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Hanna Rinne and Riku Perhoniemi

The Use of Various Services After the Onset of Unemployment

A Sequence and Cluster Analysis Study in Finland

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Abstract

Employment services, social services, and rehabilitation are the primary services supporting employment. This study aims to examine the service trajectories of unemployed persons and to identify different subgroups with different backgrounds. The association between the service trajectories and later employment status is also examined.

This study utilised register-based data from Finland comprising individuals who became unemployed in 2017 and were residing in the city of Oulu (N=8,935). Eight states were constructed for the 12 months after the onset of unemployment. We used sequence analysis to study transitions between the states, and individuals were grouped into clusters based on cluster analysis and intersequence distances.

We identified eight clusters: 1) No Services (57%); 2) Short (11%); 3) Rapid (6%); 4) Intermediate (5%); and 5) Long Labour Market Training (4%); 6) Work Trial (10%); 7) Mental Health or Substance Abuse Services (2%); and 8) Several and Simultaneous Services (6%).

Compared to persons in Cluster 1, those in Clusters 2–8 were on average younger, had fewer employment days in the 12 months before unemployment, and had lower education. Clusters 6–8 were associated with long-term diseases, and after 2 years, employment was most common in clusters 1–3 and 5.

People who become unemployed are a heterogeneous group in terms of their service paths. Pathways with rapid, short, or long labour market training are associated with later employment. Those with relatively good chances of employment can find paths to re-employment through employment services. However, the service system may not work ideally in helping young persons with health problems and individuals with various service needs towards employment.

Keywords (YSO): unemployment, unemployed people, employment services, social services, rehabilitation, rehabilitation services, service chains, sequence analysis

Preface

Employment services, social services, and rehabilitation are available for unemployed individuals, but there is little information about the service paths. Using sequence analysis, the aim of this study was to follow different service spells among those who became unemployed.

The study was part of the research project ‘Social and healthcare services and social security benefits in Oulu 2013–2018’. The project was conducted at the Research Unit of the Social Insurance Institution of Finland (Kela) between 2018 and 2023. The data of the project were collected from registers at Kela, Statistics Finland, Ministry of Economic Affairs and Employment in Finland, the City of Oulu, the Finnish Institute for Health and Welfare, major occupational healthcare providers in Oulu, and the Finnish Centre for Pensions.

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Helsinki, April 2025

Authors

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1 Introduction

1.1 Motives for Examining the Service Trajectories of Unemployed Persons

Unemployment has been more common among people with lower education and social status, and this disparity has remained consistent despite changes in the labour market (Lahtinen et al., 2020). Health is a key factor for employment – on average, people who become unemployed have poorer health than those who are employed, and unemployment may further deteriorate health. (Böckerman & Ilmakunnas, 2009; McKee-Ryan et al., 2005; Paul & Moser, 2009; Schmitz, 2011; Silver et al., 2022). Being unemployed may also have a debilitating effect on living conditions, income, social relationships, life satisfaction, access to health services, and lifestyles (Pohlan, 2019; Roelfs et al., 2011). Due to these various challenges, some unemployed individuals may need specific services based on their needs, while others require a wide range of services to gain employment.

Ideally, people are referred to different services based on their needs. Factors such as skills, previous work history, and illness play a role in determining the service needs of an individual. However, access to services often dictates the realisation of services. Theories of healthcare utilisation, which are partly applicable here as well, distinguish between personal, financial, and organisational barriers to service utilisation (Pechansky & Thomas, 1981). Moreover, selection to various services is not random; it is based on individual characteristics and administrative regulations (Tuomaala, 2002). The employment authorities' understanding of the service system may influence the referral decisions for unemployed individuals. Integration of available services requires extensive competence and coordination, as the services are often located on various political and geographical levels across different organisations. Heidenreich & Aurich-Beerheide (2014) call this the multi-dimensional, multilevel, and multistakeholder integration of service provision.

There has been a shift from passive benefits towards more active measures and workfare policies in the welfare states (Horn et al., 2023; Ylistö & Husu, 2021). For unemployed individuals, the rise of welfare conditionality means that they must actively seek employment and participate in employment services or other activation measures to receive unemployment benefits (Hvinden et al., 2001; Watts & Fitzpatrick, 2018). The rise of the activation policy may have brought more persons with complex health and social problems to employment services. Thus, employment services alone are insufficient in supporting these individuals, as they also need other services such as social services and rehabilitation (Heidenreich & Aurich-Beerheide, 2014). These services align more closely with the human capital

development approach (Ylistö & Husu, 2021), which encompasses broader welfare goals beyond employment, such as supporting work ability or life management.

Studies in Finland have identified user profiles for various services. Unemployed individuals without service use are typically educated men without long-term diseases and with prior employment. Those participating in labour market training are generally older with a good work history and no long-term diseases. Work trial participants are often younger with lower education and no long-term diseases. Rehabilitative work participants are are typically men with long-term unemployment, low education, and long-term illnesses living in single-person households. Rehabilitation service users tend to be women, older, and better educated compared to users of social services. (Aho et al., 2018; Rinne & Blomgren, 2021; Karjalainen & Karjalainen, 2010)

Public employment services are the most closely related to employment outcomes. According to earlier studies, labour market training (Aho et al., 2018; Alasalmi et al., 2020; Card et al., 2018; Kluve, 2010) has a positive connection with future employment. Employment services are found to have a different impact on employment when comparing the short-term and long-term effects (Vooren et al., 2019). In turn, vocational rehabilitation (Laaksonen et al., 2022; Leinonen et al., 2019) and rehabilitative psychotherapy (Peutere et al., 2023) have been found to have some positive effects on later employment, whereas the connection between rehabilitative work activities and employment has been lower (Aho et al., 2018; Karjalainen & Karjalainen, 2010). A Finnish study found that those in rehabilitative work activities, social work services, and mental health and substance abuse services had the lowest likelihood of future employment (Rinne & Blomgren, 2021).

In addition to service participation, the employment of jobseekers is affected by structural and individual factors as well as the meeting of labour demand and supply. Individual characteristics such as age (Neary et al., 2019), gender (Damaske, 2020), family responsibilities (Damaske, 2020; Kulik, 2001), disability (Boman et al., 2015; Robinson, 2009), sickness absence history (Salonen et al., 2023), education (Damaske, 2020), and employment history (Salonen et al., 2023) have an impact on employment and attempts to return to work.

Most evaluation studies on work-oriented services or labour market programmes only focus on the effect of one measure. Narrowing the scope of the follow-up to apply to a single measure or service makes the results from these evaluations less generalisable. Sequence studies might nuance this picture and bring forward the complexity and differences in paths through the support services. Sequence analysis has proven to be a viable multistate method for examining labour market or service use pathways. Unemployment has often been used as one of the statuses, and the aim is to study employment status trajectories (Ropponen et al.,

2022; Årnes, 2020). Sequence analysis has been found to be a good method for researching healthcare service paths among different patient groups (McKay et al., 2022; Roux et al., 2019; Vanasse et al., 2020). The method has also been used for studying the paths of unemployed persons. Wu et al. (2022) examined the use of benefits among single mothers in the 12 months following their transition from employment to unemployment. However, their study did not include the use of services. A German study used sequence analysis to examine school-to-work trajectories among young adults with disabilities (Reims & Schels, 2022). In addition to employment and unemployment, the studied statuses also included the use of services such as vocational training.

As far as we know, there are no previous studies on the service trajectories of unemployed individuals that simultaneously examine employment services, social services, and rehabilitation. By studying unemployed individuals, we can identify different service trajectories and examine the backgrounds of different groups. Furthermore, it is important to examine the connection of various service trajectories to later employment status. Sequence analysis enables taking into account the alternating and sequential use of several services as well as the timing of the services.

