epidemiology and community health. 2017, 71 (11),1101-1106.http://dx.doi.org/10.1136/jech-2017-209271

Chronic diseases as predictors of labour market attachment after participation in subsidised re-employment programme: a six-year follow-up study

Chioma A. Nwaru[1], Laura Peutere[1], Mika Kivimäki[2,3,4], Jaana Pentti[3], Jussi Vahtera[5], Pekka Virtanen[1]

1 School of Health Sciences, Faculty of Social Sciences, University of Tampere, Tampere, Finland

2. Clinicum, Faculty of Medicine, University of Helsinki, Helsinki, Finland

3 Finnish Institute of Occupational Health, Helsinki, Turku and Tampere, Finland

4 Department of Epidemiology and Public Health, University College London, London, UK

5 Department of Public Health, University of Turku and Turku University Hospital, Turku, Finland

Correspondence: Chioma A. Nwaru, School of Health Sciences, Faculty of Social Sciences, 33014, University of Tampere, Tampere, Finland. Tel.:358 442019495; Fax: +358 335516057; E-mail:Nwaru.Chioma.A@student.uta.fi

Word count:

Abstract: 240

Main text: 2914

Key words: chronic disease, re-employment, labour market attachment, subsidized re-employment, trajectory analysis

ABSTRACT

Background: Little is known about the work patterns of re-employed people. We investigated the labour market attachment trajectories of re-employed people and assessed the influence of chronic diseases on these trajectories.

Methods: The study was based on register data of 18,944 people (aged 18 to 60 years) who participated in a subsidised re-employment programme in Finland. Latent class growth analysis with Zero-Inflated Poisson was used to model the labour market attachment trajectories over a six-year follow-up time. Multinomial logistic regression was used to examine the associations between chronic diseases and labour market attachment trajectories, adjusting for age, gender, educational level, size of town, and calendar year in subsidised re-employment programme.

Results: We identified four distinct labour market attachment trajectories namely: strengthening (a relatively stable attachment throughout the follow-up time; 77%), delayed (initial weak attachment increasing later; 6%), leavers (attachment declined with time; 10%), and none-attached (weak attachment throughout the study period, 7%). We found that severe mental problems strongly increased the likelihood of belonging in the leavers (OR 3.61; 95%CI 2.23-5.37) and none-attached (OR 3.41; 95%CI 1.91-6.10) trajectories, while chronic hypertension was associated with none-attached (OR 1.37 95%CI 1.06-1.77) trajectory. The associations between other chronic diseases (diabetes, heart disease, asthma and arthritics) and labour market attachment trajectories were less evident.

Conclusions: Re-employed people appear to follow distinct labor market attachment trajectories over time. Having chronic diseases, especially mental disorders appear to increase the risk for relatively poor labour market attachment.

INTRODUCTION

Unemployment is a risk factor for many health problems. Re-employment is often promoted as a key measure to mitigate the adverse effects of unemployment. Several systematic reviews have shown that re-gaining employment improves mental health.[1-3] Re-entering paid job may also promote other aspects of health. For instance, Schuring et al.[4] reported that physical functioning, social functioning, vitality, bodily pain, and role limitations due to emotional or physical illness of those who regained employment improved compared to those who remained unemployed. Carlier et al.[5] also showed that those who re-entered paid work were three times more likely to change from poor to good health and two times more likely to change from poor to good quality of life than those who continued to be unemployed.

Poor health can be both a consequence, and a determinant of unemployment. According to a recent systematic review,[6] a poor health and a chronic disease are important predictors of exit out of paid job due to disability pension, unemployment, and early retirement. A poor health and a chronic disease can also influence the likelihood of re-entering paid jobs among unemployed people.[7] In past studies, poor health conditions such as mental problems,[8, 9] poor self-perceived general health,[10-12] and to some extent, musculoskeletal pain,[13, 14] were shown to reduce the likelihood of regaining paid jobs among unemployed people, although there are also some studies which reported contrasting findings. For instance, in a study by García-Gómez et al.[15] women with psychological distress were reported to have increased likelihood of re-employment, whereas in a study by Vesalainen and Vuori,[16] no association was found between psychological distress and re-employment.

