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There is a need to develop alternative evaluation designs to evaluate the effect of entering paid employment on health in observational studies. A hybrid model, combining fixed effects and random effects, enables the disentanglement of the selection and causation processes in paid employment. This study shows that employment has a positive influence on mental- and physical health, especially among high educated persons.

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Key terms: benefit of paid employment; benefit of working; causation; common mental health problem; educational inequality; employment; enter employment; happiness; mastery; mental health; mental health problem; paid employment; physical health; re-employment; selection; self-esteem

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Original article

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The benefits of paid employment among persons with common mental health problems: evidence for the selection and causation mechanism

by Merel Schuring, PhD,[1] Suzan JW Robroek, PhD,[1] Alex Burdorf, PhD [1]

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Objectives The aims of this study were to (i) investigate the impact of paid employment on self-rated health, self-esteem, mastery, and happiness among previously unemployed persons with common mental health problems, and (ii) determine whether there are educational inequalities in these effects.

Methods A quasi-experimental study was performed with a two-year follow-up period among unemployed persons with mental health problems. Eligible participants were identified at the social services departments of five cities in The Netherlands when being diagnosed with a common mental disorder, primarily depression and anxiety disorders, in the past 12 months by a physician (N=749). Employment status (defined as paid employment for ≥12 hours/week), mental health [Short Form 12 (SF-12)], physical health (SF-12), self-esteem, mastery, and happiness were measured at baseline, after 12 months and 24 months. The repeated-measurement longitudinal data were analyzed using a hybrid method, combining fixed and random effects. The regression coefficient was decomposed into between- and within-individual associations, respectively.

Results The between-individuals associations showed that persons working ≥12 hours per week reported better mental health (b=26.7, SE 5.1), mastery (b=2.7, SE 0.6), self-esteem (b=5.7, SE 1.1), physical health (b=14.6, SE 5.6) and happiness (OR 7.7, 95% CI 2.3–26.4). The within-individual associations showed that entering paid employment for ≥12 hours per week resulted in better mental health (b=16.3, SE 3.4), mastery (b=1.7, SE 0.4), self-esteem (b=3.4, SE 0.7), physical health (b=9.8, SE 2.9), and happiness (OR 3.1, 95% CI 1.4–6.9). Among intermediate- and high-educated persons, entering paid employment had significantly larger effect on mental health than among low-educated persons.

Conclusions This study provides evidence that entering paid employment has a positive impact on self-reported health; thus work should be considered as an important part of health promotion programs among unemployed persons.

Key terms educational inequality; enter employment; happiness; mastery; mental health; physical health; re-employment; self-esteem.

Unemployed persons have a poorer physical as well as mental health (1–6). Two different hypotheses explain the health inequalities between employed and unemployed persons. The causation hypothesis states that persons who lose paid employment will deteriorate in health, whereas unemployed persons who enter paid employment will improve in health (3, 7). The selection hypothesis states that persons who leave paid employment already have a poorer health status before leaving employment compared to persons who remain employed, whereas persons who enter paid employment already have a better health status before entering employment compared to persons who remain unemployed (8–11). These two hypotheses are not mutually exclusive and both mechanisms may contribute to the health inequalities between employed and unemployed persons.

Evidence for the beneficial effects of entering paid employment on health is mainly based on observational studies comparing those entering paid employment with those remaining unemployed. In a review of observational studies, Waddell & Burton (12) concluded that re-employment leads to benefits in psychological health

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and some measures of well-being. Another systematic review of 33 observational longitudinal studies showed that entering paid employment reduced the risk of depression and improved general mental health (13). In addition, a recent systematic review of Luciano (14) showed that entering paid employment was associated with decreased psychiatric treatment and increased self-esteem among persons with schizophrenia or other severe mental illnesses. However, in these observational studies entering paid employment is not considered as a randomly occurring event. Therefore, those who entered paid employment probably differed in (un)observed covariates from those who remained unemployed, which could have led to biased estimates of the effect of employment on health. For example, unemployed persons with improving health will be more likely to find a job and their health will continue to improve thereafter. Because it is not possible to investigate the effect of entering paid employment on health in a randomized controlled trial due to ethical and practical reasons, there is a need to develop alternative evaluation designs to evaluate the effect of entering paid employment on health with observational data while dealing with potential bias (15, 16).