1.2 Services for Unemployed Individuals in Finland

Conditional welfare and activation requirements have increased in Finland, especially among young people without formal post-compulsory education and individuals with long-term unemployment (Haikkola, 2019). The activation model in effect from 2018 to 2019 temporarily increased the conditionality of unemployment benefits (Kangas & Kalliomaa-Puha, 2019). In the current system, unemployed individuals are required to actively apply for jobs and report to employment services or participate in unemployment services—the aim of which is to promote employment—in order to receive unemployment benefits. Public employment services provide guidance and service periods, such as labour market training and work trial, during which the participants are entitled to unemployment benefits. Labour market training can be in the form of basic or vocational education, continuing education, entrepreneurial training, or integration training. Work trial is intended for individuals who either do not have vocational education or are planning to change occupation and want to find out whether a certain field is suitable for them.

At the time of our follow-up, municipalities were responsible for organising social services, which included, for example, rehabilitative work activities, mental health and substance abuse services, and social work. Rehabilitative work activities are intended for those whose unemployment has been prolonged and who are unable

to participate in employment services or work due to the limitations imposed by their work and functional ability. The purpose is to improve opportunities to find employment or education and to provide structure in daily life. It is based on an activation plan, which was jointly drawn up by the employment office, municipality, and the client. In mental health services, the purpose is to strengthen mental health and reduce any possible threats to it. The goal of substance abuse services is to reduce and eliminate factors related to substance abuse and addictive behaviour that endanger health, wellbeing, and safety. Social work ensures that people in the most difficult situations get the help and support they need. Their clients often have several needs, especially related to employment, education, livelihood, rehabilitation, and other promotion of wellbeing and participation. Many also need guidance and support to run their everyday life. Mental health and substance abuse services and social work are also aimed at people other than the unemployed.Rehabilitation aims to enhance one's ability to work and study and to improve opportunities for employment and continuing to work. The aim can also be improving the client's functional capacity and opportunities for participation. Rehabilitation is provided by several operators such as the Social Insurance Institution of Finland, employee pension institutions and healthcare services. A physician's certificate is needed to apply for rehabilitation.

To help individuals with diverse backgrounds, abilities, or challenges to enter the workforce, efforts from different service providers are needed. In Finland, services for the unemployed are divided into several different entities. Employment offices should direct unemployed individuals to the services they need. Some of the services are mandatory to receive benefits, while others are voluntary and have restricted access. However, there is lack of service integration, as no one is responsible for coordinating the services for the unemployed persons (Oivo & Kerätär, 2018).

1.3 Aims

While employment services, social services, and rehabilitation are available, there is little information about the service paths. Using sequence analysis, the aim of this study was to follow different service spells among those who became unemployed. More specifically, we aimed to examine:

- What kind of distinct clusters can be identified among the unemployed during the first 12 months following the onset of unemployment, based on individual sequences formed by different services?
- How are sociodemographic and health-related factors associated with belonging to each of the clusters?
- How does the employment status vary by cluster 1 and 2 years after the onset of unemployment?

2 Methods

2.1 Study Population

We used register-based data comprising all 18–59-year-old individuals living in the City of Oulu, Finland (Blomgren & Jäppinen, 2020). We restricted our analysis to individuals who started an unemployment spell lasting at least 4 weeks in 2017 and who had not been unemployed during the preceding 2 months (N = 8,935). The unemployment spell was defined as having registered as a jobseeker in the registers of Ministry of Economic Affairs and Employment in Finland and not having simultaneous employment days according to registers of the Finnish Centre for Pensions. Those who were temporarily laid off were excluded.

2.2 Definition of the States

We followed the study population's monthly use of services for 12 months starting from the onset of unemployment (baseline) using date-level data on services. Participating in a service was recorded for a given month if the individual engaged with the service for at least 1 day during that month. Eight mutually exclusive states (labour market training, work trial, rehabilitative work activities, mental health or substance abuse services, social work, rehabilitation, several services, and no services) were constructed for each 12-month unit in the sequence. Several services included two or more of the studied services.

Information on labour market training and work trial was retrieved from the registers of the Ministry of Economic Affairs and Employment in Finland, and information on rehabilitative work activities, mental health and substance abuse services as well as social work were derived from the registers of the city of Oulu. Data on rehabilitation use were drawn from the registers of the Social Insurance Institution of Finland and the Finnish Centre for Pensions. The data included information on vocational rehabilitation, intensive medical rehabilitation, rehabilitative psychotherapy, and discretionary rehabilitation. The different types of rehabilitation were combined because participation in rehabilitation is relatively rare.

2.3 Employment Status

We examined the employment status (employed/not employed) of the study population exactly 1 and 2 years after the onset of unemployment using the employment days from the registers of the Finnish Centre for Pensions. A person was defined as

employed if, on the day of measurement, they had an employment day according to the Finnish Centre for Pensions and did not have an unemployment day according to the Ministry of Economic Affairs and Employment in Finland.

2.4 Background Factors

We measured gender, age, marital status, and education at the start of year 2017 and counted the number of employment and unemployment days during the 12 months preceding the onset of unemployment.

Long-term diseases from the year 2016 (yes/no) were measured through special reimbursements of medicines used in the treatment of severe and long-term diseases (Saastamoinen et al., 2012).

Classification, register sources, and distribution of descriptive characteristics are presented in Table 1 (p. 12). Of the unemployed persons, a small majority were women, and nearly half (45%) were under 30 years old. The mean age was 33.8, and 60% were unmarried. One-third had a tertiary education, while more than half had a secondary education. During the 12 months preceding the onset of unemployment, 40% had no employment days and 80% had no unemployment days. In addition, 15% had at least one long-term disease.

Table 1. Descriptive Characteristics of the Study Population.

Variable	%	Source
Gender		Social Insurance Institution of Finland
Men	48	
Women	52	
Age in 2017		Social Insurance Institution of Finland
18–29	45	
30–39	25	
40–49	16	
50–59	14	
Marital status in 2017		Social Insurance Institution of Finland
Married	31	
Unmarried	60	
Divorced/widow	9	
Education in 2017		Statistics Finland
Tertiary	31	
Secondary	55	
Primary	14	
Employment days 12 months before		Finnish Centre for Pensions
0 days	39	
under 3 months	17	
3–6 months	25	
over 6 months	20	
Unemployment days 12 months before		Ministry of Economic Affairs and Employment in Finland
0 days	81	
under 3 months	10	
over 3 months	9	
Long-term diseases in 2016		Social Insurance Institution of Finland
Yes	15	
No	85	
Total	100	
N	8,935	

2.5 Statistical Methods

Sequence analysis was used to define the service pathways, i.e., to study the temporal succession of states and to summarise the intertemporal variation between individuals. Sequences were defined as 1-month strings of the states, and successive months with the same state formed episodes. We used status proportion plots and sequence index plots to visualise different service paths. We counted the frequency, average duration, and average number of episodes of the service statuses as aggregated sequence characteristics.

We grouped individual sequences into clusters. The grouping was based on inter-sequence distances, which were calculated using optimal matching analysis (OMA) (Lesnard, 2006). We set substitution costs at double the size of indel cost and used Ward's linkage. The number of clusters were decided according to Calinski-Harabasz pseudo-F's, the Duda-Hart Je(2)/Je(1) index and pseudo-T squared values (Hennig & Liao, 2010; Milligan & Cooper, 1985).

We then examined aggregated sequence characteristics by clusters: the average number of different statuses in a sequence, average number of episodes, and average total duration in each status. We also described the 10 most frequent sequence patterns for each cluster.

We used multinomial regression analysis to examine how sociodemographic and health-related factors were associated with belonging to each cluster. Logistic regression analyses were used to examine the associations between cluster memberships and employment status exactly 1 and 2 years after the onset of unemployment.