Fewer studies have investigated the influence of chronic disease on re-employment. The study by van de Mheen et al.[10] showed that chronic disease was a risk factor for not re-entering paid job, but the association did not reach statistical significance. Schuring et al.[7] also found that chronic health problem was an important determinant of re-employment in 9 out of 11 European countries that were studied, but the association was statistically significant in only four countries. Although these studies seem to suggest that chronic disease is a potential determinant of re-employment, they do not provide information regarding the role of specific diseases on the likelihood of re-employment. Given that there are differences between the chronic diseases not only with respect to the nature and with respect to degree of limitations in functional capacity, but also with respect to their prognosis, care, and management, it is probable that they may also exert differing influence on re-employment. This is why their individual role on re-employment needs to be evaluated.

Subjects of the current study consist of long-term unemployed people who participated in a labour market policy measure (state subsidised re-employment scheme). We explore their labour market attachment trajectories across a six-year period, and examine the association between chronic diseases and these trajectories. Our hypothesis is that chronic diseases will influence labour market attachment, and that the influence will differ depending on the type of disease.

METHODS

Design and study population

The present study is based on data from the Finnish Public Sector (FPS) study. The FPS study is an ongoing prospective study of employees in ten towns and five hospital districts in Finland. The general goal of the FPS study is to assess the work life of employees, and the impact of work and work-related changes on the employee health and wellbeing.[17] The Ethics Committee of the Hospital District of Helsinki and Uusimaa approved the study.

The FPS study includes employees who have been employed for at least six months in any year between 1991 and 2005 (n = 151,901) in the participating organizations. Data on all periods of employment in the participating organizations, drawn from employers' records, and work history, obtained from the register of the Finnish Centre for Pensions, have been linked to the cohort using the unique national identification number. These data were also available for long-term unemployed individuals (N = 23,213), who had their first period of subsidised re-employment in the service of ten towns in 1994-2005. Subsidised re-employment is an element of Finland's active labour market policy measures. It is designed for long-term unemployed people who have problems in finding job in the regular labour market. In practice, the municipalities in co-operation with the local unemployment offices select the participants. Health is not considered in recruiting the participants; therefore, individuals with less optimal health may also be selected into the program if they are deemed fit and capable of performing full-time job. It is a rule that the contract of the subsidy programme lasts for six months; if a participant interrupt the period this is because his/her work ability is too poor to perform the job, or because he/she finds a job in the open labor market. To ensure a homogenous group of participants for the present study in order to subsequently allow for comparable labor market trajectories, we restricted our analysis to 18,944 individuals who had complete information for the full six months participation in the subsidy programme, and excluded the rest who dropped out of the program for any reason (n = 3999). In addition, the included had to be aged 18 to 60 years at the end of the scheme. Those who had an old-age pension (n =74) or who died (n = 196) during the follow-up were also excluded as they were not at risk of re-employment or did not have complete information on labour market attachment.

Labor market attachment

Employment history data were obtained from the registers of the Finnish Centre for Pensions. This register details, with accuracy of one month, the start and end date of all work contracts in both public and private sectors, as well as that of entrepreneurship. All such periods of employment are

mandatorily insured according to the earnings-related pension. Starting at the end of the subsidised re-employment period, employment of each individual was followed-up for six years, which was divided into 12 six-month periods to enable analysis of the labor market attachment trajectories. Herein, labour market attachment is defined as the number of months (0-6) as an employee or entrepreneur during the 12-time periods.