Few studies have used random-effects models to assess the influence of employment conditions on health (17, 18). Random-effects models are commonly applied to panel data to assess the influence of variables that change over time (eg, employment status) as well as individual stable characteristics. A central assumption of random models is that the variation between persons is assumed to be random and uncorrelated with exposure variables included in the model. When (unmeasured) personal characteristics are correlated with the exposure variable (employment status), the random-effects model is likely to give biased results (18).

An alternative to random-effects models, fixed-effects models provide a way to estimate causal effects in analysis where units (individuals) are measured repeatedly over time. The essence of a fixed-effects method is that each individual serves as his or her own control, which is accomplished by making comparisons *within* individuals (19). The strength of the fixed-effects method is that it can eliminate the effects of confounding variables without measuring them or even knowing exactly what they are, as long as they are stable over time (20). However, because fixed-effects models remove the effects of all time-invariant causes – measured as well as unmeasured – it is not possible to estimate differences between individuals with respect to time-invariant covariates.

Recently developed hybrid methods make it possible to analyze both within-individual changes as well as time-invariant covariates (19, 20). The hybrid method, also called the between-within method, combines some of the virtues of the fixed-effects models with random-effects models. In the hybrid models, the time-varying independent variables are transformed into deviations from their person-specific means (within-individual estimates). In addition, time-invariant variables as well as the person-specific means of the time-varying variables (between-individual estimates) are included in the model. Finally, a random intercept is added to take into account the dependence of the multiple observations for each person. With the hybrid method, causal effects of entering paid employment can be analyzed as within-individual associations, whereas selection of person into the labor force can be analyzed as between-individual associations.

The hybrid model makes it also possible to investigate differences between socioeconomic groups. A prospective study of the European working age population showed that entering paid employment was preceded by self-rated health improvements among intermediate and high-educated persons, whereas among low educated workers self-rated health improved in the year of entering paid employment and continued to improve in the year thereafter (7). Hence, there may be differences between socioeconomic groups in the relative importance of the selection and causation mechanism contributing to the health inequalities between employed and unemployed persons.

The first aim of this study is to investigate the influence of paid employment on self-rated health, self-esteem, mastery and happiness among persons with common mental health problems on unemployment benefits. The second aim is to determine whether there are educational inequalities in the influence of paid employment on health and psychological measures. It is hypothesized that both the selection mechanism as well as the causation mechanism contribute to the health inequalities between employed and unemployed persons. Within-individual improvements of self-rated health, self-esteem, mastery and happiness among persons who entered employment would support the causation hypothesis. Differences in self-rated health, self-esteem, mastery and happiness between employed and unemployed would support the selection hypothesis.

Methods

Study design and population

A quasi-experimental study with two years follow-up was conducted in five cities in The Netherlands (Amsterdam, Utrecht, The Hague, Rotterdam, and Capelle aan den IJssel). The study population consisted of long-term unemployed persons who received a social security ben-

efit from participating cities. In The Netherlands persons who become unemployed will first receive an unemployment benefit and are transferred to the social security benefit after prolonged unemployment of 3–24 months depending on their employment history. Unemployed persons are eligible for this benefit when they do not have paid employment or the number of hours worked per week is too low. Eligible participants were identified at the social services departments of the five cities when being diagnosed with a common mental disorder, primarily depression and anxiety disorders, in the past 12 months by a physician. Such a medical examination is common practice in the five cities. This examination also ensured that eligible participants were medically fit enough to be able to perform paid employment for ≥32 hours/week. Additional requirements for enrolment were: (i) sufficient labor market skills that would enable work resumption within 24 months, (ii) sufficient skills to be able to provide answers in an interview, (iii) existing contact or eligible for contact with primary mental healthcare services, (iv) no severe acute psychiatric illness, (v) no drug addiction or homelessness, and (vi) aged <50 years. From March 2012 until October 2014, 1212 persons were invited to participate in the study. Respondents of the baseline questionnaire received a second and third questionnaire, one respectively two years later, following the same procedure. Figure 1 shows the diagram of the flow of participants through the phases of the study. The Medical Ethics Committee of the Erasmus University Medical Center approved the study.