We used Stata 14.2 for analysis (Brzinsky-Fay et al., 2006; Halpin, 2014; StataCorp, 2015).

2.6 Ethical Consideration

As the study was based on register data and there was no contact with the subjects, no ethical preliminary assessment was required under the Finnish law. The data used in the study were fully pseudonymised before access, and no informed consent was required. The data were accessed through permissions from the City of Oulu, the Social Insurance Institution of Finland, the National Institute for Health and Welfare, the Finnish Centre for Pensions, four large occupational healthcare providers, Statistics Finland, and the Finnish Tax Administration.

3 Results

3.1 States

In each month of the follow-up, the vast majority of the study population was not using services (Figure 1), and the number of persons not using services increased slightly over time. However, 43% of the study population used some service in at least one of the months in the follow-up. Labour market training was the most commonly used service; its use was common immediately after the onset of unemployment but decreased over time. The use of other services was minor throughout the follow-up.

Overall, the average number of different states during the 12-month follow-up period was 1.50 (SD 0.72, min/max 1/6). The average number of episodes meaning successive months with the same state was 1.83 (SD 1.35, min/max 1/12).

Figure 1. Status Proportion Plot (N = 8,935).

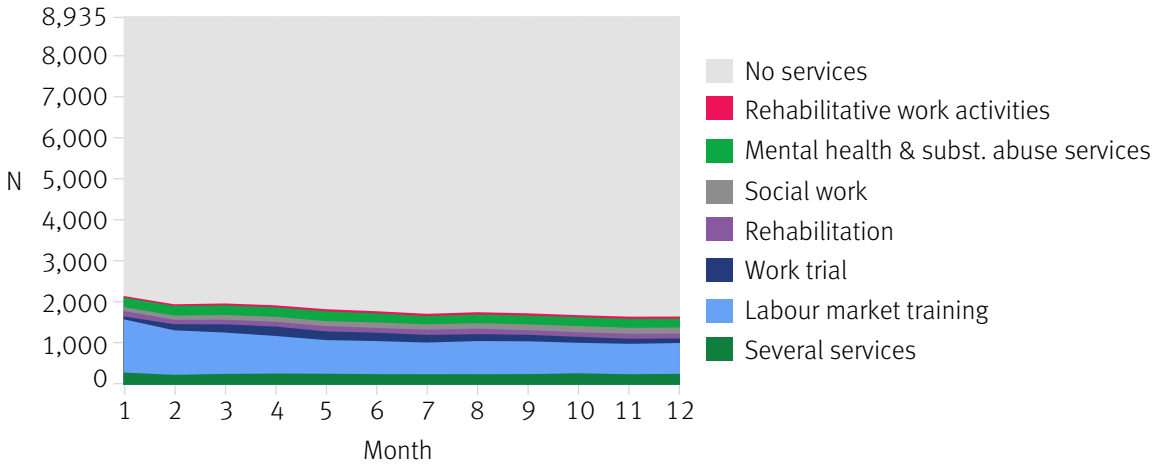


Table 2 (p. 15) provides more details on the frequencies and total durations of the states and episodes. One quarter of the study population had at least one episode of labour market training. The share of those who had at least one episode of some other service varied between 1.3% (rehabilitative work activities) and 7.8% (mental health or substance abuse services). Furthermore, 8.1% used several services during the same month. Over 94% had at least one episode without any of the studied services.

Examining the average total duration of each state, labour market training covered 1.17 months of the follow-up, while the other services covered, at most, one-third

of a month. The average number of episodes was the highest in the no services state (mean 1.12). The average total duration outside services was 9.6 months.

Among the services, the average number of separate episodes was the highest in labour market training (mean 0.30) and lowest in rehabilitative work activities (mean 0.02). The maximum number of episodes varied between three and six, depending on the service.

Table 2. Frequency, Average Duration, and Average Number of Episodes of the Service Statuses Among Unemployed Individuals (N = 8,935).

	At least one episode, %	Average total duration (months), Mean (Sd)	Months, Min/Max	Average number of episodes, Mean (Sd)	Months, Min/Max	Status in the final (12th) month, %
Rehabilitative work activities	1.3	0.07 (0.72)	0/12	0.02 (0.16)	0/3	0.6
Mental health and substance abuse services	7.8	0.30 (1.33)	0/12	0.12 (0.49)	0/6	2.4
Social work	3.4	0.17 (1.11)	0/12	0.04 (0.24)	0/3	1.7
Rehabilitation	3.5	0.16 (1.07)	0/12	0.05 (0.30)	0/5	1.3
Work trial	5.4	0.22 (1.03)	0/11	0.06 (0.27)	0/3	1.2
Labour market training	26.6	1.17 (2.66)	0/12	0.30 (0.53)	0/4	8.4
Several services	8.1	0.36 (1.55)	0/12	0.12 (0.43)	0/5	3.3
No services	94.2	9.60 (3.79)	0/12	1.12 (0.54)	0/5	81.5

3.2 Clusters

Based on the cluster-stopping indexes, we identified eight clusters. Calinski-Harabasz pseudo-F peaked at two clusters, dividing the unemployed to those with and without services. However, we wanted to distinguish between different service paths. The other cluster-stopping indexes suggested eight clusters, with the larger value on the Duda-Hart index and smaller value on the Duda-Hart pseudo-T (Supplementary Table S1).

We conducted sensitivity analyses, in which the substitution cost between different services was fixed at twice the indel cost. In addition, we set the substitution cost

between services and the no services class to 3 and subsequently to 4. These adjustments had no effect on the number of identified clusters.

Status proportion plots and sequence index plots were produced to illustrate the clusters (Figures 2, p. 21). The status proportion plots visualise the relative proportion of each state for each cluster (left). The sequence index plots visualise individual sequences in each cluster, respectively (right).

To further characterise the eight identified clusters, aggregated sequence characteristics (Tables 3 and 4, pp. 16–18) and the 10 most frequent sequence patterns (Supplementary Table S2) were drawn for each cluster.

Table 3. Aggregated Sequence Characteristics of Eight Clusters.

Cluster	%	N	Average number of different statuses in sequence, Mean (Sd)	Min/Max	Average number of episodes, Mean (Sd)	Min/Max
Cluster 1	57	5,119	1 (0)	1/1	1 (0)	1/1
Cluster 2	11	962	2.07 (0.29)	2/4	2.73 (0.77)	2/7
Cluster 3	6	528	2.07 (0.27)	2/4	2.36 (0.76)	2/6
Cluster 4	5	423	2.26 (0.60)	2/5	2.91 (1.25)	2/9
Cluster 5	4	326	1.51 (0.55)	1/4	1.72 (0.94)	1/6
Cluster 6	10	891	2.39 (0.64)	2/6	3.44 (1.56)	2/11
Cluster 7	2	168	2.25 (0.74)	1/4	4.25 (2.13)	1/10
Cluster 8	6	518	2.42 (0.98)	1/5	3.42 (1.99)	1/10

Table 4. Detailed Sequence Characteristics of Eight Clusters.

