and formed families. To fill this gap, this study analyses the life course trajectories of both disabled and non-disabled individuals, between the ages of 15 and 33, from the Sundsvall region in Sweden during the nineteenth century. Having access to micro-data that report disabilities in a population of 8,874 individuals from the parish registers digitised by the Demographic Data Base, Umeå University, we employ sequence analysis on a series of events that are expected to occur in life of young adults: getting a job, marrying and becoming a parent, while also taking into account out-migration and death. Through this method we obtain a holistic picture of the life course of disabled people. Main findings show that their trajectories did not include work or family to the same extent as those of non-disabled people. Secondary findings concerning migration and mortality indicate that the disabled rarely out-migrated from the region, and they suffered from premature deaths. To our knowledge this is the first study to employ sequence analysis on a substantially large number of cases to provide demographic evidence of how disability shaped human trajectories in the past during an extended period of life. Accordingly, we detail our motivation for this method, describe our analytical approach, and discuss the advantages and disadvantages associated with sequence analysis for our case study.

Keywords: Sequence analysis, Life course, Life trajectories, Disability, Demographic Data Base, Centre for Demographic and Ageing Research (CEDAR), Nineteenth century, Sweden

e-ISSN: 2352-6343

PID article: <http://hdl.handle.net/10622/23526343-2017-0006?locatt=view:master>

The article can be downloaded from [here](#).

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1 INTRODUCTION

1.1 BACKGROUND AND RATIONALE

According to historical research, getting a job, marrying and giving birth to children were both expected and common events as young individuals in the past transitioned into adult life. The order and timing of these events were influenced by economic preconditions and norms in society, and encouraged by legislation and institutions such as the state and the church (Bras, Liefbroer & Elzinga 2010; Lundh 1999, 2003; McQuillan 1989; Reher 1998). For young people, an occupation and access to income were means to affording a family and household on their own, and children were to be born upon marriage, and not before. Even though most men and women followed this expected pathway, less is known about the family formation of those with disabilities. Their demographic experiences are important to identify, as disabled people have been a minority long absent from history, and because their actual life trajectories reflect their living conditions.

Our study fills in this gap of information using sequence analysis, a method we argue helps to clarify how young individuals historically experienced disability. Combined with the access to longitudinal micro-level data on both disabled and non-disabled people, this method enables us to provide an extended picture of how disability interfered with life when accounting for a series of events associated with work and family formation. The ability to conduct sequence analysis on a past population with disabilities from about 150-200 years ago makes our investigation novel in its approach, as quantitative measures are underused in recent social history and studies concerned with disability issues. Although quantitative methods dominate in the field of historical demography, sequence analysis has been of comparatively limited use, given that it is a method only recently developed and perhaps because it primarily shows descriptive outcomes (Abbott 1995; Abbott & Tsay 2000; Courgeau 2016; Dribe, Manfredini & Oris 2014; Kok 2007; Ritschard & Oris 2006; Schumacher, Matthijs & Moreels, 2013). Within this field, the most popular way to conduct life course research is to employ event history analysis in different ways, focusing on the outcome of one single event and its significant determinants. Although sequence analysis also has its limitations, it works to complement the life course approach by examining several events and their different outcomes simultaneously. These advantageous properties strengthen our empirical findings, and we discuss how we obtain them by using sequence analysis methods.

Even though our study of disabled people contributes exceptional findings to the research area on vulnerable populations, which has gained increasing interest among scholars including historical demographers (cf. e.g. Axelsson & Sköld 2011; Bengtsson, Campbell & Lee 2004; Harris, Gálvez & Machado 2016; Rouf 2004; Shi & Stevens 2010; Vikström 2006), the present paper is primarily a methodological contribution to life course scholarship within history and the social sciences that use longitudinal micro-level data. Section 1.2 describes the purpose of this study and section 1.3 gives an account of previous research and the historical context to set the scene for the subjects we study. Section 2 describes the research area and data selected for analysis. Section 3 discusses our analytical approach from a life course perspective and details how we employ the method of sequence analysis, while Section 4 presents the results. A conclusion of the major findings is detailed in Section 5, as is a discussion of the limits and benefits we recognise from our use of sequence analysis.

1.2 PURPOSE

The purpose of this study is twofold, as it concerns both the results and the methods. The first aim is to contribute new historical knowledge about the life trajectories of young disabled individuals by using sequence analysis of a series of key events in their lives compared to non-disabled people, all of whom resided in the nineteenth-century Sundsvall region in Sweden. The non-disabled people function as references that enable us to find out whether and to what extent (1) getting a job, (2) finding a spouse to marry, and (3) becoming a parent, were less likely events in the lives of disabled people. These three events are of primary interest to us, even though out-migration and death are also of concern. To differentiate the findings, we focus on whether the occurrence, order and timing of these events varied substantially by gender and disability. The second aim is to detail and assess the methodological means with which we obtain the findings, and to discuss the advantages and disadvantages associated with sequence analysis.

1.3 PREVIOUS RESEARCH AND THE HISTORICAL CONTEXT

There are few studies that consider how lives developed among disabled individuals in society, both past and present, with regard to their work and families. Most contemporary studies show that disabled people are positioned more weakly in the labour market than the 'able' majority (Arvidsson, Widén & Tideman 2015; Barnes & Mercer 2005; National Board of Health and Welfare Report 2009), and they are more likely to live alone as a result of having few opportunities to find a partner (Franklin 1977; Sainsbury & Lloyd-Evans 1986; Schur, Kruse & Blanck 2013). As for past society, information on the lives of disabled individuals is limited and biased due to their being poorly documented in historical data. As a consequence, disability history studies are primarily occupied with analysing records from institutions to which disabled people were occasionally admitted, or of the relatively small number of them recognised in other sources, usually because they deviated from appearances or behaviours perceived as 'normal' at the time. Such data issues not only jeopardise historians' chances to identify them and discern their life experiences, but also risk fostering the perception that disability brought difficulties in life, even though this must not be the one and only outcome. Yet, there are some historical disability studies of particular interest that we evaluate below. We also make some general remarks about contextual conditions that governed young individuals' pathways into work and family life in normative directions, as did the life-cycle servant system and some legislation.

Disabled or not, most young people across Western Europe were subject at the time to the life-cycle servant system, according to which they were to be hired as servants- or as apprentices, maidservants or farm hands - in households other than their parents' (Bras, Liefbroer & Elzinga 2010; Dribe 2000; Hajnal 1982; Lundh 1997; Moring 2003; Whittle 2005). In Sweden, adolescents from the lower socio-economic strata usually did after having passed confirmation around the age of 15 or 16 years, or shortly after (Jacobsson 2000). The servant system had a large impact on individuals' marriage patterns, resulting in rather high ages at first marriage (Hajnal 1965, 1982; Moring 2003); In nineteenth-century Sweden men married at the average age of about 27 and women at 25 (Harnesk 1990; Gaunt 1983; Lundh 1999, 2003). This was because the future husband and wife had to gather the material resources needed to afford the establishment of an independent household, which took time to accumulate. In this way, the servant cycle system was part of the economy and the labour market that worked to delay family formation in nineteenth-century northwestern Europe, in particular in Sweden where the urban-industrialisation transformation occurred at a slow pace.

Even though historical works on disability issues suggest that impairment limited people's ability to take up work and support a family (Förhammar & Nelson 2004; Longmore & Umansky 2001), and thus to comply with the servant system, disabled individuals were not excluded from the labour or marriage markets. Having examined their living conditions in nineteenth-century Scotland, when the chance of being entitled to any economic support from society was small, Hutchison (2007) finds that access to a job and an income was vital for them in order to make a living and possibly unite with a spouse. Sometimes their marriages were even for practical reasons, as the partner with the disability could then enjoy socio-economic support from the spouse. Even though the increasing establishment of institutions during the nineteenth century manifested the growing anxiety about individuals regarded as deviant (Foucault 1965), research suggests that authorities did not admit all persons with disabilities into institutions, nor could they afford to; they were aware that a job would provide disabled people opportunities to become productive citizens and thus less of a burden to society (Bengtsson 2012; Borsay 2005; Förhammar 1991; Olsson 2010). Authorities' concerns were furthermore raised by disabled individuals' reproduction if children were likely to inherit their parents' disabilities, as this would challenge politicians' goals of creating a healthy population. Marital legislation was one means to regulate reproduction, and in nineteenth-century Sweden, until 1915 people were not allowed to marry if they suffered from epilepsy or from 'idiocy' or a few other mental deficiencies (*sinnessjuk, sinnesslö*) (Hafström 1972). Yet another two Swedish laws regulated people's work and involvement in the labour market. According to the Servant and Master Act (*tjänstehjonsstadgan*), which was in effect from 1664 until 1926, citizens who were not self-employed or did not live off some property were to find subsistence through employment; otherwise, they were not to enjoy their civil rights in society (Harnesk 1990; Helgesson 1978; Petersson 1983). Until 1885, authorities could take action enforcing their employment. As a result of parishes administering the legislation, relocations across parish borders required that a job or other source of support awaited migrants at their new parish of residence. Historians contend that the state's intentions with these laws were to supply employers' demand for a workforce and to cut local authorities' costs for unproductive parishioners in terms of poor relief (Harnesk 1990; Helgesson 1978). Among those few who were entitled to such relief, disabled people were

recorded and have thus become subject to historical studies (Engberg 2005; Vikström 2006). However, given the nature of such records, these studies can primarily offer snapshots of the lives of disabled people if and when they received relief, and only a minority of them did. In nineteenth-century Sweden, welfare provision was limited in scale, while the number of people in need was not (Harnesk 1990; Petersson 1983; Winberg 1977).