Chronic diseases

Subjects with chronic diseases were identified at the beginning of the subsidised re-employment programme using the records from the Social Insurance Institution on entitlements to special reimbursements for cost of purchased drugs for severe and chronic diseases. To be eligible for this entitlement, a patient must provide a physician's certificate about his or her conditions to the institution, where the application for entitlement is accepted after reviewing that the predefined criteria for the disease and its medication are met. We considered six common chronic diseases that were covered in the reimbursement programme: diabetes, heart disease, arthritis, asthma or chronic obstructive pulmonary disease (COPD), chronic hypertension, and severe mental problems. The ICD-codes (version 10) for these diseases is provided in Table 1. Each of the chronic diseases was coded as 0 = those without disease, and 1 = those with disease. Participants were also classified into two groups based on whether they had any of the six chronic diseases or whether they had none of the chronic diseases.

Table 1: Chronic diseases and their International Classification of Diseases codes

Diseases	ICD-codes (version 10)
Diabetes	E10-E14, E89.1
Heart disease	111.0, 113, 150, 197.1, P29.0, 120-122, 124.0, 125
Arthritis	A04.6, A39.8, A50.5, D76.0, D76.3, H20.1, H30, I33.0, J84, K50.9, K51.9, K73.2, K74.3, K83.0, L40.5, M02, M05, M06, M08, M13.9, M30–M35, M45, M46.1, M46.9, M94.1, N03, N04, Q44.2
Asthma or COPD	E84.0, J41-J45, P27.1
Chronic hypertension	110-113, 115, 127.0
Severe mental problems	A52.1, A69.2, A81.0, B22.0, B56.9, B57.2, E01.8, E03.9, E52, E53.8, E75.6, E83.0, E83.5, F01, F03, F06.0-F06.3, F20-F25, F28, F29, F30.1, F30.2, F31, F32.3, F33.3, F84, G10, G20, G30.0, G30.1, G30.8, G30.9, G31.0, G35, G40.9, M30.0, M32.8

Sociodemographic variables

Age and gender variables were obtained from the employers' registers. Age was categorised into three: "18-29", "30-44", and "45-60". Educational level, retrieved from Statistics Finland, was classified as: "basic", "vocational school", and "college or university degree". Data on calendar year in subsidised re-employment was derived from the register of the Finnish Centre for Pensions, and categorised as: "1994-1997", "1998-2001", and "2002-2005" based on the unemployment and subsidised re-employment rate at that time. Information on the ten towns were the participants worked during the follow-up was used as a proxy for the area of residence. The variable was dichotomized as "small" and "big" towns. The small towns included Raisio, Naantali, Nokia, Valkeakoski, and Virrat, while the big towns included Tampere, Turku, Oulu, Vantaa and Espoo.

Statistical analysis

We used latent class growth model (LCGM) to identify subgroups (latent classes) within the population that are following similar labor market attachment trajectories during the six-year period. [18-20] We applied the Zero-Inflated Poisson (ZIP) model of LCGM [20] since the outcome variable (labor market attachment) was a count with large values at 0 month and at 6/6 months. ZIP model is well suited for modeling count data with excess zeros.[20] We estimated two to six latent class models or trajectories, and specified a quadratic growth term in all the models assuming that labor market attachment will decrease with time after an initial increase. We evaluated the fit of the models, i.e. compared k and k-1 models, using four main selection criteria. First, the Bayesian Information Criteria (BIC), where model with lower BIC values indicated well-fitting model.[21] Second, the Lo Mendell and Rubin Adjusted Likelihood Ratio test (LMR-LRT), where a significant p-value ($p < 0.05$) indicates that the k class fit better than the k-1 class model.[22] Third, the average posterior probabilities of group membership for each class. This measure indicates the classification quality of the classes, where higher values (closer to 1) suggest that the trajectories correctly classifies individuals with similar pattern of labour market attachment, and discriminates between individuals with dissimilar attachment patterns.[23] Fourth, and most importantly is the usefulness of the classes or trajectories in practice. This is determined by examining both the distinctiveness and the sizes (proportions) of each of the trajectory groups.[20] For trajectory groups to serve a useful substantive purpose, they should be distinguishable in terms of their shapes and other explanatory characteristics. They should also be of reasonable sizes (at least five percent) to ensure precision.[18,23]