Cluster	At least one episode, %	Average total duration (months), Mean (Sd)	Months, Min/Max	Average number of episodes, Mean (Sd)	Min/ Max
Cluster 1 No Services (N = 5,119)					
No services	100	12 (0)	12/12	1	1/1
Cluster 2 Short Labour Market Training (N = 962)					
Rehabilitative work activities	0.6	0.01 (0.13)	0/3	0.01 (0.55)	0/1
Mental health & subst. abuse	8.6	0.27 (0,60)	0/3	0.21 (0.47)	0/3
Social work	1.9	0.02 (0.17)	0/3	0.02 (0.14)	0/1
Rehabilitation	7.3	0.11 (0.45)	0/4	0.08 (0.32)	0/2
Work trial	2.3	0.03 (0.19)	0/2	0.02 (0.15)	0/1
Labour market training	72.1	0.99 (0.94)	0/5	0.76 (0.51)	0/3
Several services	4.3	0.04 (0.21)	0/2	0.04 (0.20)	0/1
No services	100	10.5 (0.86)	5/11	1.58 (0.55)	1/4
Cluster 3 Rapid Labour Market Training (N = 528)					
Mental health & subst. abuse	3.0	0.03 (0.19)	0/2	0.03 (0.19)	0/2
Work trial	1.1	0.02 (0.15)	0/2	0.01 (0.11)	0/1
Labour market training	100	3.51 (1.27)	1/6	1.13 (0.34)	1/3
Several services	2.3	0.03 (0.21)	0/3	0.02 (0.17)	0/2
No services	100	8.41 (1.29)	5/10	1.15 (0.40)	1/3
Cluster 4 Intermediate Labour Market Training (N = 423)					
Mental health & subst. abuse	6.4	0.18 (0.77)	0/6	0.09 (0.38)	0/2
Rehabilitation	1.9	0.05 (0.40)	0/5	0.03 (0.24)	0/3
Work trial	6.6	0.22 (0.91)	0/6	0.08 (0.31)	0/2
Labour market training	100	7.10 (1.51)	1/10	1.23 (0.48)	1/4
Several services	11.8	0.27 (0.87)	0/6	0.16 (0.47)	0/3
No services	99.1	4.2 (1.34)	0/7	1.32 (0.55)	0/4
Cluster 5 Long Labour Market Training (N = 326)					
Labour market training	100	11.11 (1.06)	8/12	1.14 (0.39)	0/1
Several services	7.4	0.14 (0.56)	0/4	0.09 (0.35)	0/2
No services	42.3	0.73 (0.95)	0/3	0.48 (0.61)	0/3

Cluster	At least one episode, %	Average total duration (months), Mean (Sd)	Months, Min/Max	Average number of episodes, Mean (Sd)	Min/ Max
Cluster 6 Work Trial (N = 891)					
Rehabilitative work activities	2.5	0.07 (0.51)	0/5	0.02 (0.16)	1/5
Mental health & subst. abuse	23.0	0.75 (1.55)	0/6	0.42 (0.89)	0/6
Social work	10.0	0.44 (1.42)	0/8	0.12 (0.37)	0/3
Rehabilitation	11.5	0.50 (1.58)	0/10	0.17 (0.53)	0/5
Work trial	43.1	1.94 (2.59)	0/11	0.48 (0.60)	0/3
Labour market training	33.7	0.94 (1.56)	0/6	0.37 (0.55)	0/3
Several services	15.7	0.25 (0.67)	0/4	0.18 (0.45)	0/3
No services	100	7.11 (1.97)	1/10	1.69 (0.78)	1/5
Cluster 7 Mental Health and Substance Abuse Services (N = 168)					
Rehabilitative work activities	1.2	0.04 (0.33)	0/3	0.02 (0.22)	0/2
Mental health & subst. abuse	100	8.42 (2.08)	4/12	2.07 (1.01)	1/5
Rehabilitation	5.4	0.10 (0.50)	0/5	0.06 (0.26)	0/2
Labour market training	8.3	0.13 (0.45)	0/3	0.10 (0.33)	0/2
Several services	31.6	0.86 (1.54)	0/7	0.43 (0.73)	0/4
No services	76.8	2.43 (1.93)	0/6	1.55 (1.24)	0/5
Cluster 8 Several and Simultaneous Services (N = 518)					
Rehabilitative work activities	15.6	1.00 (2.74)	0/12	0.22 (0.57)	0/3
Mental health & subst. abuse	19.5	0.40 (0.94)	0/5	0.25 (0.56)	0/3
Social work	36.9	2.17 (3.63)	0/12	0.48 (0.70)	0/3
Rehabilitation	23.4	1.63 (3.47)	0/12	0.38 (0.80)	0/4
Work trial	6.6	0.16 (0.66)	0/4	0.09 (0.40)	0/3
Labour market training	16.8	0.40 (1.11)	0/7	0.20 (0.49)	0/3
Several services	78.6	5.01 (3.96)	0/12	1.23 (0.97	0/5
No services	44.5	1.23 (1.9)	0/9	0.57 (0.72)	0/3

Cluster 1 (No Services) consisted of persons who used no services during the follow-up (Table 4, pp. 17–18, Figure 2, p. 21). It included over half of the study population (57%).

Cluster 2 (Short Labour Market Training) (11%) was the largest service cluster. It included persons who mostly had a short period of labour market training at some point of the follow-up. Most persons in this cluster had only two statuses during the follow-up: a short period in a service and a period with no services (Figure 2, Table 3). Of all the persons in this cluster, 72% had been in labour market training for 1 month, on average (Table 4). Most of the time they were not using any of the examined services (10.5 months).

Cluster 3 (Rapid Labour Market Training) (6%) was characterised by rapid labour market training. The most common sequence pattern (78%) included labour market training in the beginning of the follow-up and no service use after that (Figure 2, Supplementary Table S2). On average, persons in this cluster had only these two different statuses. The duration of labour market training in total was 3.5 months, on average, and the duration of no services was 8.4 months (Table 4).

Cluster 4 (Intermediate Labour Market Training) (5%) included persons who all had intermediate labour market training at some point of the follow-up. Half of the sequences included only two states: an episode of labour market training and one episode of no services, or vice versa (Supplementary Table S2). The average time in labour market training in total was 7.1 months, and time in no services was 4.2 months (Table 4).

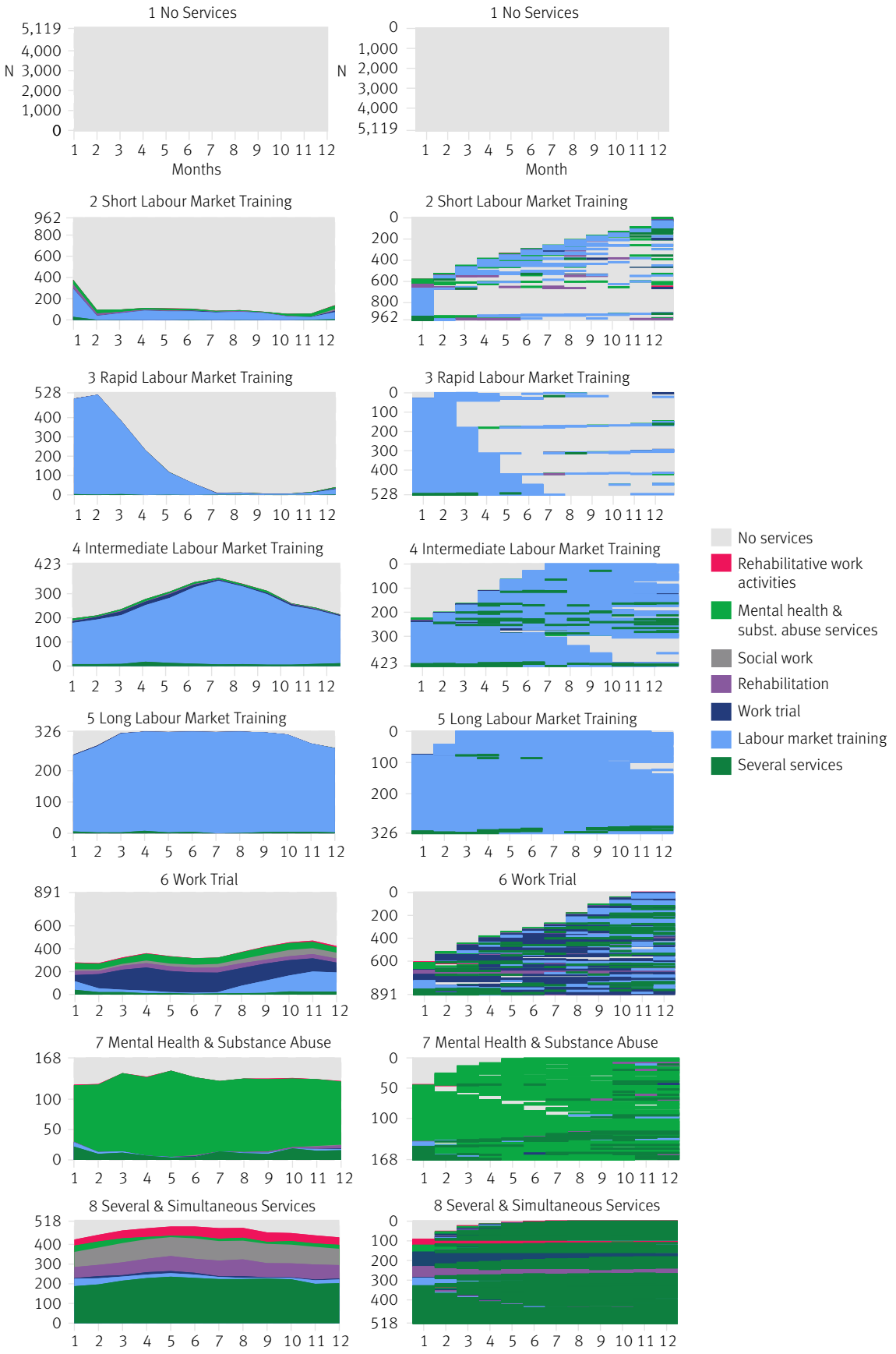
Cluster 5 (Long Labour Market Training) (4%) included persons who had been in long labour market training for the entire or nearly the entire follow-up time. The duration of labour market training was, on average, 11.1 months (Table 4). The most frequent sequence pattern included only labour market training (52%), the other sequence patterns were combinations of labour market training and a period with no services. Persons in this cluster had only 1.5 different statuses and 1.7 episodes, on average (Table 3).