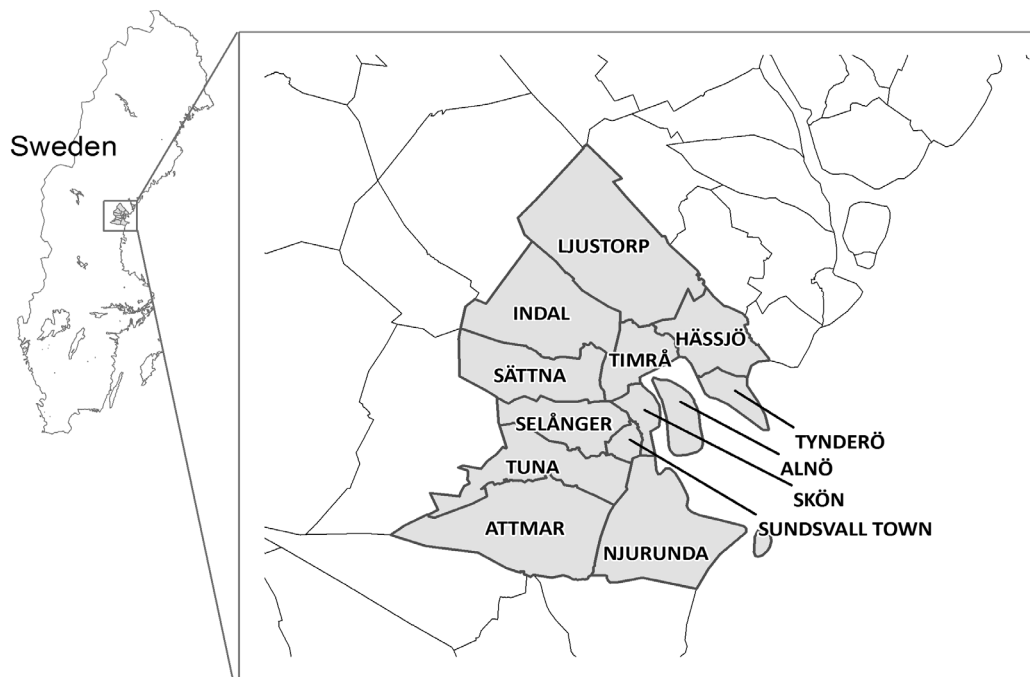
Without a doubt, the data issues associated with researching disabled people across their lifetime in history explain why studies incorporating life course perspectives are few, albeit not non-existent. In her study of the Swedish town of Linköping in the nineteenth century, Olsson (1999) made use of parish registers and identified some thousand disabled individuals, of whom she could follow about 400 over time. Olsson finds that both marriages and occupations allocated to the lower strata were reported among them, where men primarily worked as unskilled labourers or craftsmen or farmhands, and women as maidservants or seamstresses. However, as Olsson only provides descriptive statistics and does not conduct sufficient comparisons with non-disabled people, it is difficult to assess the extent to which disability limited individuals' opportunities to work and form families. De Veirman (2015) provides such a comparison in her PhD thesis analysing the life courses of people with hearing impairment and their hearing siblings in Flanders, Belgium, before and during industrialisation. In combination with her dataset allowing event history analysis, the sibling comparison lends credibility to De Veirman's results on how hearing disabilities inhibited, for instance, individuals' propensity to find employment or a spouse (cf. De Veirman, Haage & Vikström 2016). Our own event history analyses (Cox regression models) of a considerably larger population than the younger-aged study group under analysis in the present study show that disability increased the mortality risks to a most significant degree, and in particular, for men and those with mental disabilities (Haage, Häggström Lundevaller & Vikström 2016). We further find that disability had negative effects on people's marital chances, again with some variations depending on type of disability and gender (Haage, Vikström & Häggström Lundevaller 2017). Nonetheless, disability did not stop them from marrying, as about one in four did. Our studies and those of De Veirman exemplify how event history analysis can help obtain comparative demographic results that can detect and differentiate the life courses and experiences of disabled people in history.

2 AREA AND DATA

2.1 AREA SELECTED FOR ANALYSIS

The Sundsvall region is chosen as a research area (Figure 1). This area shows a fairly representative selection of the population makeup and the economic structure found elsewhere in nineteenth-century Sweden and northwestern Europe. The majority of this population depended on agricultural production. In this study, we include eight parishes from the region: Attmar, Hässjö, Indal, Ljustorp, Selånger, Sättna, Tuna and Tynderö. In four other parishes (Alnö, Skön, Njurunda and Timrå) the socio-economic and demographic structure transformed from the middle of the nineteenth century onwards, where the production and labour market came to be primarily based on the sawmill industry. Its economic side effects for business and commerce were most evident in the only urban setting of the region Sundsvall town, which is also subject to our study. Besides the mortality decline typical for the nineteenth century, the large influx of migrants looking for better prospects in this expanding sawmill industry explains the rapid population growth during the latter half of the century (Bergman 2010; Edvinsson 1992; Vikström 2003). In 1840 there were 18,793 inhabitants, a number that had increased to 46,418 by 1880 (Alm Stenflo 1994). As these contextual characteristics were present in the Sundsvall region and because its parish registers are digitised and indicate disabilities, it constitutes a sufficient 'laboratory' for our analysis.

Figure 1 Map of Sweden and the Sundsvall region showing the parishes included in the study.



Source: Demographic Data Base, Umeå University.

2.2 DIGITISED PARISH REGISTERS INDICATING DISABILITIES

The parish registers of the Sundsvall region are digitised and stored by the Demographic Data Base (DDB) at Umeå University, Sweden. They are based on original registers for parishioners' birth, baptism, marriage, out- or in-migration, death and burial, and the catechetical examination records, and also provide notes on occupation. As all these registers are digitised and linked on an individual level, they yield a demographic description of each parishioner, which even includes the date, or at least the year, when essential life events occurred, such as starting work, marriage, childbearing, relocation or death (Vikström, Brändström & Edvinsson 2006; Westberg, Engberg & Edvinsson 2016). The rich information across an individual's lifetime makes the DDB registers well suited for life course research. They have proven useful to many historians in Sweden and abroad, some of whom, including ourselves, conduct event history analysis (e.g. Haage, Häggström Lundevaller & Vikström 2016; Haage, Vikström & Häggström Lundevaller 2017; Edvinsson & Lindkvist 2011; Kolk 2011; Vikström 2003, 2011; Vikström, Marklund & Sandström 2016). That these registers also provide good quality data for use of sequence analysis is detailed further below.

The catechetical examination records (*husförhörslängder*) explain why Sweden's parish registers are exceptionally informative. They go back to the seventeenth century, due to the obligation of the ministers to keep records of the parishioners' knowledge of the catechism and their reading skills (Nilsdotter Jeub 1993). In these records, the ministers reported events such as occupational changes and also other notes about the parishioners, such as remarks about their impairments (*lytesmarkeringar*), which indicate the presence of disabilities. Parishioners whom the ministers recognised as disabled have been manually categorised as such by us, since the DDB has not coded this information consistently. Further, we account only for impairments that are fairly evident, such as hearing and visual disabilities and a few other types of physical or mental dysfunctions (Table 1). This facilitates comparisons between the group of disabled people and parishioners in the Sundsvall region who did not have any of these particular impairments reported in the parish registers. Thus, those who were not blind, not deaf mute, or not crippled and so forth (Table 1), we recognise as being non-disabled, even though some of them may have had impairments more vaguely defined by the ministers or perhaps suffered from some illnesses (Drugge 1988; Haage 2012; Rogers & Nelson 2003). They represent the average, or typical, life trajectory of the population living in the same time-space context as did the group of disabled people. Of course, there is a risk of underestimating disabilities in the parish registers, as this

type of documentation was not the primary task of the ministers. However, this is not a big problem, as disabled persons who may have been incorrectly added to the group of non-disabled people will affect the results very little, and because we can be fairly certain that those in the group with disabilities were in fact disabled. The fact that Sweden's parish registers constitute one of few historical sources that provide any information at all about the life experiences of disabled people further justifies our use of this data. Moreover, the documentation of impairments was made more consistent from 1860 on, as all ministers across the country from then onwards were to follow some general guidelines from Statistics Sweden, to which they annually reported demographic data about their parishioners to ease authorities' desire to advance the health status of the population (Haage, Häggström Lundevaller & Vikström 2016; Haage 2017).

Table 1 *Disability types based on the impairments reported in the parish register on the population under study in the Sundsvall region.*

Blind	Visual defects, including weak-sighted, short-sighted and blind
Deaf mute	Hearing or communication dysfunctions, ranging from bad hearing to deaf, and from difficulties speaking to stammering to mute
Crippled	Physical dysfunctions, e.g. lame, limping, walking with crutches, missing body parts, harelippped, small in size or crippled
Mental disabilities	Mental dysfunctions, e.g. foolish, silly, less cognisant (<i>mindre vetande</i>), insane, feeble-minded or crazy
Multiple disabilities	Combination of two or more of the above disabilities

Source: Digitised parish registers, the Sundsvall region, Demographic Data Base, Umeå University.

Notes: On the categorisation of mental disabilities, cf. BiSOS (1907).

2.3 DATASET AND EVENTS

For the purpose of our study we target a young population in the Sundsvall region. The dataset consists of 8,874 unique observations of 15-year-old individuals born between 1820 and 1860, of whom 117 had marks of impairments (Table 2) before the age of 15 years or on the 15th birthday at the latest. The reason for choosing young persons is that they were in the beginning of their transition to adulthood which was associated with the central events under study, such as getting the first job, marrying for the first time and giving birth to the first child. Being indicative of people's involvement in work and family, these three events are of primary interest to us, even though we also check for out-migration (from the parish) and death, which we thus term as events of secondary interest. At the start of observation (age 15 years) all individuals in the dataset were unmarried and had no children, and only a few of them had any occupation reported. The latter makes their socio-economic status difficult to determine. Consequently, Table 2 details the occupational status of their fathers when the research subjects were born. Although the group of disabled men and women is small in number, their socio-economic origins show more similarities than dissimilarities when compared to those in the non-disabled group. Fathers to disabled men are, to a slightly higher extent, found to have been farmers or skilled labourers in trade and industry. From start of observation, we follow all individuals for a maximum of 18 years (to age 33 years) in order to identify how disabilities influenced their life courses with respect to the events under study.