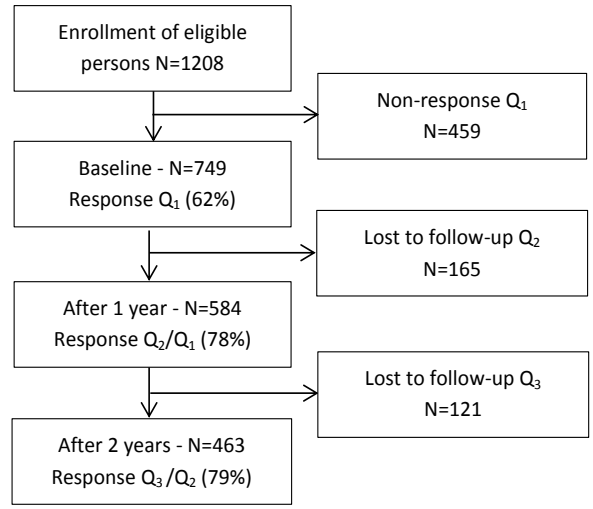

Figure 1. Flow chart filled out questionnaires at baseline and one respectively two years later.

Data collection

A questionnaire was sent to the home address of the participants, followed by two reminders, two and, respectively, four weeks later. As a large part of the study population had a non-Dutch background, the covering letter and questionnaire were translated into Turkish and Moroccan-Arabic and sent in addition to the Dutch questionnaire to persons with a Turkish or Moroccan surname. If persons needed help with completing the questionnaire, they could get in touch with an interviewer. Persons who did not reply to the postal questionnaire, were visited by an interviewer at their home address with at least three attempts at different day times during a two-week period. The interviewers were matched with persons based on their ethnic background and could offer an interview in the mother tongue (Dutch, Turkish, Arabic).

Outcome measures

Mental and physical health were measured with the Mental and Physical Component Summary scales of the 12-item Short-Form Health Survey (SF-12) (21) (eg, "During the past four weeks, have you felt calm and peaceful?", "During the past four weeks, how much of the time has your physical health or emotional problems interfered with your social activities?" answered on a 5-point scale, ranging from "all of the time", "most of the time", "some of the time", "a little of the time" to "none of the time"). Scores could range from 0-100, with a higher score indicating a better health-related quality of life. A mental health score below the cut-off point of 45.6 was regarded as indicative for an episode of depression in the previous 30 days (22, 23).

Mastery was measured with the Personal Mastery Scale (24), which consists of six items (eg, "I have little control over the things that happen to me", "There is little I can do to change many of the important things in my life") answered on a 4-point Likert scale, ranging from "strongly agree", "agree", "disagree" to "strongly disagree" (Cronbach's alpha=0.78). The sum score of the 6 items was calculated and ranged from 6–18; a higher score indicated a higher level of mastery.

Self-esteem was measured with the Rosenberg Self-Esteem Scale (25), with 10 items (eg, "On the whole, I am satisfied with myself", " All in all, I am inclined to feel that I am a failure"), answered on a 4-point Likert scale, ranging from "strongly agree", "agree", "disagree" to "strongly disagree" (Cronbach's alpha=0.86). The sum score of the 10 items was calculated and ranged from 10–40, a higher score indicated a higher level of self-esteem.

Happiness was measured with one single question: "All things considered, how happy would you say that you are?", answered on a 4-point scale, ranging from

"unhappy", "not so happy", "happy" to "very happy". (26) A dichotomous variable was made with score 0 for "unhappy" and "not so happy" and 1 for "happy" and "very happy".

Employment status

The official definition of paid employment in the Netherlands is being in paid employment for ≥12 hours per week (27). A dichotomous variable was computed, coded "1" when an individual was currently involved in paid work for at least 12 hours per week and "0" when an individual was non-employed or worked for <12 hours per week.