Cluster 6 (Work Trial) (10%) included persons mostly in work trials. Work trial was the most common service (43% of all persons) and had the longest period in total (1.9 months on average) (Figure 2, Supplementary Table S2). Labour market training (34%) and mental health or substance abuse services (23%) were also fairly common. All persons in this cluster had one or more spells of no services, with average total duration on 7.1 months. The most common sequence pattern was not using services, followed by work trial and again not using services (18%) (Supplementary Table S2). Cluster 6 had the largest number of different statuses in a sequence, 2.4 on average (Table 3).

Cluster 7 (Mental Health and Substance Abuse Services) (2%) was the smallest cluster and included persons who had been in mental health or substance abuse services for a total of 8.4 months on average (Table 4). One-third had also used several services simultaneously. In the most frequent sequence patterns, mental health and substance abuse services and not using services alternated (Supplementary table S2). Cluster 7 had the largest number of episodes in general (4.25) (Table 3).

Cluster 8 (Several and Simultaneous Services) (6%) included persons in several and simultaneous services. Persons in this cluster were in some service throughout the entire follow-up period. Most of them (79%) were in several services simultaneously over an average period of 5.0 months during the follow-up (Table 4). Cluster 8 had the highest proportion of persons in social work (37%), rehabilitative work activities (16%), and rehabilitation (23%) at some point of the follow-up. The cluster included several different sequence patterns, as the 10 most frequent patterns covered only a third of all cluster members (Supplementary Table S2).

Figure 2. Status Proportion Plots for Each Cluster (left) and Sequence Index Plots in Each Cluster (right) Over the Follow-Up (N = 8,935).



3.3 Associations Between Background Factors and Clusters

We used multinomial logistic regression analysis to examine how the background factors were associated with belonging to clusters (Table 5, pp. 23–24). All background factors were entered into the model simultaneously, and Cluster 1 was chosen as the reference group. Compared to most of the other clusters, persons in Cluster 1 were more often 30 years old or older, married, and had tertiary education (Table 6, p. 25). In addition, they more often had at least some employment days and less than 3 months of unemployment during the 12 months preceding the unemployment.

In relation to cluster 1, Clusters 6 and 8 were associated with being female and Cluster 4 with being male, when adjusted for other background factors (Table 5). Compared to Cluster 1, practically all service clusters were associated with being under 50 years old, as the relative risk ratios (RRRs) were lowest among those aged 50–59 (Table 5). Furthermore, Cluster 7 was especially associated with being 30–39 years old.

All service clusters, apart from Cluster 2, were associated with primary education. Clusters 5, 6, and 8 were also associated with secondary education. The association with primary education was especially emphasised in Cluster 8. All clusters, apart from Clusters 4 and 5, were associated with being unmarried, and Clusters 6–8 were also associated with being divorced/widowed.

In relation to Cluster 1, all clusters were associated with no employment days during the 12 months before the onset of unemployment.

Clusters 6–8 were associated with having a long-term disease before the onset of unemployment.

Table 5. Associations Between Sociodemographic Determinants and Belonging to Each Cluster[a].

Variable	Cluster 2		Cluster 3		Cluster 4		Cluster 5		Cluster 6		Cluster 7		Cluster 8	
	RRR	95% CI	RRR	95% CI	RRR	95% CI	RRR	95% CI	RRR	95% CI	RRR	95% CI	RRR	95% CI
Gender														
Men	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Women	1.02	(0.88–1.18)	0.98	(0.81–1.18)	0.79	(0.64–0.98)	0.96	(0.76–1.22)	1.42	(1.21–1.65)	1.30	(0.94–1.81)	1.38	(1.13–1.69)
Age in 2017														
18–29	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
30–39	0.68	(0.56–0.83)	0.48	(0.37–0.63)	1.12	(0.85–1.46)	1.21	(0.90–1.62)	0.72	(0.59–0.89)	1.98	(1.32–2.97)	0.88	(0.67–1.15)
40–49	0.89	(0.71–1.13)	0.52	(0.37–0.73)	1.10	(0.80–1.52)	0.94	(0.65–1.36)	0.83	(0.64–1.06)	1.16	(0.67–2.01)	0.95	(0.67–1.34)
50–59	0.85	(0.66–1.09)	0.30	(0.19–0.46)	0.46	(0.31–0.70)	0.26	(0.15–0.45)	0.47	(0.35–0.64)	0.81	(0.44–1.46)	0.43	(0.28–0.67)
Education in 2017														
Tertiary	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Secondary	1.09	(0.92–1.28)	1.05	(0.83–1.33)	1.05	(0.83–1.32)	1.44	(1.09–1.89)	1.82	(1.50–2.21)	1.41	(0.95–2.08)	1.47	(1.09–1.98)
Primary	1.14	(0.88–1.48)	2.43	(1.81–3.28)	2.06	(1.49–2.85)	2.59	(1.78–3.79)	3.73	(2.90–4.79)	3.26	(2.00–5.31)	9.20	(6.71–12.63)
Marital status in 2017														
Married	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Unmarried	1.48	(1.23–1.78)	1.34	(1.03–1.74)	0.80	(0.62–1.02)	0.77	(0.58–1.02)	1.28	(1.05–1.57)	1.74	(1.15–2.62)	2.76	(2.02–3.76)
Divorced/ widow	1.11	(0.83–1.48)	0.99	(0.62–1.59)	0.92	(0.63–1.36)	1.17	(0.77–1.78)	1.38	(1.03–1.86)	2.28	(1.32–3.93)	3.92	(2.62–5.85)