Table 2 *Descriptive statistics on the population under study in the Sundsvall region according to disability, gender and socio-economic origin based on the father's occupation at birth of the research subjects: absolute and relative distribution.*

	Disabled group		Non-disabled group		Total N (%)
	Men N (%)	Women N (%)	Men N (%)	Women N (%)	
Socio-economic origin by father's occupation					
Upper strata	-	-	102 (2.5%)	106 (2.5%)	208 (2.5%)
Middle strata - Small-scale entrepreneurs in trade and industry - Small-scale entrepreneurs in agriculture	4 (.5%) 37 (49%)	2 (5%) 16 (38%)	270 (6%) 1,871 (42.5%)	309 (7%) 1,808 (41.5%)	585 (6.5%) 3,732 (42%)
Lower strata - Skilled and unskilled labourers in trade and industry - Unskilled labourer in agriculture	23 (31%) 7 (9%)	12 (28%) 8 (19%)	833 (19%) 876 (20%)	841 (19.5%) 843 (19.5%)	1,709 (19%) 1,739 (20%)
Unknown	4 (.5%)	4 (10%)	433 (10%)	465 (10%)	906 (10%)
Total N (%)	75 (100%)	42 (100%)	4,385 (100%)	4,372 (100%)	8,874 (100%)
Type of disabilities (group of disabled)					
Blind	9 (12%)	5 (12%)	-	-	14 (12%)
Deaf mute	23 (30.5%)	13 (31%)	-	-	36 (30.5%)
Crippled	19 (25.5%)	5 (12%)	-	-	24 (20.5%)
Mental disabilities	20 (26.5%)	15 (35.5%)	-	-	35 (30%)
Multiple disabilities	4 (5.5%)	4 (9.5%)	-	-	8 (7%)
Total N (%)	75 (100%)	42 (100%)			117 (100%)

Source: Digitised parish registers, the Sundsvall region, Demographic Data Base, Umeå University.

Notes and explanations: All individuals were born between 1820 and 1860 and were 15 years old at start of observation. The social classification scheme is based on the DDB's occupational codes grouped as below.¹

- | | |
|------------------------------------|---|
| Upper social strata | 1. Large-scale business entrepreneurs
2. Higher-civil officials |
| Middle social strata and craftsmen | 3a. Small-scale entrepreneurs in trade and industry, master artisans
3b. Small-scale entrepreneurs in agriculture (farmers, tenant farmers) |
| Lower social strata | 4. Lower-civil officials
5. Skilled labourers, craftsmen and artisans below the rank of master
6a. Unskilled labourers in trade and industry
6b. Unskilled labourers in agriculture (farmhands, crofters, maidser-vants) |

1 The DDB classification does not completely correspond to the two commonly used classification schemes in historical studies, SOCPO and HISCLASS, but there are many similarities between them (van Leeuwen & Maas 2011; van de Putte & Miles 2005). For a comparison between the schemes, see the Appendix in Edvinsson & Broström (2012).

As for the first job, this event is taken from the first occupational notes on individuals in the parish registers, which we regard as suggestive for their employment and transition to the labour market. However, if there is no or flawed registration of occupation in the data, this may not necessarily imply no work or unemployment, nor does the recognition of people as being farmhands, maidservants or unskilled labourers, for example, confirm that they were really employed in these occupations. Scholars have debated and investigated further if the occupational data in these types of records are inconsistent, particularly for women and especially if they were married (Leeuwen, Maas & Miles 2002; Putte & Miles 2005; Vikström 2010). Similar to most of these scholars we assume that if there is occupational data about persons, which there often is in the Swedish parish registers and especially for men, it is most likely that they did the work in question. The events of marriage and childbearing are easier to determine, as the parish registers in general document such demographic events consistently (e.g. first date of marriage or childbearing), which we view as indicative for people's involvement in the marriage market or family formation. The same detailed documentation also exists for the two events of secondary interest to us, i.e. out-migration and death.

3 METHODS

3.1 THE LIFE COURSE APPROACH

Similar to many other historical demographic studies, the life course approach constitutes the basis for our study and has governed our choice of sequence analysis as explained below. With great influence from Glen E. Elder Jr. (2004), the life course approach has yielded a wide cross-disciplinary interest (Giele & Elder 1988; Kok 2007; Mayer & Brandon Tuma 1990). It conceptualises the life course as a process and the result of two fundamental principles, one of which concerns individuals' agency and own decision-making, whereas the other principle recognises the time-space setting in terms of the societal structure and socio-familial context, which also works to shape the choices people make across their lifetime. Historian Jan Kok departs from this notion as he discusses the life course approach from historical demographic perspectives, arguing that its 'analysis is devoted to studying the interaction between life courses and demographic, economic, institutional and cultural changes' (Kok 2007, p. 205). This is an ambitious task, indeed, which many historical demographers have taken on, increasingly making use of software packages and digitised data on populations that facilitate the obtaining of life course findings based on event history analysis (Alter, Gutmann, Leonard & Merchant 2012). A great body of their work concerns people's entry into the labour market and the marriage market and family life (Alter 1988; Janssens 1993; Lundh & Kurosu 2014), or how different populations experienced declining rates of mortality and fertility, respectively (Bengtsson, Campbell & Lee 2004; Edvinsson 1992; Janssens 2014). With examples from literature, Kok (2007) demonstrates and debates both the promises and pitfalls associated with the development of the life course approach among historical demographers and their statistical employment of it, primarily in terms of proportional hazards models or odds ratios models. One major drawback is that even if such estimates may be most accurate in identifying significant factors determining the single event under study, these models fail to trace and treat the life course as the dynamic process it really is, Kok contends. Accordingly, he calls for research techniques that recognise several events or their sequences during an extended time span of people's life courses. As the means of using these techniques were still in the making, they were almost absent within the field of historical demography when Kok made his call in 2007. However, he was not alone then, nor the first to express this advancement for life course research. Since the early 2000s, statistician Gilbert Ritschard has discussed sequence analysis as a most useful method for studying events during extended time spans, just as he and his colleagues have demonstrated in their research (Oris & Ritschard 2014; Ritschard & Oris 2005; Ritschard, Gabadinho, Müller & Studer 2008; Studer & Ritschard 2016).

Even though we conduct sequence analysis to clarify how life developed in the past among a large number of disabled and non-disabled people, we cannot tell whether their life courses were primarily the outcome of individual choices or were shaped by the specific time-space context, discerning the two aforementioned principles. Furthermore, proponents of the life course approach argue that there are more principles; three of which concern the life-span development, timing of events and linked lives (Elder, Kirkpatrick Johnson & Crosnoe 2004; Kok 2007). In this study, we make ample recognition

of the life-span development in accounting for essential events (job, marriage and parenthood) during an extended period of people's life (between 15 and 33 years of age). The principles of both timing (through age) and linked lives are also considered, the latter as our results indicate how human life courses interdepend on others by involvement in the labour market (e.g. employer) and the marriage market (e.g. spouse).

3.2 SEQUENCE ANALYSIS

This section details our use of sequence analysis in order to investigate how life unfolded for a group of young disabled individuals compared to those without disabilities living in the same time-space context. In parallel with sequence analysts, we technically conceive a sequence as the chronological states that the research subject holds over his/her lifetime, in the present case with regard to occupation, marital status and parenthood. Any shift in state is due to an event or transition in life. These events result in a sequence of different states called 'life trajectories', while the time in a certain state is termed 'duration'. A distinction is often made between 'life trajectories' and 'pathways'; the latter refer to standardised patterns of behaviours perceived as normal by society at the time, whereas trajectories show actual life courses (Kok 2007). Besides biological age, pathways work to prescribe the 'appropriate' age (or timing) to take up a job or marry, and the expected order of life events, such as parenthood should follow after marriage.

Like Aisenbrey and Fasang (2010), we focus on the discrete transition between states and a holistic trajectory. Sequence analysis enables the researcher not only to analyse single events and their transitions from one point in time to another, isolated from other events, but also to study multiple events and their sequential continuity or change in the same analysis (Abbott & Tsay 2000; Aisenbrey & Fasang 2010). According to Abbott (1990) sequence analysis can be applied to identify (1) typical trajectories, (2) factors contributing to shaping these trajectories and (3) whether different trajectories affect some outcome variable. This study employs the former two applications, as it concerns whether disabilities made people's trajectories differ from those of people without disabilities, which we consider as typical. We start to observe all disabled and non-disabled individuals after their 15th birthdays to investigate the occurrence, timing and order of the three events of primary interest to us (first occupation, first marriage and first child) and those of secondary interest (out-migration and death). The observation window lasts at the longest until age 33 years, which constitutes the period in life when the events we are primarily interested in took place. The occurrence of any event will cause a shift in state of the persons concerned, as we regard every event to be non-reversible and non-recurrent.

As the parish registers usually provide complete dates of the events, we have time-stamped data. It is, however, sufficient for our purpose to transform the data to a format appropriate for sequence analysis. All the dates of events are discretised into 'age years' whereby the order and spacing of events within one age year is ignored. A 'state' describes a person during that particular year of his/her life. The length of each state is consequently one year, and the whole sequence is 18 years long, corresponding to the observation time. The first state starts at the 15th birthday, and the second state starts at the 16th birthday and so forth. Table 3 illustrates how a few possible states appear, where Y (yes) shows that the event has occurred, whereas N (no) shows it has not.

Table 3 *Image exemplifying some sequence states subject to analysis.*

State	0	1	10	11	100	101	110	111
First occupation	N	Y	N	Y	N	Y	N	Y
First marriage	N	N	N	N	Y	Y	Y	Y
First child	N	N	Y	Y	N	N	Y	Y

Notes: Y = Yes, an event resulting in a change of state has occurred; N = No such event has occurred.

Explanations:

0 = No occupation/No marriage/No child

1 = Occupation/No marriage/No child

10 = No occupation/No marriage/Child

11 = Occupation/No marriage/Child

100 = No occupation/Marriage/No child

101 = Occupation/Marriage/No child

110 = No occupation/Marriage/Child

111 = Occupation/Marriage/Child

As will be evident in the next section, the most common state at the start of observation was 0. This refers to ‘zero’ events, indicating that the individuals had no occupation, were not married and had no children. If an occupation is recorded at the age of 20, for instance, the state changes to 1 at the time point representing that age. During the individual sequences, the states change if one event in the series of events being analysed occurs. To illustrate this, Table 4 describes the sequence of a deaf mute woman in the dataset. She got her first occupation when she was 17 years old, married at the age of 25 and gave birth to her first child the year after.

Table 4 *Image displaying all states by age year in the life sequence of a deaf mute woman in the dataset during observation time.*

Age	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
State	0	0	1	1	1	1	1	1	1	1	101	111	111	111	111	111	111	111	111

Notes and explanations: See Table 3.