Individual characteristics

Sociodemographic variables, such as ethnic background, education, age, sex and marital status, were included in the study. Ethnic background of the respondent was based on the country of birth of the parents. In case the mother was born in The Netherlands, the country of birth of the father was leading. Different ethnic groups were defined, based on differences in geographical and cultural distance from The Netherlands. Three ethnic minority groups were defined (i): Turks and Moroccans (ii); Antilleans and Surinamese; and (iii) a miscellaneous group with all other countries of origin. Persons were divided into three groups according to the highest level of educational attainment. A high educational level was defined as higher vocational training or university, intermediate educational level was defined as higher secondary schooling or intermediate vocational training, and low educational level was defined as no education, primary school, lower and intermediate secondary schooling or lower vocational training. Marital status was used to distinguish those subjects married or living with a partner from others. Persons were divided in two groups based on the presence of children in the household (yes/no). Unemployment duration was defined as the number of years since last paid employment and divided into three categories ≤1, 0–5, and >5 years of non-employed or never worked.

Statistical analysis

Descriptive statistics were used to describe the study population at baseline: frequencies for dichotomous and categorical variables and means with standard deviations for continuous variables. In addition, the overall mean of all observations concerning health status of participants during unemployment or employment was calculated. Loss-to-follow up analysis included logistic regression analysis with all measured covariates at baseline as independent variables and response at follow-up as dichotomous outcome measure.

The repeated measurements were analyzed using a hybrid regression model, whereby individuals contributed with the baseline measurement and at least one follow-up measurement (19, 20). The regression coefficient of the independent time-varying variable (employment status, coded 0 for unemployment and 1 for employment) was decomposed into (i) a between-individuals regression coefficient representing how the exposure values averaged across all person-observations within individuals are related to the outcome, and (ii) a within-individual regression coefficient representing how the variation in the exposure around the individual's mean level of the exposure across all person-observations is related to the outcome (28). A random intercept was added to the model to take into account the dependence of the multiple observations for each person. The following regression model was used:

$$y_{it} = \alpha_t + \beta_{0i} + \beta_W(x_{it} - x_i) + \beta_B x_i + \gamma z_i + \varepsilon_{it}$$

where y_{it} is the dependent variable for individual i at time t, $\alpha_{t\,is}$ the time effect that is constant across individuals, β_{0i} is the individual-specific random intercept, x_{it} is the exposure variable (employment status) for the i^{th} participant at measurement t, x_i is the mean value of the exposure variable averaged across all measurement times separately within each participant, z_i are the independent variables that do not vary over time and ε_{it} is the error term (19, 20). The regression coefficient β_W gives the within-individual estimate and β_B gives the between-individuals estimate. The unstandardized within-individual estimate provides insight in the change in scores of the outcome measures among individuals who enter or exit paid employment. The unstandardized between-individual estimate provides insight in the difference in outcome measures between individuals who were unemployed versus employed. All models were adjusted for education, sex and age. Mental and physical health, self-esteem and mastery were modelled with linear regression analysis, happiness with logistic regression analysis. A sensitivity analysis was done excluding those individuals who left paid employment (N=15).

In addition, two alternative models were used to analyze the association between health and employment status. First, a fixed-effects model was used to analyses within-individual changes in health among persons who enter (or exit) paid employment. Second, a random-effects model was used to analyses differences in health between employed and unemployed persons. More information about these models can be found in appendix 1 (www.sjweh.fi/show_abstract.php?abstract_id=3675).

Effect sizes (ES) of the health change after entering paid employment were calculated by dividing the within-

individual regression coefficient by the standard deviation of each measure on population level at baseline among persons who entered paid employment. Analyses were conducted using STATA version 14.1 (Stata Corp, College Station, TX, USA). For the hybrid model, the commands "xtmixed" and "xtmelogit" were used.