Variable	Cluster 2		Cluster 3		Cluster 4		Cluster 5		Cluster 6		Cluster 7		Cluster 8	
	RRR	95% CI	RRR	95% CI	RRR	95% CI	RRR	95% CI	RRR	95% CI	RRR	95% CI	RRR	95% CI
Employment days 12 months before														
0 days	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
under 3 months	0.53	(0.43–0.65)	0.50	(0.38–0.65)	0.76	(0.57–1.01)	0.76	(0.54–1.07)	0.50	(0.41–0.62)	0.34	(0.21–0.56)	0.28	(0.21–0.39)
3–6 months	0.42	(0.35–0.51)	0.30	(0.23–0.40)	0.48	(0.36–0.64)	0.51	(0.36–0.71)	0.28	(0.23–0.35)	0.23	(0.14–0.36)	0.10	(0.06–0.14)
over 6 months	0.52	(0.43–0.64)	0.47	(0.35–0.62)	0.77	(0.59–1.02)	1.24	(0.92–1.67)	0.49	(0.39–0.60)	0.28	(0.17–0.46)	0.17	(0.11–0.24)
Unemployment days 12 months before														
0 days	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
under 3 months	0.86	(0.67–1.10)	0.55	(0.37–0.81)	0.72	(0.49–1.05)	0.52	(0.32–0.84)	0.73	(0.55–0.96)	0.97	(0.56–1.69)	1.10	(0.78–1.55)
over 3 months	0.93	(0.71–1.21)	0.86	(0.59–1.26)	1.06	(0.75–1.51)	1.14	(0.78–1.67)	0.89	(0.66–1.20)	1.09	(0.60–2.00)	1.10	(0.72–1.68)
Long-term diseases in 2016														
No	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Yes	1.17	(0.96-1.43)	0.92	(0.68-1.25)	1.11	(0.83-1.48)	0.90	(0.63-1.28)	1.33	(1.08-1.64)	3.81	(2.71-5,37)	1.98	(1.52-2.57)
Total, N	**962**		**528**		**423**		**328**		**891**		**168**		**518**	

a Mutually adjusted models using multinomial logistic regression with relative risk ratios (RRRs and 95% confidence intervals), Cluster 1 as a reference.

Table 6. Descriptive Characteristics of the Study Population by Cluster (%).

Variable	Cluster 1, %	Cluster 2, %	Cluster 3, %	Cluster 4, %	Cluster 5, %	Cluster 6, %	Cluster 7, %	Cluster 8, %
Gender								
Men	47	50	52	53	50	43	43	48
Women	53	50	48	47	50	57	57	52
Age in 2017								
18–29	38	52	67	40	41	57	36	61
30–39	27	19	17	31	34	21	38	20
40–49	17	15	10	20	18	14	14	12
50–59	18	14	6	9	6	9	13	7
Education in 2017								
Tertiary	37	29	23	32	27	19	25	13
Secondary	55	60	55	52	57	61	54	41
Primary	8	11	22	16	16	21	21	47
Marital status in 2017								
Married	35	25	21	37	36	24	25	13
Unmarried	55	68	75	55	55	67	61	76
Divorced/widow	10	7	4	8	10	8	14	11
Employment days 12 months before								
0 days	28	47	57	40	36	55	60	77
under 3 months	18	15	15	18	16	15	13	11
3–6 months	32	20	14	20	18	14	15	6
over 6 months	22	17	14	22	30	16	13	7
Unemployment days 12 months before								
0 days	78	83	88	83	84	86	83	85
under 3 months	11	9	5	7	6	7	9	9
over 3 months	10	8	6	10	11	7	8	6
Long-term diseases in 2016								
No	85	85	90	85	88	85	63	81
Yes	15	15	10	15	12	15	37	19
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
N	**5,119**	**962**	**528**	**423**	**328**	**891**	**168**	**518**

3.4 Later Employment Status

One year after the onset of unemployment, 36% were employed (Table 7, p. 27). Employment was most frequent in Cluster 1, which is why it was used as the reference group in the logistic regression analysis (OR=1.00). Employment was the second most frequent (42%) in Cluster 3.

When modelling odds for employment 1 year after baseline, all other clusters except Cluster 3 had statistically significantly lower odds for employment (both when adjusted for gender and age [model 1] and for all background factors [model 2]). The lowest odds for employment were found in Clusters 8 (OR 0.12, [model 1])) and 5 (OR 0.15). Controlling for all background factors slightly decreased the differences.

When measuring the employment status 2 years after baseline, the differences between clusters were somewhat similar to model 1. However, the level of employment was higher in all groups (total 52%). In model 2 adjusting for all background factors, only four of the service clusters had statistically significantly lower odds for employment, and the employment level was the same between Cluster 1 and Clusters 2, 3, and 5.

Table 7. Employment in Each Cluster 1 and 2 Years After the Onset of Unemployment (N=8,935)[a].

	One year					Two years				
		Model 1[b]		Model 2[c]			Model 1[b]		Model 2[c]	
Cluster	**%**	**OR**	**95% CI**	**OR**	**95% CI**	**%**	**OR**	**95% CI**	**OR**	**95% CI**
1 No Services	44	1.00		1.00		59	1.00		1.00	
2 Short Labour Market Training	34	0.65	(0.56–0.76)	0.75	(0.65–0.87)	53	0.77	(0.67–0.89)	0.92	(0.79–1.06)
3 Rapid Labour Market Training	42	0.86	(0.71–1.03)	1.13	(0.93–1.37)	53	0.75	(0.63–0.90)	1.04	(0.86–1.26)
4 Intermediate Labour Market Training	31	0.55	(0.45–0.69)	0.61	(0.49–0.76)	51	0.69	(0.56–0.84)	0.78	(0.64–0.97)
5 Long Labour Market Training	11	0.15	(0.10–0.21)	0.15	(0.10–0.21)	53	0.75	(0.60–0.94)	0.83	(0.66–1.05)
6 Work Trial	20	0.30	(0.25–0.36)	0.38	(0.32–0.45)	36	0.38	(0.32–0.44)	0.50	(0.43–0.59)
7 Mental Health and Substance Abuse Services	15	0.22	(0.15–0.34)	0.31	(0.20–0.48)	27	0.26	(0.18–0.36)	0.37	(0.26–0.53)
8 Several and Simultaneous Services	9	0.12	(0.09–0.16)	0.21	(0.15–0.29)	19	0.16	(0.13–0.20)	0.31	(0.24–0.39)
All unemployed	36					52				

a Logistic regression (% and odds ratios [ORs] with 95% confidence intervals).

b Model 1: adjusted for gender and age.

c Model 2: adjusted for gender, age, education, marital status, employment days, unemployment days, long-term diseases.

4 Discussion

4.1 Main Results

Using sequence analysis, the aim of this study was to follow different service spells among individuals who became unemployed in 2017. Furthermore, we aimed to identify subgroups with different service pathways. We also examined how various background factors were associated with subgroups as well as the employment status 1 and 2 years after the onset of unemployment. There was considerable variability in how the services were utilised. Over half of the study population did not use any employment services, social services, or rehabilitation during the 12 months after the onset of unemployment. Those who did, had diverse service pathways, characterised by short, rapid, intermediate, and long labour market training, work trial, mental health or substance abuse services, and several and simultaneous services.

Some clusters demonstrated short-term engagement with services, while others exhibited long-term use of specific services, such as labour market training and mental health or substance abuse services. This diversification underscores the heterogeneous needs and service utilisation behaviours.

Compared to persons in Cluster 1 (No Services), those in the seven service clusters were, on average, younger and had lower education and fewer employment days in the 12 months preceding unemployment. Service pathways also varied by gender, age, and health.

One year after the onset on unemployment, the employment rate was the highest among Clusters 1 (No Services) and 3 (Rapid Labour Market Training). After 2 years, Clusters 2 (Short Labour Market Training) and 5 (Long Labour Market Training) reached the same level of employment. The result is not hugely surprising, as employment is the primary goal of labour market training.