All our analyses are performed in the statistical environment R, complemented with the package and toolbox TraMineR (Life Trajectory Miner for R) (Gabadinho, Ritschard, Müller & Studer 2011; Gabadinho, Studer, Müller, Buergin & Ritschard 2015). This package enables us to analyse categorical sequential data to mine and to visualise the life course sequences in our distinct dataset. The advantages associated with this package are many, for example, the capacity to handle a large number of state sequence data and transform them into different formats, useable plot functions and the possibility to handle individual longitudinal characteristics (Gabadinho, Ritschard, Müller & Studer 2011).

4 RESULTS

Below, we examine the sequences with regard to the occurrence of all events, hence both those of primary interest (job, marriage and parenthood) and those of secondary interest (out-migration and death). We also analyse the sequence states the individuals held by the end of our observation and discuss their first occupation. Finally, we investigate the timing and order of the events.

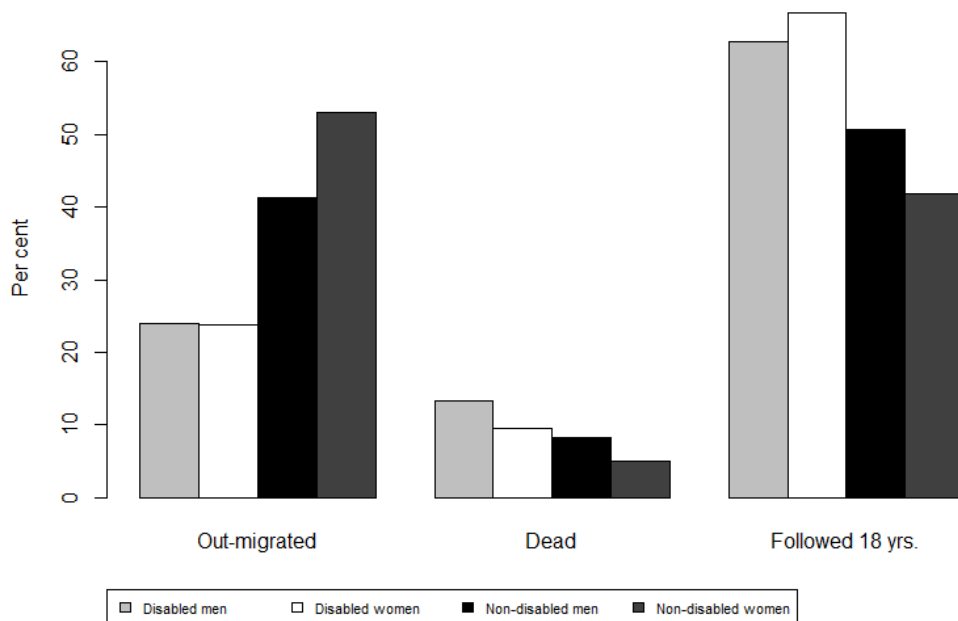
4.1 THE OCCURRENCE OF THE EVENTS UNDER STUDY

Figure 2 shows the proportions in the population under study who died, migrated from the parish of residence or stayed in it during the whole observation period consisting of 18 years (from 15 to 33 years of age). The events of dying and moving out are special in that they break the completeness of the sequences and thus have to be treated separately. About 24% of the disabled individuals, both men and women, departed from their parish during observation. This was a small share compared to the great proportion of migrants found among the non-disabled, where more women than men left the parish (53% and 41%, respectively). The limited migration among disabled people helps explain their high share of mortality in Figure 2, as non-disabled migrants may have passed away in parishes beyond our observation. Disabled men died to a slightly larger degree than did disabled women (13% and 9.5%, respectively).² The differences between the disabled and non-disabled groups observed above are statistically significant at the 5% level within each gender.³

2 The higher mortality risks associated with disability have been shown by Cox regression analyses in a previous study (Haage, Häggström Lundevaller & Vikström 2016).

3 Pearson’s chi-squared tests show p-value = 0.00713 for men and p-value = 0.000757 for women. The groups in the test are defined by a contingency table relating disability status (disabled or non-disabled) to the outcomes (observed whole period, moved or died).

Figure 2 *Relative distribution of end states by gender and disability at the end of observation: out-migration, death and the proportion able to be followed during the entire observation period (from 15 to 33 years of age).*



Source: Digitised parish registers, the Sundsvall region, Demographic Data Base, Umeå University.

Notes: The category 'Followed 18 years' includes individuals who are subject to study during the entire observation period (from 15 to 33 years of age). This means they remained in the parish or survived in it until the end of observation.

We now turn to the occurrence of events among individuals who could be followed over the entire window of observation, from 15 to 33 years of age. Examining their states at the end of the observation gives a summarised picture of the occurrence of events, however it disregards the order in which they took place and the timing between them (Aisenbrey & Fasang 2010). This allows us to answer the question whether disabled people differed from the non-disabled with regard to getting an occupation, marrying and/or having a child. Figure 3 shows results where the variations between the disabled and non-disabled groups are statistically significant.⁴

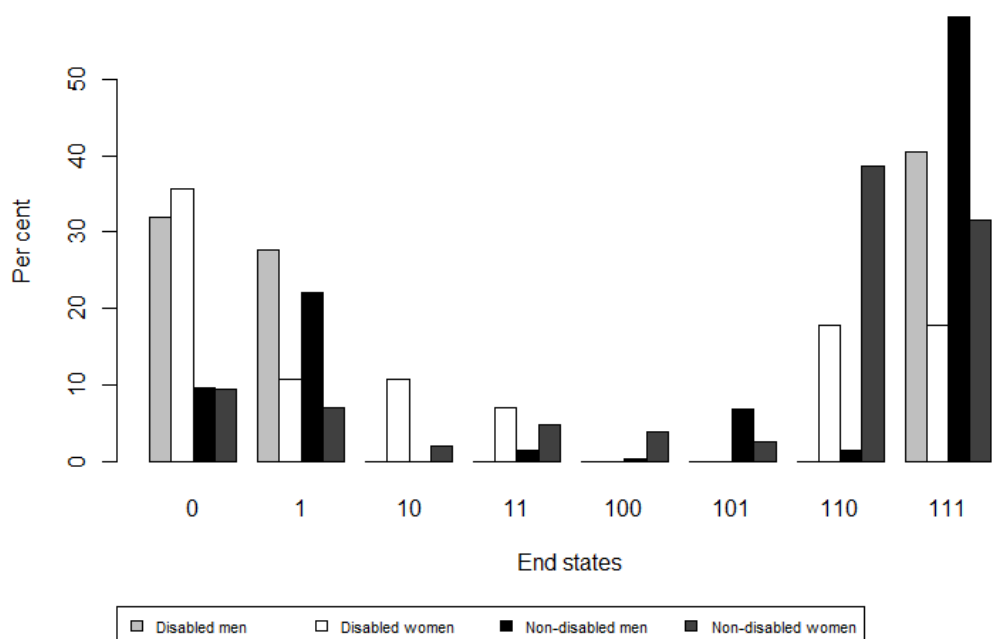
Figure 3 shows that about 30% of the disabled men and almost 40% of the disabled women did not experience any of the events we study (state 0). This means that they did not hold any occupation during the observation time; neither did they marry or have a child.⁵ Only about 10% of the non-disabled individuals ended up in that state (0). Regardless of disability, considerably more men than women took up an occupation, but stayed unmarried and childless (state 1) during observation. Getting a job, marrying and giving birth to a child (state 111), was the most common male trajectory, particularly among non-disabled men (58%) compared to disabled men (40%). An evident share of the women experienced marriage and childbearing without having any occupation reported while we observed them (state 110).⁶ However, this particular state (110) was twice as large among the non-disabled women (40%) compared to their disabled counterparts (20%). While only about 7% of the former women gave birth to illegitimate offspring during observation (states 10 and 11), almost 20% of those with disabilities did.

4 Pearson's chi-squared tests show p-value = 3.63e-07 for men and p-value = 9.15e-12 for women. The groups in the test we defined by a contingency table relating disability status (disabled or non-disabled) to the eight possible end states.

5 In a previous study, where we ran Cox regression models on the propensity to marry among disabled and non-disabled individuals, the latter had higher marital chances (Haage, Vikström & Häggström Lundevaller 2017). See also, De Veirman (2015).

6 The absence of occupation among the women must not be taken to imply that they did not work; it is primarily due to poor documentation of their actual work in the sources. Similar to historical population registers in general, Sweden's parish registers under-report women's occupations (Vikström 2010).

Figure 3 *Relative distribution of states at the end of observation by gender and disability after 18 years of observation (from 15 to 33 years of age).*



Source: Digitised parish registers, the Sundsvall region, Demographic Data Base, Umeå University.

Explanations:

- | | |
|--|---------------------------------------|
| 0 = No occupation/No marriage/No child | 100 = No occupation/Marriage/No child |
| 1 = Occupation/No marriage/No child | 101 = Occupation/Marriage/No child |
| 10 = No occupation/No marriage/Child | 110 = No occupation/Marriage/Child |
| 11 = Occupation/No marriage/Child | 111 = Occupation/Marriage/Child |

Table 5 indicates the influence of disability further by showing how the occurrence of the three events of primary interest to us of (first job, marriage and childbearing) varied by disability and gender among all individuals under observation. The higher share of non-disabled people transitioning from no occupation to having one, or from being unmarried to married, is evident when compared to those having disabilities, and in particular regarding marriage. Whereas only about one disabled man in four married (26.7%), 40% of their non-disabled peers did. According to Table 5, disability impeded the occurrence of parenthood for both genders and particularly made women marry to a lesser extent; however, the few disabled women who did marry were younger than were the non-disabled women. Further, the proportion of men and women who held any occupation while we observe them differed substantially by disability. While 44% of the non-disabled women held an occupation, only 36% of the disabled women did. A similar gap was present among the men (67% and 59%, respectively), and we may wonder if the types of jobs they had also differed by disability. Our examination of individuals in the two groups who have a first job reported suggests that disability did not markedly affect their occupation if they had one. Among the women who worked, about nine in ten were maid-servants (*piga*), regardless of disability status. Disabled men who found a first job primarily worked as farmhands (45%), while unskilled labourers comprised the second most frequent occupational group among them (20%). The latter percentage was higher among non-disabled men having jobs (25%), while proportionally fewer of them were farmhands (41%). Beside journeymen and craftsmen, such as shoemakers and tailors, occupations as farmers, crofters and sailors exemplify other relatively common occupations among the men regardless of whether they had disabilities or not. There is little evidence that disabled individuals who worked gathered into a few specific occupations that made them differ from their non-disabled counterparts. However, disability was less associated with holding any occupation at all, especially among the women.