Having established the optimal number of latent classes (i.e. labour market attachment trajectories), we then examined the association between chronic disease and these trajectories in a multinomial logistic regression. Multinomial logistic regression is designed for modelling categorical outcome variable with more than two categories.[18, 24] We conducted both unadjusted and adjusted analysis. The adjusted model included potential covariates such as age, gender, educational level, size of town,

and calendar year in subsidised re-employment programme. We presented the results of the regression analyses as odds ratio (OR) with their 95% confidence interval (95% CI). We used Mplus version 7 for LCGA-ZIP,[25] and IBM SPSS Statistics for Windows version 23.0 (Armonk, NY: IBM Corp) for the multinomial logistic regression.

RESULTS

In the beginning of the subsidised re-employment programme, 1,567 out of the 18,944 participants had at least one chronic disease. Of the 1,567, 190 (1.0%) had diabetes, 46 (0.2%) had heart disease, 130 (0.7%) had arthritis, 562 (3.0%) had asthma or COPD, 642 (3.4%) had chronic hypertension, and 100 (0.5%) had severe mental problems. Table 2 shows the socio-demographic characteristics of the study participants. The proportion of participants with chronic disease was higher among older people, those with basic educational qualification, and those who participated in the subsidy programme after 1997.

Table 2: Socio-demographic characteristics of the study population

		Chronic disease status at beginning of the subsidised re-employment programme		
	Total (n = 18,944) n (%)	With chronic disease(s) (n = 1567) n (%)	Without chronic disease (n = 17377) n (%)	p-value
Age				< 0.001
18-29	9924 (52.4)	453 (4.6)	9471 (95.4)	
30-44	6662 (35.2)	659 (9.9)	6003 (90.1)	
45-60	2358 (12.4)	455 (19.3)	1903 (80.7)	
Gender				0.259
Male	5555 (29.3)	440 (7.9)	5115 (92.1)	
Female	13389 (70.7)	1127 (8.4)	12262 (91.6)	
Educational level				< 0.001
Basic	5251 (27.7)	495 (9.4)	4756 (90.6)	
Vocational school	9525 (50.3)	721 (7.6)	8804 (92.4)	
College/university	4168 (22.0)	351 (8.4)	3817 (91.6)	
Calendar year in subsidised re-employment				< 0.001
1994-1997	13174 (69.5)	1004 (7.6)	12170 (92.4)	
1998-2001	4158 (21.9)	386 (9.3)	3772 (90.7)	
2002-2005	1612 (8.5)	177 (11.0)	1435 (89.0)	
Size of town				0.555
Small	2329 (12.3)	200 (8.6)	2129 (91.4)	
Big	16615 (87.7)	1367 (8.2)	15248 (91.8)	

P-value by Pearson's Chi-Square test

Table 3. Fit statistics of the LCGM-ZIP with two to six latent classes (n = 18,944)

Class	BIC	Average posterior probabilities for the most likely latent class membership	LMR-LRT P-value	Classification (proportions) of individuals based on their mostly likely class membership	Number of parameters
2	862341.942	0.99, 0.98	0.000	0.87, 0.13	10
3	852166.103	0.97, 0.95, 0.99	0.000	0.07, 0.12, 0.81	14
4	846412.297	0.93, 0.99, 0.95, 0.98	0.000	0.06, 0.77, 0.10, 0.007	18
5	841777.001	0.98, 0.78, 0.93, 0.95, 0.93	0.000	0.07, 0.18, 0.05, 0.10, 0.60	22
6	837861.118	0.96, 0.89, 0.93, 0.93, 0.96, 0.77	0.000	0.06, 0.09, 0.05, 0.58, 0.05, 0.17	26

In the trajectory analysis, after considering the fit indices in Table 3, we arrived at a four-class trajectory. Figure I presents the diagrammatic representation of the four-class labour market attachment trajectories. The trajectories included those who maintained a relatively stable attachment throughout the follow-up time ('strengthening', 77%); those with initial weak attachment that steadily increased after 36 months ('delayed', 6%), those whose attachment declined with time ('leavers', 10%), and those who had a very weak attachment throughout the study period ('none attached', 7%). We refer to the two last groups as poor attachment trajectories.