The varying average durations and episodes across different services suggest differential roles and impacts of employment services, social services, and rehabilitation. This variability in service use may point to differing levels of access, effectiveness, or relevance of each service type to the study population.

4.2 Subgroup With No Services

A majority of the unemployed individuals (57%) did not use any targeted services. On average, this subgroup was older, better educated, and had a stronger prior attachment to work, putting them in a better position to find employment (Böckerman & Ilmakunnas, 2009; Lahtinen et al., 2020). Finding employment without receiving any services indicates that the services are not targeted at those who do not need them. Still, this subgroup, too, is affected by welfare conditionality (Hvinden et al., 2001; Watts & Fitzpatrick, 2018). These individuals might have been in other services, such as short-term courses or guidance and counselling services, which were not included in the services examined in this study. Furthermore, they could have been studying independently while receiving unemployment benefits, and some of them might have found employment quickly after the onset of unemployment. Indeed, compared to the individuals in the service clusters, a larger proportion was employed after 1 and 2 years. However, 40% were not employed after 2 years, suggesting that some could have needed slightly more substantial services.

4.3 Subgroups With Labour Market Training

A notable proportion of the unemployed individuals (43%) engaged with at least one service, labour market training being the most prevalent. Thus, labour market training plays a crucial role for those who do seek services, especially shortly after unemployment begins. In total, 27% had at least one such episode, reflecting its central role in the aimed pathway to employment. Labour market training had the longest duration, an average of 1.17 months, which suggests that interventions may be relatively short-term.

Clustering revealed four subgroups with different durations and timing: short, rapid, intermediate, and long labour market training. In total, 25% of the study population belonged to these four clusters. These clusters mostly had only two statuses in the sequences: labour market training and no services.

Labour market training is offered in employment sectors with the greatest need for employees. A person has to be in need of training as well as suitable for the training and work in question. Furthermore, they must meet the field-specific or occupation-specific health and skills requirements. This is also reflected in the results of this study. Persons in labour market training clusters had more favourable background characteristics than those in the other service clusters, supporting earlier studies (Aho et al., 2018).

According to previous research, labour market training is positively related to employment in Finland (Aho et al., 2018; Alasalmi et al., 2020; Rinne & Blomgren, 2021). There are also similar results from other countries (Card et al., 2018; Kluve, 2010). Our results mostly support these findings but also bring out differences in the timing and length of training: 1 year after the onset of unemployment, Cluster 3 (Rapid Labour Market Training) had the highest frequency of employment along with Cluster 1 (No Services). Those in Cluster 5 (Long Labour Market Training) were still in the training 1 year after baseline. However, after 2 years, those in clusters 2 (Short Labour Market Training) and 5 (Long Labour Market Training) had reached the same employment level. This indicates that rapid, short, and long labour market training can be effective.

Individuals who are considered motivated and easily employed can also be selected to the services (Tuomaala, 2002). Those referred to services may have simpler and therefore easier needs to meet, and some would have been employed even without being referred to a service, as they may have participated in the service only to receive unemployment benefits and not because they needed the service (Horn et al., 2023; Ylistö & Husu, 2021). This especially applies those in Cluster 3 (Rapid Labour Market Training), whose employment was at the same level as those who did not participate in any of the examined services. In addition, their use of other services was also at the lower level. Most of them appear to be young people possibly just entering the working life.

Still, of the four labour market training clusters, only those in Cluster 4 (Intermediate Labour Market Training) had a lower employment level than members in Cluster 1 (No Services) at the 2-year mark. Males were more commonly associated with this cluster than females. Otherwise, this group's background did not substantially differ from Cluster 1. Compared to other labour market training clusters, individuals in Cluster 4 more commonly used several services, suggesting that they have larger needs. Employment services should pay more attention to this group to fulfil their various needs.

4.4 Subgroups Characterised by Several Services, Mental Health or Substance Abuse Services, and Work Trials

The remaining three service clusters included persons in several and simultaneous services or in mental health or substance abuse services and those with an emphasis on work trials. Together, these subgroups comprised 18% of all unemployed individuals. Persons in all three clusters used services extensively, especially those in Clusters 7 (Mental Health and Substance Abuse Services) and 8 (Several and Simultaneous Services).

In Clusters 7 (Mental Health and Substance Abuse Services) and 8 (Several and Simultaneous Services), a majority was already using the services when unemployment started. In Cluster 6 (Work Trial), the work trial service typically started some time after unemployment began. This is understandable, as work trials are targeted only at unemployed persons, but various types of social services and rehabilitation can be entered from different labour market statuses.

All three clusters were associated with long-term diseases, lower education, and no previous employment days. The higher proportion of long-term diseases was expected; for example, rehabilitation is intended to those with a defect, injury, or an illness diagnosed by a physician. Gender appeared to influence service cluster association, with females being more prevalent in these three clusters. This could reflect gender-based differences in service needs or preferences. Further, primary education was particularly associated with using several services. Those in the Cluster 7(Mental Health and Substance Abuse Services) were slightly older than members in the other two clusters, and they also had long-term diseases more often. Compared to the other two clusters, previous attachment to work was slightly stronger among those in Cluster 6 (Wotk Trial).

Later employment level in these subgroups was significantly lower than in the other clusters, especially in the Cluster 8 (Several and Simultaneous Services), where only one-fifth were employed after 2 years. This is partly explained by the nature of the services used by those in Cluster 8, as employment is not the primary goal in, for example, mental health or substance abuse services. Furthermore, social work, rehabilitative work activities, and rehabilitation primarily focus on other outcomes than employment. In some cases, employment may be the primary goal of rehabilitation, which has been found to have some positive effect on later employment (Laaksonen et al., 2022; Leinonen et al., 2019; Peutere et al., 2023). However, these studies included persons with varying attachment to work. Thus, the services might be less effective for unemployed individuals specifically.

Studies on vocational rehabilitation based on Individual Placement and Support (IPS) have found some effects on gaining employment among individuals who are unemployed and experiencing mild or moderate mental health conditions (Fadyl et al., 2020). There is limited information on the targeting and effects of social services. However, it is known that only few of those participating in rehabilitative work activity find employment (Aho et al., 2018; Karjalainen & Karjalainen, 2010). Individuals participating in social work, rehabilitative work activities, or rehabilitation might have benefited in other ways instead; they might have gained better functional ability or improved their quality of life (Karinkanta & Reiterä, 2023; Karjalainen & Karjalainen, 2010).

Work trial is part of employment services, and therefore a better association with later employment might have been expected with Cluster 6. Mayer et al. (2019) have shown that work trials might have a small positive effect on employment but that continuation of unemployment is still more likely.

In Clusters 6 (Work Trial) and 8 (Several and Simultaneous Services), the majority of the participants were under 30 years old. This is a group with an especially strong welfare conditionality (Haikkola, 2019), as they must participate in youth activation measures in order to receive unemployment benefits. The measures might improve their basic skills and qualifications but do not offer labour market advantage (Russell et al., 2011). In fact, they might even cause emotional harm (Ylistö & Husu, 2021) and trap young people between various services (Russell et al., 2011). According to our study, the Finnish system with several segmented services does not seem capable of creating service paths from unemployment to employment for them. On the other hand, they may have pursued studies and entered employment later, after completing their studies.

Most individuals in Cluster 7 only used mental health or substance abuse services, while only a minority also participated in employment services. According to Knapp et al. (2013), public bodies might not focus on individuals with the most severe mental health conditions, perhaps because they believe the costs outweigh the benefits. In particular, those with co-occurring mental health conditions and substance abuse are less likely to access employment services, despite expressing an interest in said services (Frounfelker et al., 2011). In addition, employers' negative attitudes towards people with mental illness hinder their employment possibilities, leading to reduced willingness to seek for a job (Brouwers, 2020). In Europe, the mental health burden among the youth is significant (Neufeld, 2022), which is why attention should be focused on this group.