Table 5 Occurrence of the events of first occupation, first marriage and first childbearing by disability and gender, and the mean and median ages at the transitions of these events.

Type of events	First occupation			First marriage			First childbearing		
	N (%) within group	Mean age	Median age	N (%) within group	Mean age	Median age	N (%) within group	Mean age	Median age
Disabled men (N=72)	44 (58.7%)	21.4	20.0	20 (26.7%)	25.7	26.0	20 (26.7%)	26.6	26.5
Disabled women (N=45)	15 (35.7%)	20.3	18.0	12 (28.6%)	22.8	22.5	16 (38.1%)	22.9	22.5
Non-disabled men (N=4,385)	2,995 (67.4%)	21.1	20.0	1,789 (40.8%)	25.8	26.0	1,604 (36.6%)	26.2	26.0
Non-disabled women (N=4,372)	1,941 (44.4%)	18.9	18.0	2,043 (46.7%)	23.7	23.0	1,908 (43.6%)	23.6	23.0

Source: Digitised parish registers, the Sundsvall region, Demographic Data Base, Umeå University.

Table 5 also reports the mean and median ages of when people experienced the events of central interest in our study. The results suggest that disabled individuals who found an occupation or a spouse, for example, took up work or married slightly later in life than did their non-disabled counterparts. These notions indicating the timing of transitions are further investigated in the next section.

4.2 THE TIMING AND ORDER OF THE EVENTS

The mean and median ages in Table 5 show some evidence that disabilities delayed people's transition to work and marriage, but made women bear their first child slightly earlier in life. Sequence analysis offers a graphical view of these notions by showing the state distributions by time points that indicate the timing of the events under study. Such plots provide an aggregated picture of the general pattern for all life trajectories - or sequences - among the individuals by group (Gabadinho, Ritschard, Müller & Studer 2011). Figure 4 shows the state distributions by time points (age) per gender and disability during observation. The share of men who did not get any job, remained unmarried and did not have any children (green-coloured state) is considerably larger among the disabled men than among their non-disabled peers. At the age of 28, the slope for the former men levels off at about 20%, while for the latter men it continues to decrease. That the share drops at a slightly slower pace and later in time suggests that men who left the 'green' state due to occupation did later in life, if disabled. The proportion of men who held an occupation but did not experience marriage or parenthood (yellow-coloured state) fluctuated over their lifetime but is quite similar by the end of observation, regardless of disability. However, the higher level of migration of non-disabled men, many of whom probably married outside of the observation area, contributed to this similarity. Death (red-coloured state) is the only state where the disabled men were consistently proportionally greater than were the non-disabled men. The development over time for the state equal to occupation, marriage and family formation (purple-coloured state) shows that it involved disabled men to a slightly lower proportion and somewhat later in life compared to the non-disabled men.

Primarily due to a smaller number of cases and events, Figure 4 displays a more irregular trajectory pattern for disabled women. Even though they too moved through the sequence of occupation, marriage and having a child (purple-coloured state), or transitioned to marriage and parenthood (light-grey-coloured state), they did so to a lower extent and in a slower pace than the non-disabled women. The state representing death (red-coloured state) and the state equal to having a child without marriage and occupation (blue- and orange-coloured state) show higher shares of disabled women than of non-disabled women. The latter state result suggests why we found that disabled women who transitioned to parenthood demonstrated the lowest mean and median ages (Table 5). The graphical view of the state distributions suggests that both disability and gender shaped people's life trajectories.

Figure 4 *Relative distribution of states by time points per gender and disability during observation (from 15 to 33 years of age).*

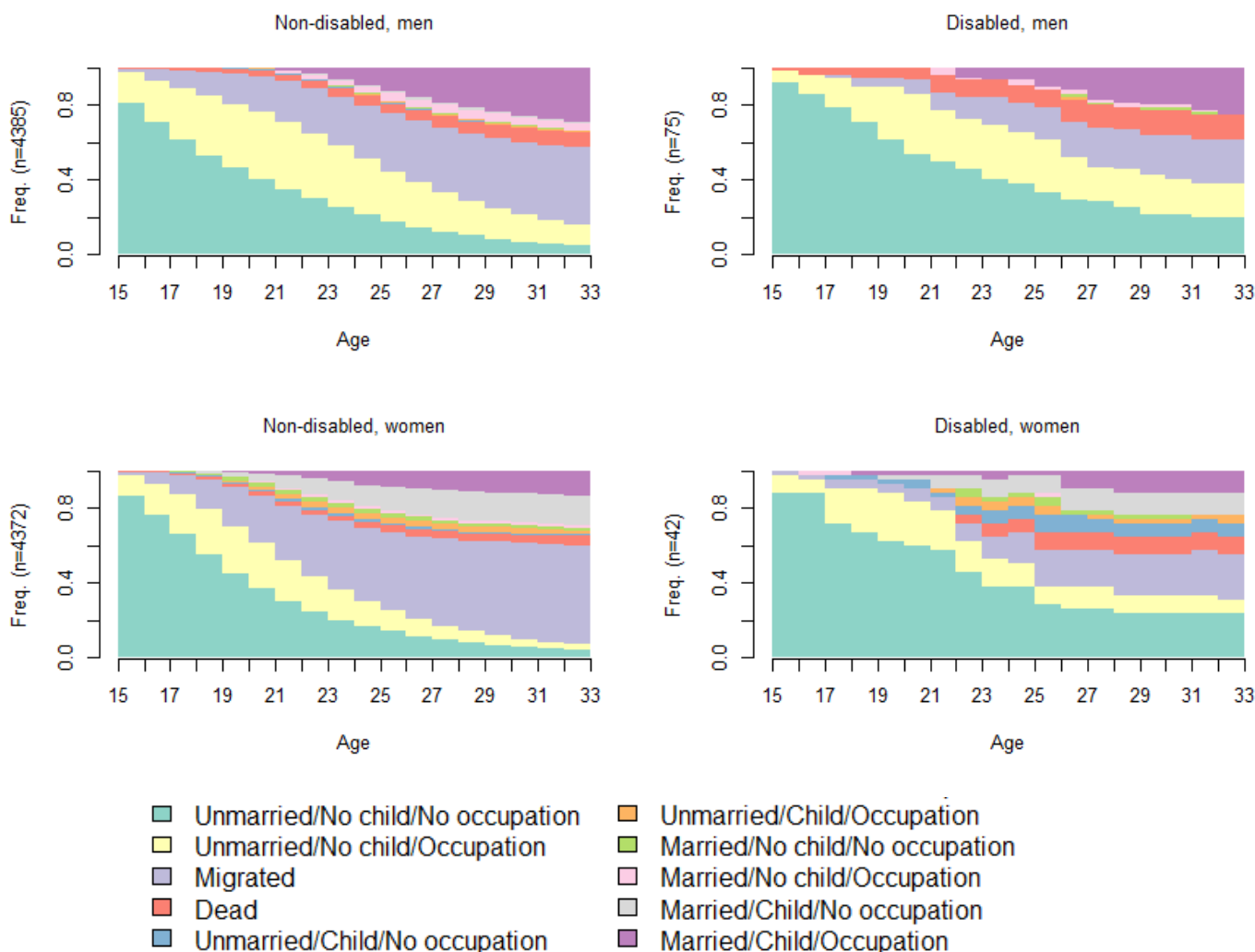


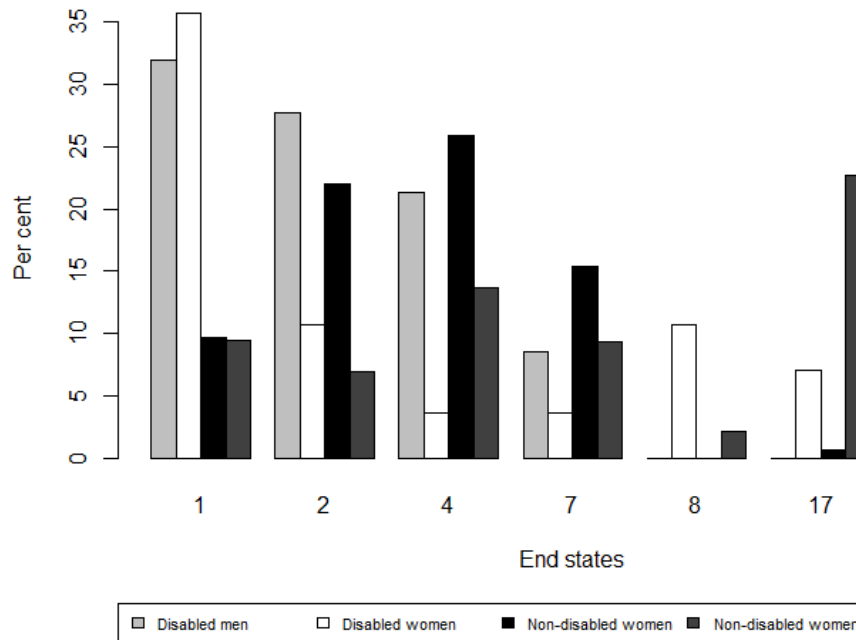
Figure 5 displays the order in which the events occurred, without taking the duration of the different states into consideration. It shows the distribution of the seven most frequent state orders, defined as those that represent 10% or more of the individuals. Table 6 in the Appendix details the different types of state orders derived from our analyses.⁷

State order type 1 (state order 0) - no occupation, no marriage and no birth of a child - was the most frequent life trajectory for disabled people. It was slightly more common among disabled women (36%) than among disabled men (32%). In general, type 2 (occupation but no marriage and no child) was more frequent among men than women. That both disabled men and women demonstrate larger proportions of this type (2) is because their non-disabled counterparts had, to a great part, transitioned to marriage and/or parenthood, represented by types 4 and 7. State order type 7 is equivalent to type 4, except that marriage and the birth of the first child occurred in the same state (the same age year). This trajectory was the most common among non-disabled men, as approximately every second one of them is typed 4 or 7. However, the order of the three events associated with these two types (occupation, marriage and parenthood) was also relatively frequent among disabled men, as about 35% are found in type 4 or 7. Compared to the men, a considerably smaller share of the women represent these two state order types, accounting for only about 25% of the non-disabled women and not even 10% of the disabled women. Women are far more frequently shown in the state order types 8, 17 and

⁷ We have merged the state order types 1 and 0-1 together when the subsequent states in the sequence are identical (see Table 6, Appendix 1). State 1 signifies that individuals held an occupation at the start of observation, while order 0-1 means that those who weren't employed, started working during the first year of observation (age 15 years).