All socio-demographic characteristics were significantly related to labour market attachment trajectories (Supplementary File 1). Individuals aged between 45 and 60 years were more likely to belong in the poor attachment trajectories than those in other age groups, likewise males than females, and persons with low educational qualification. People who had their subsidised re-employment between 1994 and 1997 were less likely to belong in the poor attachment trajectories than those in other groups; likewise those who lived in small towns than those who lived in big towns.

Table 4 shows the association between each of the chronic disease and labour market attachment trajectories. We present only the adjusted association because there was no substantial difference in the results of the unadjusted and adjusted models. With the exception of asthma, all chronic diseases increased the risk of belonging in the poor attachment trajectories, however, only the result of hypertension and mental problems reached the conventional level of statistical significance. Having hypertension was associated with a 1.4-fold increased odd of belonging in the "none-attached" trajectory, while having severe mental problems was associated with a 3.6-fold and 3.4-fold increased odd of belonging in the "leavers" and "none-attached" trajectories respectively.

Table 4. Adjusted association between chronic diseases and labour market attachment trajectories: results obtained from multinomial logistic regression with their Odds ratio (OR) and their 95% confidence interval (95%CI)

	Labour market attachment trajectories during the 6-year follow-up		
	Delayed vs. strengthening	Leavers vs. strengthening	None-attached vs. strengthening
	OR (95%CI)	OR (95%CI)	OR (95%CI)
With any chronic disease (n = 1567)	1.06 (0.83-1.35)	1.27 (1.08-1.49)	1.27 (1.05-1.54)
Diabetes (n = 190)	1.25 (0.69-2.28)	1.47 (0.97-2.22)	1.26 (0.75-2.10)
Arthritis (n = 130)	0.48 (0.15-1.51)	1.26 (0.74-2.14)	1.39 (0.75-2.59)
Asthma (n = 562)	1.18 (0.83-1.68)	1.06 (0.80-1.40)	0.78 (0.53-1.15)
Hypertension (n = 642)	0.81 (0.52-1.26)	1.13 (0.89-1.43)	1.37 (1.06–1.77)
Heart disease (n = 46)	1.81 (0.54-6.01)	1.19 (0.53-2.67)	1.70 (0.75-3.85)
Severe mental problems (n = 100)	1.19 (0.43-3.30)	3.61 (2.23–5.37)	3.41 (1.91–6.10)

Odds ratio adjusted for age, gender, educational level, size of town, and calendar year in subsidised re-employment programme

DISCUSSION

We identified four distinct labour market attachment trajectories over a six-year follow-up period among participants of state subsidised re-employment programme. Whereas 77% of the re-employed people assumed the trajectory of strengthening attachment throughout the study, 17% belonged in the poor attachment trajectories. We found that severe mental problem strongly increased the risk of belonging in the poor attachment trajectories, while the effect of somatic diseases varied according to the type of the disease, and was less evident.

Whereas there are empirical evidence on the association between chronic disease and non-re-employment,[7-9] the present study, to our knowledge, is the first to identify the work trajectories of re-employed people and to demonstrate the relationship between chronic diseases and these trajectories. The finding of an association between severe mental problems and poor labour market attachment trajectories confirms previous studies,[8,9] which showed reduced likelihood of re-employment among long-term unemployed people with physician-diagnosed mental disorders. In our study, the influence of severe mental problem on labour market attachment was prominent. Research suggest that severe mental problems are highly recurrent,[26] and is associated with increased sickness absence recurrence,[27] and work impairment.[28] There are also reports which suggest that persons with mental disorders may face discrimination in the labor market.[29,30] It is possible therefore that difficulty in finding jobs or in coping with work activities partly explain the finding of poor labor market attachment among individuals with severe mental problems. Also, employers may be reluctant in hiring or accommodating persons with a history of severe mental problems in order to avoid loss of productivity.