In Cluster 8 (Several and Simultaneous Services) , a very large proportion had no work experience, and the education level was particularly low. The description of the participants largely corresponds to clients in rehabilitative work activities (Karjalainen & Karjalainen, 2010). Especially in this cluster, the coordination of different services and the human capital approach should be emphasised.

Certain activities or services, such as rehabilitation, social work, and mental health and substance abuse services, seem to start very shortly after unemployment begins. However, accessing these services is typically time-consuming because of various preliminary services and clinical assessments. Therefore, it is likely that individuals in these services had accessed the services already before their current period of unemployment began.

These three clusters likely include individuals whose capacity for work has decreased and who should receive disability allowance instead of unemployment benefits. Persons with long-term unemployment in particular may suffer from diseases impairing their work ability (Pharr et al., 2012; Silver et al., 2022). Furthermore, such diseases may be left untreated because they are not identified in the service system (Nurmela et al., 2018; Oivo & Kerätär, 2018). As employment offices focus on unemployment, identifying social and health problems or need for rehabilitation can be delayed. According to Saikku (2018), the activation policy has integrated social and employment policies but is yet to incorporate disability policy. In addition, no one is responsible for coordinating the services targeted at unemployed individuals (Oivo & Kerätär, 2018).

At the time of this study, employment services were responsible for coordinating the assessment of the unemployed person's ability to work and function (Karjalainen & Liukko, 2020), while the municipalities had the overall responsibility for social and healthcare services. Recently, there have been changes in the responsibilities. Social and health services were transferred to the larger wellbeing services counties in 2023, while the responsibility for organising employment services was transferred to municipalities in 2025. Despite the changes, there is no actor taking the overall responsibility for services advancing employment. Thus, a more coordinated service system is required. Investments should be made to improve the competence of employment office employees in identifying their clients' service needs and in understanding the service network and developing cooperation between employment services and social and health services.

4.5 Methodological Considerations

The strength of our study was the rich individual-level register-based data including all unemployed individuals in the city of Oulu. Instead of only one service or services from just one provider, the data included information on the use of several different services as well as various background factors, such as working history. It was also possible to follow an individual's work history for a relatively long period of time. It is important to study employment with a longer follow-up period, as was evident from the results concerning labour market training. On the other hand, the follow-up period might have been too short for some subgroups. In addition, it is noteworthy that we only examined employment as an outcome. It is possible the interventions lead to full-time studies first and then to employment in a new profession later.

Our study also had some other limitations. For example, our study population covered the unemployed individuals in only one city. Compared to the entire population of Finland, the population of Oulu is younger and better educated, and the

unemployment rate is slightly higher. The availability of services is also better in a large city than in a small city. (Blomgren & Jäppinen, 2020.)

Compared to previous studies, this research included comprehensive information on employment services, social services, and rehabilitation. Among employment services, self-initiated studies were not included in the analysis. However, self-initiated studies may not be considered a formal service, but rather an opportunity to study while receiving unemployment benefits. In terms of social services, the analysis covered rehabilitative work activities, mental health and substance abuse services, and social work. Services such as disability services and services for immigrants were excluded. Regarding rehabilitation, the study focused on services organised by the Social Insurance Institution of Finland and earnings-related pension providers. Rehabilitation provided by social and health services or non-governmental organisations was not included. This study did not address health-care services.

Regarding the used methods, our results do not describe the effects of different service paths. Instead, the results describe their connection to employment. Even though we adjusted several background factors, some differences that cannot be taken into account by adjusting still exist between different clusters. With our data, it was not possible to find out whether the services were appropriate, sufficient, and timely. However, sequence analysis proved to be a good way to identify various service paths. The main problem related to this method was that a person can receive several services at the same time (or during the same month), and it would have been too complicated to study all service combinations separately.

4.6 Conclusions

A majority of the unemployed individuals did not use any of the studied services to support employment withing the first 12 months after the onset of unemployment. This group also had the highest employment rate 1 and 2 years after the unemployment started, indicating that many do not need services for future employment.

Service use seemed to vary greatly between unemployed individuals. In addition to employment support, they may need assistance with issues related to health or life management, for example. It is important that a wide selection of different services is available to unemployed individuals, and that each person seeking employment can be guided to effective services based on their needs.

Paths towards employment can be found in the employment services for those whose chances of employment are relatively good. However, the service system may not work ideally in helping young people with health problems and those with several different service needs towards employment.

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Supplementary Tables

Supplementary table S1. The Calinski-Harabasz pseudo-F's, Duda-Hart Je(2)/Je(1) index and pseudo-T squared values.

Number of clusters	Calinski-Harabasz pseudo-F	Duda-Hart, Je(2)/Je(1)	Duda-Hart, pseudo-T squared value
1		0.6805	4194.42
2	4194.42	0.8361	558.96
3	3223.63	0.8055	507.79
4	3016.54	0.8185	151.7
5	2549.15	0.8444	261.06
6	2288.9	0.6136	3827.77
7	2137.56	0.7491	250.16
8	1984.23	0.8517	89.85
9	1867.08	0.8212	98.84
10	1785.37	0.8759	125.94
11	1725.64	0.8059	81.87
12	1658.68	0.8842	100.43
13	1605.87	0.7756	121.77
14	1554.29	0.6105	335.58
15	1510.22	0.7871	49.22

Supplementary table S2. Ten most frequent sequence patterns for clusters (order of episodes regardless of length). At least 5 cases. States: 1. No services, 2. Rehabilitative work activities, 3. Mental health and substance abuse services, 4. Social work, 5. Rehabilitation, 6. Work trial, 7. Labour market training, 8. Several services

Sequence order, Cluster 1	N	%	Sequence order, Cluster 2	N	%	Sequence order, Cluster 3	N	%	Sequence order, Cluster 4	N	%
1	5119	100	1 7 1	331	34	7 1	412	78	1 7	110	26
			7 1	231	24	7 1 7 1	29	5	7 1	102	24
			1 3 1	80	8	7 1 7	25	5	1 7 1	73	17
			1 7	56	6	1 7 1	21	4	7 1 7	32	8
			5 1	29	3	7 1 3 1	7	1	7 1 7 1	10	2
			3 1	27	3			0	1 7 1 7	8	2
			1 3	22	2			0	1 6 1 7	5	1
			7 1 7 1	20	2						
			1 5 1	16	2						
			8 1	13	1						
Other		**0**			**14**			**6**			**20**
Total	**5119**	**100**		**962**	**100**		**528**	**100**		**423**	**100**

Sequence order, Cluster 5	N	%	Sequence order, Cluster 6	N	%	Sequence order, Cluster 7	N	%	Sequence order, Cluster 8	N	%
7	168	52	1 6 1	163	18	3	18	11	8	42	8
1 7	62	19	1 7	130	15	3 1 3	17	10	4	20	4
7 1	37	11	1 6	43	5	1 3 1 3	12	7	4 8	20	4
7 1 7	18	6	6 1	35	4	3 1 3 1 3	10	6	8 4 8	17	3
1 7 1	10	3	1 4	25	3	1 3	8	5	1 4 8	12	2
7 8 7	7	2	1 3 1 3 1	17	2	3 1 3 1	6	4	5	12	2
8 7	5	2	1 7 1	13	1	3 1 3 1 3 1	5	3	8 4	12	2
			1 3 1	12	1	3 8 3	5	3	2	11	2
			1 5	12	1				5 1 5	11	2
			1 6 1 6	11	1				1 4	10	2
Other		**6**			**48**			**52**			**68**
Total	**326**	**100**		**891**	**100**		**168**	**100**		**518**	**100**

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