24 than men. Types 17 and 24 represent those not having any occupation, but marrying and giving birth to a child. In the latter type (24) the events of marriage and parenthood occurred in the same age year, while type 17 indicates that the child was born in the subsequent year upon marriage. Type 8 includes women who did not hold any job and did not marry, but gave birth to illegitimate offspring. While about 12% of the women with disabilities become unwed mothers this way, only 2% of those without disabilities did.

Figure 5 *Relative distribution of the most frequent state orders by gender and disability after 18 years of observation (from 15 to 33 years of age).*



Source: Digitised parish registers, the Sundsvall region, Demographic Data Base, Umeå University.

Notes: The figure shows the seven most common orders of states in the dataset, which are defined as those that represent 10% or more of the individuals (Table 6 in Appendix). Individuals who at the start of observation (age 15) have no occupation reported, but gain one during the first year of observation (age 15) are coded as having a first occupation from start of observation.

Explanations:

Type	State orders	Description
1	0	No occupation - no marriage - no child
2	0-1/1	First note of occupation - no marriage - no child
4	0-1-101-111/1-101-111	First note of occupation - first marriage - birth of first child
7	0-1-111/1-111	First note of occupation - first marriage & birth of first child (in the same state)
8	0-10	No occupation - no marriage - birth of first child
17	0-100-110	No occupation - first marriage - birth of first child
24	0-110	No occupation - first marriage & birth of first child (in the same state)

5 CONCLUDING DISCUSSION

In the nineteenth century the transition to adulthood was marked by essential events in an individual's life, such as getting the first job, marrying and giving birth to the first child. Our first aim was to employ sequence analysis to examine whether and how disabilities influenced the occurrence, timing and order of these events in the life trajectories of a young population comprising 8,874 individuals in the nineteenth-century Sundsvall region in Sweden. Also taking into account the events of out-migration (from the parish) and death, we observed both disabled and non-disabled people during an extended life-span period (between ages 15 and 33 years) when young adults were expected to seek their livelihood and establish themselves by taking up work, marrying and becoming parents. This section highlights the major findings from employing the method of sequence analysis, followed by a discussion where we assess our use of this method, which was the second aim of the study.

The sequence analysis results provide a rather complete picture of how disabled individuals moved through life as young adults. With regard to work and family, we find substantial differences between how their trajectories developed when compared to those of non-disabled individuals. Whereas the latter often experienced several of the three events under study while we observe them and usually in the expected order (first job, then marriage followed by parenthood), disabled people did so to a lesser extent. Even if it was not impossible for them to find a job, considerably fewer of both the men and women worked or married, compared to their non-disabled peers, and if they did, they usually did so later in life. In all, the life sequences clearly demonstrate that disability impeded individuals' opportunities in the labour market, and even more so in the marriage market. The other two events we investigated reflect these difficulties by showing that disability resulted in premature mortality and made people less mobile in terms of out-migration. These notions are the major conclusions from our sequence analyses, but there are even more findings to highlight. First, even if disabled men found jobs (and if so, usually the same types of occupations as the non-disabled), they did not transition to the same extent to marriage; thus, fewer disabled men shared a life with a wife and children. It seems as if work and income did not render many young disabled men sufficient resources to afford a family. Second, when comparing women's trajectories, it appears that one in five disabled women gave birth to illegitimate offspring, while only one in ten among the non-disabled women did.

Yet another conclusion we draw is that the findings discerned above would not have been obtained without using sequence analysis. For several reasons, we view this method as beneficial for identifying the multiple influences that disability may have had on humans historically. One advantage is that it helps us to trace men and women's actual trajectories, which in turn reflect their varied opportunities in life depending on disability and gender. This is because sequence analysis can account for several events at the same time and during an extended period of people's lives, provided that there is access to micro-level and longitudinal data. Providing such a holistic window into individuals' lives makes this method attractive for detecting the phenomenon of cumulative disadvantages or advantages across life, for instance, although this method has a few limitations. It is true that more advanced statistical tools exemplified by Cox regression models are superior in estimating the propensity to experience specific life events, such as getting a job or marrying or dying, depending on individuals' different attributes and the impact of contextual factors. However, these models examine only one single event at one occasion, even if they can account for the impact of time-varying variables. Human life courses uncover a series of events that may be mutually interdependent and made up by life sequences that regression models cannot completely handle. Further, these sequences are not easily imagined from outcomes showing hazards or odds ratios instead of extended life trajectories. The occurrence of events, and even the delay or absence of events across the life course, comes to the fore in the colourful charts displaying the outcomes from sequence analysis. Even if its statistical power is limited and our use of this method only shows descriptive outcomes, we think it holds a pedagogical advantage in displaying life trajectories as it does. This makes the results relatively easy to grasp, even for scholars less familiar with statistical measures, many of whom are operating in the fields of social history or disability studies, for example. Results based on sequence analysis may thus increase their interest in life course research and quantitative methods within the field of historical demography, which would be beneficial to any minor field, as this in fact is. We further hope our study has illustrated that historical demographers, for their part, could obtain more or new knowledge about issues in past populations by implementing sequence analysis.

Given both our findings and experiences from using the method of sequence analysis, we end by discussing a few limitations of the present study and propose a couple of means to rectify them. To

deepen the understanding of how disabilities influenced human life in the past, there is a need to distinguish between different types of disabilities and to account for more than the five events analysed above for young individuals between the ages of 15 and 33 years. Even though their trajectories show considerable differences with regard to disability, investigating even more events and sequences within the group of disabled people and during an even more extended period of their lives would improve the possibility of seeing evidence of the accumulation of their advantages or disadvantages. One next step is to explore how disability shaped occupational trajectories not only the first job examined above since quite many disabled men seemed to have made it that far but did not continue on to marriage and family formation. Another event to target would be when the individuals left their parental homes, as this move signifies yet another transition toward adult life. In this study we only checked for migrations going beyond parish borders, which left us with indications that a lock-in mechanism, probably coupled with access to work or support from relatives, made disabled people migrate from their parishes to a markedly lower degree than did their non-disabled peers. Another most important step to take is to combine sequence analysis with event history analysis. Recent research has begun to use this combination due to life course scholars' increasing awareness that the two methods must not compete, but rather complement each other in making up for their individual drawbacks (Bras, Liefbroer & Elzinga 2010; Courgeau 2016; Svensson, Lundholm, De Luna & Malmberg 2015). We support this direction in research and intend to contribute to it by, for example, identifying whether there are any significant associations between premature mortality risks and the specific life sequences found in this study. Such analyses would provide explanations to the premature deaths that disabled individuals obviously suffered, as we have seen in the present study, even though it has primarily provided knowledge on how disability influenced young men and women's life trajectories while still alive.

ACKNOWLEDGMENTS

This paper is part of a project headed by Lotta Vikström that has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No. 647125), 'DISLIFE Liveable Disabilities: Life Courses and Opportunity Structures Across Time'. The present paper is also part of another project led by Lotta Vikström, 'Experiences of disabilities in life and online: Life course perspectives on disabled people from past society to present', funded by the Wallenberg Foundation (*Stiftelsen Marcus och Amalia Wallenbergs Minnesfond*). The authors are grateful to the useful comments we received on a first draft of the paper, which was presented at the LaCOSA II International Conference on Sequence Analysis and Related Methods, Lausanne, Switzerland, 8–10 June 2016. We also appreciated the feedback we got when an extension of the first draft was presented at the 2nd Conference of the European Society of Historical Demography (ESHG) in Leuven, Belgium, 21–24 September 2016. Next, we wish to thank the anonymous reviewers for providing suggestions on how to advance our study. Finally, we are grateful to all the support regarding both research and data that we enjoy from our colleagues at the Centre for Demographic and Ageing Research (CEDAR) and the Demographic Data Base (DDB), Umeå University, Sweden.

REFERENCES

- Abbott, A. (1990). A primer on sequence methods. *Organization Science*, 1(4), 375-392.
DOI: [10.1287/orsc.1.4.375](https://doi.org/10.1287/orsc.1.4.375)
- Abbott, A. (1995). Sequence analysis: new methods for old ideas. *Annual Review of Sociology*, 21, 93-113.
DOI: [10.1146/annurev.so.21.080195.000521](https://doi.org/10.1146/annurev.so.21.080195.000521)
- Abbot, A. & Tsay, A. (2000). Sequence analysis and optimal matching methods in sociology review and prospect. *Sociological Methods & Research*, 29(1), 3-33.
DOI: [10.1177/0049124100029001001](https://doi.org/10.1177/0049124100029001001)