Our study shows that the effect of somatic disease on labor market attachment was less compared to that of mental problems. Moreso, the results were mostly non-significant except for the association

between hypertension and none-attached trajectory. This finding is in agreement with the two-year [9] and five-year [8] follow-up studies from Norway, which also did not find any significant association between diagnosed somatic disease and re-employment. These findings seem to suggest that chronic somatic diseases are less an obstacle to work participation among re-employed people.

There are some limitations with our study. One is that we do not have information regarding the type of contract hence, we could not distinguish between full-time and part-time job. Another is that we lacked adequate power to have conducted analysis that is more detailed, for instance, explore the role of age and gender as potential effect modifiers, which would have provided concrete information regarding potential targets for possible intervention. There may be the possibility of residual confounding since we did not have information on all potential confounders, particularly, on marital status. Given that the health of unemployed people are generally worse than that of employed people,[31] we cannot rule out the fact that our reference group does not have health problems. Our investigation was restricted to those diseases that are covered in the reimbursement program, which are only a "tip of the iceberg" of diseases that could affect labour market participation. It is also possible that our reliance on the records of the reimbursement program may have resulted in under-representation of chronic diseases, but we think that if there are any under-representation, it may not be substantial. The reason is that in Finland, the special reimbursement program has been established for a long time, and is popular among physicians, pharmacist and citizens. Therefore, it is highly improbable that a patient fulfilling the diagnostic criteria is not applying for the entitlement, and there is no reason to suspect that long-term unemployed people would be in particular risk of not applying. The extrapolation of our findings to the general population may be limited since our sample constituted of a selected group of long-term unemployed people i.e. those who participated in the state subsidized re-employment scheme, and amongst these, we focused only on those with complete information during the subsidised re-employment scheme. However, on the average, they may be

regarded as a representative sample of re-employed people in Finland given that they were pooled from ten towns in Finland with varying recruitment criteria.

A major strength of our study relates to the longitudinal design, which made it possible for us to evaluate the labour market experience of re-employed people over many time points. In addition, the use of reliable register-based data provided us with the opportunity to overcome methodological drawbacks associated with missing data, selection bias, and recall bias, which were common among many past studies.

CONCLUSIONS

Our study shows that re-employed people follow distinct labour market attachment trajectories over time, and that severe mental problems strongly increased the risk of belonging in the poor attachment trajectories. The influence of chronic somatic diseases on labor market attachment was less evident. Policy programs that would promote supportive work environment for re-employed people with severe mental problems should be encouraged in order to prevent future unemployment of re-employed people with severe mental problems.

Figure 1: Labour market attachment trajectories of re-employed people during the six-year follow-up time (n = 18,944)

ACKNOWLEGEMENTS: This project was supported by the funding from the Doctoral School of Health Sciences, University of Tampere and by the Academy of Finland (grant number 267727). MK is supported by Nordforsk, the Nordic Program on Health and Welfare and he UK Medical Research Council (K013351). We are grateful to Tapio Nurmi and Bright Nwaru for their advice and suggestions during the preparation of this manuscript.

COMPETING INTEREST: none declared

What is already known on this subject

• Poor health have been associated with reduced likelihood of re-employment among unemployed people.

• However, less is known about the labour market attachment trajectories of re-employed people and the influence of different chronic diseases on these trajectories.

What this study adds

• During six years subsequent to the period of subsidised re-employment, the participants assumed four distinct labour market attachment trajectories which are characterized as ‘strengthening’, ‘delayed’, ‘leavers’, and ‘none-attached’.

• Having severe mental problem strongly increased the risk of belonging in the poor attachment trajectories, while the effect of chronic somatic diseases differed according to the type of disease, and was less evident.

• Policy programs that would promote supportive work environment for re-employed people with severe mental problems should be encouraged in order to prevent future unemployment among this group of re-employed people.

REFERENCES

1. van der Noordt M, Ijzelenberg H, Droomers M, et al. Health effects of employment: a systematic review of prospective studies. *Occup Environ Med* 2014;71:730-736.
2. Hergenrather KC, Zeglin RJ, McGuire-Kuletz M, et al. Employment as a social determinant of health: a systematic review exploring the relationship between employment status and physical health. *Rehabilitation Research, Policy, and Education* 2015;29(1):2-26(25).
3. Rueda S, chambers L, Wilson M, et al. Association of returning to work with better health in working-aged adults: a systematic review. *Am J Public Health* 2012;102(3):541-556.
4. Schuring M, Mackenbach J, Voorham T, et al. The effect of re-employment on perceived health. *J Epidemiol Community Health* 2011;65(7):639-44.
5. Carlier BE, Schuring M, Lötters FJB, et al. The influence of re-employment on quality of life and self-rated health, a longitudinal study among unemployed persons in the Netherlands. *BMC Public Health* 2013;13:505.

6. van Rijn RM, Robroek SJ, Brouwer S, et al. Influence of poor health on exit from paid employment: a systematic review. *Occup Environ Med* 2014;71(4):295-301.
7. Schuring M, Burdorf L, Kunst A,et al. The effects of ill health on entering and maintaining paid employment: evidence in European countries. *J Epidmiol Community Health* 2007;61:597-604
8. Claussen B. Health and re-employment in a five-year follow-up of long-term unemployed. *Scand J Public Health* 1999;27(2):94-100
9. Claussen B, Bjorndal A, Hjort PF. Health and re-employment in a two year follow-up of long-term unemployed. *J Epidemiol Community Health* 1993;47:14-8.
10. van de Mheen H, Stronks K, Schrijvers CTM, et al. The influence of adult ill health on occupational class mobility and mobility out of and into employment in The Netherlands. *Social Science & Medicine* 1999;49:509-518.
11. Schuring M, Robroek SJW, Otten FWJ, et al. The effect of ill health and socioeconomic status on labor force exit and re-employment: a prospective study with ten years forllow-up in the Netherlands. *Scand J Work Environ Health* 2013;39(2):134-143.
12. Carlier BE, Schuring M, van Lenthe FJ, et al. Influence of health on job search behavior and re-employment: the role of job-search cognitions and coping resources. *J Occup Rehabil* 2014;24:670-679.
13. Virtanen P, Janlert U, Hammarström A. Health status and health behaviour as predictors of the occurence of unemployment and prolonged unemployment. *Public Health* 2013;127:46-52.
14. Nwaru CA, Nygård C-H, Virtanen P. Musculoskeletal pain and re-employment among unemployed job seekers: a three-year follow-up study. *BMC Public Health* 2016;16:531. DOI 10.1186/s12889-016-3200-0.

15. García-Gómez P, Jones AM, Rice N. Health effects on labor market exits and entries. *Labor Economics* 2010;17:62-76.
16. Vesalainen J, Vuori J. Job-seeking, adaptation and re-employment experiences of the unemployed: a three-year follow-up. *J Community Appl Soc Psychol* 1999;9:383-94
17. Kivimäki M, Gimeno D, Ferrie JE et al. Socioeconomic position, psychosocial work environment and cerebrovascular disease among women: the Finnish Public Sector Study. *International Journal of Epidemiology* 2009;38(5):1265-1271.
18. Muthén B, Muthén LK. Integrating person-centered and variable-centered analyses: growth mixture modeling with latent trajectory classes. *Alcoholism: Clinical and Experimental Research* 2000;24:882-891.
19. Nagin DS. Analyzing developmental trajectories: a semiparametric, group-based approach. *Psychological Methods* 1999;4(2):139-157.
20. Nagin DS, Odgers CL. Group-based trajectory modeling in clinical research. *Annu Rev Clin Psychol* 2010;6:109-38.
21. Kreuter F, Muthén B. Analyzing criminal trajectory profiles: bridging multilevel and group-based approaches using growth mixture modeling. *J Quant Criminol* 2008;24:1-31.
22. Nylund KL, Asparouhov T, Muthén BO. Deciding on the number of classes in latent class analysis and growth mixture modeling: a Monte Carlo simulation study. *Structural Equation Modeling* 2007;14(4):535-569.
23. Andruff H, Carraro N, Thompson A, et al. Latent class growth modeling: a tutorial. *Tutorials in Quantitative Methods for Psychology* 2009;5(1):11-24.
24. Jung T, Wickrama KAS. An introduction to latent class growth analysis and growth mixture modeling. *Social and Personality Psychology Compass* 2008;302-317.
25. Muthén LK, Muthén BO (1998-2012) Mplus User's guide. Seventh Edition. Los Angeles, CA: Muthén & Muthén.