- Aisenbrey, A. & Fasang, A. E. (2010). New life for old ideas: the "second wave" of sequence analysis. Bringing the "course" back into the life course. *Sociological Methods & Research*, 38(3), 420-462.
DOI: [10.1177/00491241093557532](https://doi.org/10.1177/00491241093557532)
- Alm Stenflo, G. (1994). *Demographic Description of the Skellefteå and Sundsvall Regions during the 19th Century*. Umeå: Demographic Data Base.
- Alter, G. C. (1988). *Family and the Female Life Course: The Women of Verviers, Belgium, 1849-1880*. Madison, WI: University of Wisconsin.
- Alter, G. C., Gutmann, M. P., Leonard, S. H. & Merchant, E. R. (2012). Introduction: longitudinal analysis of historical-demographic data. *Journal of Interdisciplinary History*, 42(4), 503-517.
DOI: [10.1162/JINH_a_00302](https://doi.org/10.1162/JINH_a_00302)
- Arvidsson, J., Widén, S. & Tideman, M. (2015). Post-school options for young adults with intellectual disabilities in Sweden. *Research and Practice in Intellectual and Developmental Disabilities*, 2(2), 180-193.
DOI: [10.1080/23297018.2015.1028090](https://doi.org/10.1080/23297018.2015.1028090)
- Axelsson, P. & Sköld, P. (Eds.). (2011). *Indigenous Peoples and Demography: The Complex Relation between Identity and Statistics*. New York, NY: Berghahn Books.
- Barnes, C. & Mercer, G. (2005). Disability, work, and welfare: challenging the social exclusion of disabled people. *Work, Employment and Society*, 19(3), 527-545.
DOI: [10.1177/0950017005055669](https://doi.org/10.1177/0950017005055669)
- Bengtsson, S. (2012). Arbete för individen och samhället. In: K. Engwall & S. Larsson (Eds.), *Utans förskapets historia - om funktionsnedsättning och funktionshinder*. Lund: Studentlitteratur.
- Bengtsson, T., Campbell, C. & Lee, J. Z. (Eds.). (2004). *Life under Pressure. Mortality and Living Standards in Europe and Asia, 1700-1900*. Cambridge, MA: The MIT Press.
- Bergman, M. (2010). *Constructing communities: The establishment and demographic development of sawmill communities in the Sundsvall district, 1850-1890* (Doctoral dissertation). Umeå, Umeå University.
- BiSOS (1907). A. *Befolknings-statistik. Statistiska Central-Byråns underdåniga berättelse för år 1900*. Tredje afdelningen. Stockholm: SCB.
- Borsay, A. (2005). *Disability and Social Policy in Britain since 1750*. Hampshire: Palgrave Macmillan.
- Bras, H., Liefbroer, A. C. & Elzinga, C. H. (2010). Standardization of pathways to adulthood? An analysis of Dutch cohorts born between 1850 and 1900. *Demography*, 47(4), 1013-1034.
DOI: [10.1007/BF03213737](https://doi.org/10.1007/BF03213737)
- Courgeau, D. (2016). Do different approaches in social science lead to divergent or convergent models. In: G. Ritschard & M. Studer (Eds.), *Proceedings of the International Conference on Sequence Analysis and Related Methods (LaCOSA II)* (pp. 7-30). Lausanne, Université de Lausanne.
- De Veirman, S. (2015). *Breaking the Silence: The Experiences of Deaf People in East Flanders, 1750-1950: A Life Course Approach*. Ghent, Ghent University.
- De Veirman, S., Haage, H. & Vikström, L. (2016). Deaf and unwanted? Marriage characteristics of deaf people in eighteenth- and nineteenth-century Belgium. A comparative and cross-regional perspective. *Continuity and Change*, 31, 241-273.
DOI: [10.1017/S0268416016000230](https://doi.org/10.1017/S0268416016000230)
- Dribe, M. (2000). *Leaving Home in a Peasant Society. Economic Fluctuations, Household Dynamics and Youth Migration in Southern Sweden, 1829-1866*. Lund, Lund University.
- Dribe, M., Manfredini, M. & Oris, M. (2014). The roads to reproduction: Comparing life course trajectories in preindustrial Eurasia. In: Lundh, C. & S. Kurosu (Eds.), *Similarity in difference: Marriage in Europe and Asia, 1700-1900* (pp. 85-116). Cambridge, MA: The MIT Press.
- Drugge, U. (1988). *Om husförhörlängder som medicinsk urkund. Psykisk sjukdom och förståndshandikapp i en historisk källa*. Umeå: Scriptum nr 8. Rapportserie utgiven av forskningsarkivet vid Umeå universitet.
- Edvinsson, S. (1992). *Den osunda staden: Sociala skillnader i dödlighet i 1800-talets Sundsvall* (Doctoral dissertation). Umeå, Umeå University.

- Edvinsson, S. & Broström, G. (2012). Old age, health, and social inequality: exploring the social patterns of mortality in 19th century Northern Sweden. *Demographic Research*, 26(23), 633-660.
DOI: [10.4054/DemRes.2012.26.23](https://doi.org/10.4054/DemRes.2012.26.23)
- Edvinsson, S. & Lindkvist, M. (2011). Wealth and health in 19th century Sweden. A study of social differences in adult mortality in the Sundsvall Region. *Explorations in Economic History*, 48(3), 376-388.
DOI: [10.1016/j.eeh.2011.05.007](https://doi.org/10.1016/j.eeh.2011.05.007)
- Elder, G. H. Jr., Kirkpatrick Johnson, M. & Crosnoe, R. (2004). The Emergence and Development of Life Course Theory. In: J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the Life Course* (pp. 3-19). New York: Springer.
- Engberg, E. (2005). *I fattiga omständigheter: Fattigvårdens former och understödstagare i Skellefteå socken under 1800-talet* (Doctoral dissertation). Umeå, Umeå University.
- Foucault, M. (1965). *Madness and Civilization: A History of Insanity in the Age of Reason*. New York: Pantheon books.
- Förhammar, S. (1991). *Från tärande till närande: Handikapputbildningens bakgrund och socialpolitiska funktion i 1800-talets Sverige*. Stockholm: Almqvist & Wiksell.
- Förhammar, S. & Nelson, M. C. (Eds.). (2004). *Funktionshinder i ett historiskt perspektiv*. Lund: Studentlitteratur.
- Franklin, P. A. (1977). Impact of disability on the family structure. *Social Security Bulletin*, 40, 3-18.
- Gabardino, A., Ritschard, G., Müller, N. S. & Studer, M. (2011). Analyzing and visualizing state sequences in R with TraMineR. *Journal of Statistical Software*, 40(4), 1-37.
DOI: [10.18637/jss.v040.i04](https://doi.org/10.18637/jss.v040.i04)
- Gabardino, A., Studer, M., Müller, N., Buergin, R. & Ritschard, G. (2015). Package "TraMineR" Trajectory Miner: a toolbox for exploring and rendering sequences.
Retrieved from <http://traminer.unige.ch>
- Gaunt, D. (1983). *Familjeliv i Norden*. Stockholm: Gidlunds förlag.
- Giele, J. Z. & Elder Jr., G. H. (1998). Life Course Research. Development of a Field. In: J. Z. Giele & G. H. Elder Jr. (Eds.), *Methods of Life Course Research. Qualitative and Quantitative Approaches* (pp. 5-27). Thousand Oaks, CA: SAGE Publications Inc.
- Haage, H. (2017). *Disability in individual life and past society: life course perspectives of people with disabilities in the Sundsvall region of Sweden in the nineteenth century*. (Doctoral dissertation). Umeå, Umeå University
- Haage, H., Vikström, L. & Häggström Lundevaller, E. (2017). Disabled and excluded? Marital chances among disabled people in nineteenth-century northern Sweden. *Essays in Economic and Business History*. Vol. 35, No. 1, 207-238
- Haage, H., Häggström Lundevaller, E. & Vikström, L. (2016). Gendered death risks among disabled individuals in Sweden: A case study of the 19th-century Sundsvall Region. *Scandinavian Journal of History*, 41(2), 160-184.
DOI: [10.1080/03468755.2016.1155859](https://doi.org/10.1080/03468755.2016.1155859)
- Hafström, G. (1972). *Den svenska familjerättens historia*. Lund: Studentlitteratur.
- Hajnal, J. (1965). European Marriage Patterns in Perspective. In: D. V. Glass & D. E. C. Eversley (Eds.), *Population in History: Essays in Historical Demography*. London: Edward Arnold Publishers Ltd.
- Hajnal, J. (1982). Two kinds of preindustrial household formation system. *Population and Development Review*, 8(3), 449-494.
DOI: [10.2307/1972376](https://doi.org/10.2307/1972376)
- Harnesk, B. (1990). *Legofolk*. Stockholm: Almqvist & Wiksell International.
- Harris, G., Gálvez, L. & Machado, H. (2016). *Gender and Well-being in Europe: Historical and Contemporary Perspectives*. Abingdon, UK: Routledge.

- Helgesson, V. (1978). Kontroll av underklassen: Försvarslöshetsfrågan 1825-53. In: I. Hammarström (Ed.), *Ideologi och socialpolitik i 1800-talets Sverige, Fyra studier*. Uppsala: Studia Historica Upsalensia.
- Hutchison, I. (2007). *A History of Disability in Nineteenth Century Scotland*. New York: The Edwin Mellen Press.
- Jacobsson, M. (2000). *Att blifva sin egen: Ungdomars väg in i vuxenlivet i 1700- och 1800-talens övre Norrland* (Doctoral dissertation). Umeå, Umeå University.
- Janssens, A. (1993). *Family and Social Change: The Household as a Process in an Industrializing Community*. Cambridge: Cambridge University Press.
- Janssens, A. (2014). *Labouring Lives: Women, work and the demographic transition in the Netherlands 1880-1960*. Bern: Peter Lang Publishing Group.
- Kok, J. (2007). Principles and prospects of the life course paradigm. *Annales de Démographie Historique*, 1(113), 203-230.
DOI : [10.3917/adh.113.0203](https://doi.org/10.3917/adh.113.0203)
- Kolk, M. (2011). Deliberate birth spacing in nineteenth century Northern Sweden. *European Journal of Population*, 27(3), 337-359.
DOI: [10.1007/s10680-011-9228-z](https://doi.org/10.1007/s10680-011-9228-z)
- Longmore, P. K. & Umansky, L. (Eds.). (2001). *The New Disability History: American Perspectives*. New York: New York University Press.
- Lundh, C. (1997). *The World of Hajnal Revisited. Marriage Patterns in Sweden 1650-1990*. Lund Papers in Economic History (No. 60).
- Lundh, C. (1999). Servant migration in Sweden in the early nineteenth century. *Journal of Family History*, 24(1), 53-73.
DOI: [10.1177/036319909902400104](https://doi.org/10.1177/036319909902400104)
- Lundh, C. (2003). *Life Cycle Servants in Nineteenth Century Sweden - Norms and Practice*. Lund Papers in Economic History (No. 84).
- Lundh, C. & Kurosu, S. (2014). *Similarity in difference: Marriage in Europe and Asia, 1700-1900*. Cambridge, MA: The MIT Press.
- Mayer, K. U. & Brandon Tuma, N. (1990). Life Course Research and Event History Analysis: An Overview. In: K. U. Mayer & N. Brandon Tuma (Eds.), *Event History Analysis in Life Course Research* (pp. 3-20). Madison, WI: The University of Wisconsin Press.
- McQuillan, K. (1989). Economic structure, and age at marriage: Some evidence from Alsace. *Journal of Family History*, 14(4), 331-346.
DOI: [10.1177/036319908901400403](https://doi.org/10.1177/036319908901400403)
- Moring, B. (2003). Nordic family patterns and the north-west European household system. *Continuity and Change*, 18(1), 77-109.
DOI: [10.1017/S0268416003004508](https://doi.org/10.1017/S0268416003004508)
- National Board of Health and Welfare. (2009). *Att följa levnadsförhållande för personer med funktionshinder*. (Report, Stockholm).
- Nilsdotter Jeub, U. (1993). *Parish Records: 19th Century Ecclesiastical Registers*. Umeå, Umeå University: Information from the Demographic Data Base.
- Olsson, C. G. (2010). *Omsorg & Kontroll. En handikapphistorisk studie 1750-1930*. Umeå, Umeå University.
- Olsson, I. (1999). *Att leva som lytt: Handikappades livsvillkor i 1800-talets Linköping*. Linköping, Linköping Universitet.
- Oris, M. & Ritschard, G. (2014). Sequence Analysis and Transition to Adulthood: An Exploration of the Access to Reproduction in Nineteenth-Century East Belgium. In: P. Blanchard, F. Bühlmann, & J.-A. Gauthiers (Eds.), *Advances in Sequence Analysis: Theory, Methods, Applications, Vol. 2* (pp. 151-167). Berlin: Springer-Verlag.
DOI: [10.1007/978-3-319-04969-4_8](https://doi.org/10.1007/978-3-319-04969-4_8)

- Petersson, B. (1983). *Den farliga underklassen: Studier i fattigdom och brottslighet i 1800-talets Sverige*. Umeå, Umeå universitet.
- Reher, D. (1998). Family ties in Western Europe: persistent contrasts. *Population and Development Review*, 24, 203-34.
Stable URL: <http://www.jstor.org/stable/2807972>
- Ritschard, G. & Oris, M. (2005). Life course data in demography and social sciences: Statistical and data-mining approaches. In: R. Levy, P. Ghisletta, J.-M. le Goff et al. (Eds.), *Towards an Interdisciplinary Perspective on the Life Course. Advances in Life Course Research Vol. 10* (pp. 289-320). Amsterdam: Elsevier.
- Ritschard, G., Gabadinho, A., Müller, N. S. & Studer, M. (2008). Mining event histories: A social science perspective. *International Journal of Data Mining, Modelling and Management*, 1(1), 68-90.
DOI: [10.1504/IJDMMM.2008.022538](https://doi.org/10.1504/IJDMMM.2008.022538)
- Rogers, J. & Nelson, M. C. (2003). "Lapps, Finns, Gypsies, Jews and Idiots": Modernity and the use of statistical categories in Sweden. *Annales de Démographie Historique*, 1(105), 61-79.
DOI : [10.3917/adh.105.79](https://doi.org/10.3917/adh.105.79)
- Ruof, M. C. (2004). Vulnerability, vulnerable populations, and policy. *Kennedy Institute of Ethics Journal*, 14, 411-425.
DOI: [10.1353/ken.2004.0044](https://doi.org/10.1353/ken.2004.0044)
- Sainsbury, S. & Lloyd-Evans, P. (1986). *Deaf Worlds: A Study of Integration, Segregation, and Disability*. London: Hutchinson.
- Schumacher, R., Matthijs, K. & Moreels, S. (2013). Migration and reproduction in an urbanizing context: Family life courses in 19th century Antwerp and Geneva. *Revue Quetelet*, 1(1), 51-72.
DOI: [10.14428/rqj2013.01.01.03](https://doi.org/10.14428/rqj2013.01.01.03)
- Schur, L., Kruse, D. & Blanck, P. (2013). *People with Disabilities: Sidelined or Mainstreamed?* Cambridge: Cambridge University Press.
- Shi, L. & Stevens, G. D. (2010). *Vulnerable Populations in the United States*. San Francisco, CA: John Wiley & Sons.
- Studer, M. & Ritschard, G. (2016). What matters in differences between life trajectories: A comparative review of sequence dissimilarity measures. *Journal of the Royal Statistical Society, Series A*, 179(2), 481-511.
DOI: [10.1111/rssa.12125](https://doi.org/10.1111/rssa.12125)
- Svensson, I., Lundholm, E., De Luna, X. & Malmberg, G. (2015). Family life course and the timing of women's retirement - A sequence analysis approach. *Population, Space and Place*, 21(8), 856-871.
DOI: [10.1002/psp.1950](https://doi.org/10.1002/psp.1950)
- Van de Putte, B. & Miles, A. (2005). A social classification scheme for historical occupational data. *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, 38(2), 61-94.
DOI: [10.3200/HMTS.38.2.61-94](https://doi.org/10.3200/HMTS.38.2.61-94)
- van Leeuwen, M., Maas, I. & Miles, A. (2002). *HISCO: Historical International Standard Classification of Occupations*. Leuven: Leuven University Press.
- van Leeuwen, M. & Maas, I. (2011). *HISCLASS: A Historical International Social Class Scheme*. Leuven: Leuven University Press.
- Vikström, L. (2011). Identifying dissonant and complementary data on women through the triangulation of historical sources. *International Journal of Social Research Methodology*, 13(2), 211-221.
DOI: [10.1080/13645579.2010.482257](https://doi.org/10.1080/13645579.2010.482257)
- Vikström, L. (2010). Identifying dissonant and complementary data on women through the triangulation of historical sources. *International Journal of Social Research Methodology*, 13, 211-21.
DOI: [10.1080/13645579.2010.482257](https://doi.org/10.1080/13645579.2010.482257)

- Vikström, L. (2006). Vulnerability among paupers: Determinants of individuals receiving poor relief in nineteenth-century northern Sweden. *The History of the Family*, 11(4), 223-239.
DOI: [10.1016/j.hisfam.2006.12.004](https://doi.org/10.1016/j.hisfam.2006.12.004)
- Vikström, L. (2003). *Gendered routes and courses: The socio-spatial mobility of migrants to nineteenth-century Sundsvall, Sweden*. Umeå, Umeå University.
- Vikström, P., Brändström, A., & Edvinsson, S. (2006). Longitudinal databases: Sources for analyzing the life course. *History and Computing*, 14, 109-128.
DOI: [10.3366/hac.2002.14.1-2.109](https://doi.org/10.3366/hac.2002.14.1-2.109)
- Vikström, L., Marklund, E., & Sandström, G. (2016). Demographic outcomes during colonisation: Migration and Mortality among indigenous and non-indigenous populations in nineteenth-century Sweden. *Journal of Migration History*, 2, 148-177.
DOI: [10.1163/23519924-00201006](https://doi.org/10.1163/23519924-00201006)
- Westberg, A., Engberg, E. & Edvinsson, S. (2016). A unique source for innovative longitudinal research: The POPLINK database. *Historical Life Course Studies*, 3, 20-31.
Stable URL: [10622/23526343-2016-0003](https://doi.org/10.622/23526343-2016-0003)
- Whittle, J. (2005). Servants in rural England c. 1450-1650: Hired Work as Means of accumulating Wealth and Skills before Marriage. In: M. Ågren & A. L. Erickson (Eds.), *The Marital Economy in Scandinavia and Britain 1400-1900* (pp. 89-107). Aldershot: Ashgate.
- Winberg, C. (1977). *Folkökning och proletarisering: Kring den sociala strukturomvandlingen på Sveriges landsbygd under den agrara revolutionen* (Doctoral dissertation). Göteborg, Göteborgs Universitet.

Appendix

Table 6 The order of states in the sequences that represent 10% or more of the individuals in the dataset.

Type	Order of states	Disabled group		Non-disabled group	
		Men N (%)	Women N (%)	Men N (%)	Women N(%)
1	0	15 (31.9%)	10 (35.7%)	215 (9.7%)	173 (9.5%)
2a	0-1mm	13	3	393	109
2b	1			94	20
Total 2		13 (27.7%)	3 (10.7%)	487 (22.0%)	129 (7.0%)
3a	0-1-101			103	36
3b	1-101			23	8
Total 3				125 (5.6)	44 (2.4)
4a	0-1-101-111	7	1	444	185
4b	1-101-111	3		131	66
Total 4		10 (21.3%)	1 (3.6%)	575 (25.9%)	251 (13.7%)
5a	0-1-11			13	51
5b	1-11		1	12	14
Total 5			1 (3.6%)	25 (1.1%)	65 (3.6%)
6a	0-1-11-111		1	35	35
6b	1-11-111		1	20	20
Total 6			2 (7.1%)	55 (2.5%)	105 (5.7%)
7a	0-1-111	4	1	271	128
7b	1-111			71	43
Total 7		4 (8.5%)	1 (3.6%)	342 (15.4%)	171 (9.3%)
8	0-10		3 (10.7%)	1(0%)	39 (2.1%)
9	0-10-11		1 (3.6%)	3 (0.1%)	6 (0.3%)
10	0-10-11-111			14 (0.6%)	5 (0.3%)
11	0-10-110		1 (3.6%)	4 (0.2%)	67 (3.7%)
12	0-10-110-111			10 (0.5%)	
13	0-10-111			10 (0.5%)	3 (0.2%)
14	0-100			9 (0.4%)	71 (3.9%)
15	0-100-101			8 (0.4%)	1 (0.1%)
16	0-100-101-111			14 (0.6%)	
17	0-100-110		2 (7.1%)	16 (0.7%)	416 (22.7%)
18	0-100-110-111			31 (1.4%)	
19	0-100-111	2 (4.3%)		36 (1.6%)	
20	0-101			17 (0.8%)	1 (0.1%)
21	0-101-111	1 (2.1%)		90 (4.1%)	16 (0.9%)
22	0-11			5 (0.2%)	16 (0.9%)
23	0-11-111		1 (3.6%)	8 (0.4%)	19 (1.0%)
24	0-110		2 (7.1%)	13 (0.6%)	222 (12.1%)
25	0-110-111			39 (1.8%)	1 (0.1%)
25	0-111	2 (4.2%)		65 (2.9%)	7 (0.4%)
26	100-110				1 (0.1%)
27	110				1 (0.1%)
Summa		47 (100%)	28 (100%)	2,217 (100%)	1,830 (100%)

Explanations:

0 = No occupation/No marriage/No child
 1 = Occupation/No marriage/No child
 10 = No occupation/No marriage/Child
 11 = Occupation/No marriage/Child

100 = No occupation/Marriage/No child
 101 = Occupation/Marriage/No child
 110 = No occupation/Marriage/Child
 111 = Occupation/Marriage/Child

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