26. Bruce SE, Yonkers KA, Otto MW et al. Influence of psychiatric comorbidity on recovery and recurrence in generalized anxiety disorder, social phobia, and panic disorder: a 12-year prospective study. *Am J Psychiatry*2005;162(6):1179-87.
27. Koopmans PC, Bűltmann U, Roelen CAM et al. Recurrence of sickness absence due to common mental disorders. *Int Arch Occup Environ Health*2011;84(2):193-201.
28. Lim D, Sanderson K, Andrews G. Lost productivity among full-time workers with mental disorders. *The Journal of Mental Health Policy and Economics*2003;3(3):139-146.
29. Hipes C, Lucas J, Phelan JC et al. The stigma of mental illness in the labor market. *Soc Sci Res*2016;56:16-25
30. Quinn DM, Williams MK, Weisz BM. From discrimination to internalized mental illness stigma: the mediating roles of anticipated discrimination and anticipated stigma. *Psychiatr Rehabil J*2015;38(2):103-8.
31. Herbig B, Dragano N, Angerer P. Health in the long-term unemployed. *Dtsch Arztebl Int*2013;110(23-24):413-9.DOI:10.3238/arztebl.2013.0413

Supplementary File 1: Distribution of background variables by trajectories of labor market attachment during the six-year follow-up

		Trajectories of labor market attachment during the six-year follow-up				
	Total N = 18,944	Strengthening (n = 14577) n (%)	Delayed (n = 1101) n (%)	Leavers (n = 1970) n (%)	None attached (n = 1296) n (%)	p-value
Age						< 0.001
18-29	9924 (52.4)	7759 (78.2)	680 (6.9)	905 (9.1)	580 (5.8)	
30-44	6662 (35.2)	5390 (80.9)	363 (5.4)	565 (8.5)	344 (5.2)	
45-60	2358 (12.4)	1428 (60.6)	58 (2.5)	500 (21.2)	372 (15.8)	
Gender						< 0.001
Male	5555 (29.3)	3974 (71.9)	404 (7.3)	662 (11.9)	515 (9.3)	
Female	13389 (70.7)	10603 (79.2)	697 (5.2)	1308 (9.8)	781 (5.8)	
Educational level						< 0.001
Basic	5251 (27.7)	3607 (68.7)	371 (7.1)	708 (13.5)	565 (10.8)	
Vocational Sch.	9525 (50.3)	7436 (78.1)	588 (6.2)	951 (10.0)	550 (5.8)	
College/university	4168 (22.0)	3534 (84.8)	142 (3.4)	311 (7.5)	181 (4.3)	
Calendar year in subsidized re-employment						< 0.001
1994-1997	13174 (69.5)	10127 (76.9)	882 (6.7)	1303 (9.9)	862 (6.5)	
1998-2001	4158 (21.9)	3227 (77.6)	153 (3.7)	478 (11.5)	300 (7.2)	
2002-2005	1612 (8.5)	1223 (75.9)	66 (4.1)	189 (11.7)	134 (8.3)	
Size of town						0.015
Small	2329 (12.3)	5402 (77.6)	386 (5.5)	742 (10.7)	428 (6.2)	
Big	16615 (8.3)	9175 (76.5)	715 (6.1)	1228 (10.2)	868 (7.2)	

P-value by Pearson's Chi-Square test