Results

Figure 1 shows that 62% (749/1208) of the eligible persons who were invited to participate in the study, completed the baseline questionnaire. After one year follow-up, 78% (584/749) of the baseline participants responded, and, after two years, 79% (463/584) of the one year follow-up participants responded. Loss-to-follow up was significantly higher among higher educated persons [odds ratio (OR) 2.4, 95% CI 1.5–3.9] and persons with children (OR 1.40, 95% CI 1.0–1.9), and significantly lower among long-term unemployed persons (OR 0.5, 95% CI 0.3–0.7) and persons aged 35–45 years (OR 0.6, 95% CI 0.4–0.8). Loss-to-follow up was not related to sex, ethnical background, mental health, physical health, mastery, or self-esteem at baseline.

Table 1 shows that the majority of the participants had a low education level (65%), were not married or living with a partner (74%), were unemployed for more than one year (78%) and had a non-native Dutch ethnic background (62%). At baseline, the majority of the participants were completely out of the workforce (97%) and a small minority worked <12 (1.5%) or 12–28 (1.2%) hours per week. During the two-year follow-up period, 56 persons (8%) entered paid employment for ≥12 hours per week. Among those persons who were employed at baseline or during follow-up (N=65), 15 persons (23%) became unemployed again.

Employed participants reported a better mental and physical health, more self-esteem, higher mastery compared to unemployed participants during all measurements. At baseline, the mean mental health score was 54.9 [standard deviation (SD) 29.5] among the employed persons, compared to 39.3 (SD 23.9) among the unemployed persons. Among those persons who were consistently unemployed mental and physical health did not change over time. Employed persons worked 18 (SD 5) hours a week at baseline, 32 (SD 9) hours a week after one year and 29 (SD 9) hours a week after two years. Being (very) happy was more often reported among the employed persons after one (67%) and two years (67%) of follow-up, compared to the unemployed persons (41% respectively 38%) as shown in table 2.

Differences between unemployed and employed persons were found for all health and psychological measures as well as happiness. Persons who were involved in paid employment for ≥12 hours per week had a better mental health [b=26.7, standard error (SE) 5.1]: the mental health score of the SF-12 scale was 26.7 points higher among employed persons compared to unemployed persons. In addition, employed persons had a better physical health (b=14.6, SE 5.6), higher self-esteem (b=5.7, SE 1.1), better mastery (b=2.7, SE 0.6) and were more likely to be happy (OR 7.7, 95% CI 2.3–26.4) than persons who did not work or worked less than 12 hours per week (table 3 & figure 2).

In addition, table 3 shows a within-individual change in mental health (b=16.3, SE 3.4) among persons who entered (N=56) or left (N=15) paid employment: the mental health score of the SF-12 scale increased or decreased by 16.3 points after entering respectively exiting paid employment. Within-individual associations were also found for employment status and physical health (b=9.8, SE 2.9), self-esteem (b=3.4, SE 0.7) and mastery (b=1.7, SE 0.4). Persons were three times more likely to be (very) happy (OR 3.1, 95% CI 1.4–6.9) during a period of employment compared to a period of non-employment. Sensitivity analyses including only persons who entered paid employment (excluding 15 persons who left paid employment) showed larger within-individual improvements of mental and physical health, mastery, self-esteem and happiness (18.7–25.9% increase).

Table 1. Baseline characteristics of the total study population (N=749).

	Study population N=749	
	N	%
Age (years)		
18–35	304	40.6
35–45	292	39.0
45–65	153	20.4
Education		
Low	488	65.2
Intermediate	189	25.2
High	72	9.6
Sex		
Women	394	52.6
Ethnic background		
Native Dutch	287	38.3
Turkish/Moroccan	222	29.6
Antillean/Surinamese	110	14.7
Other immigrants	130	17.4
Married/living with a partner		
Yes	197	26.3
Children		
Yes	428	57.1
Unemployment duration		
<1 year	161	21.5
1–5 years	399	53.3
>5 years or never worked	189	25.2
Labor force participation		
No paid employment	729	97.3
Paid employment (<12 hours/week)	11	1.5
Paid employment (12–28 hours/week)	9	1.2

Table 2. Mental health, physical health, mastery, self-esteem, and happiness among persons with common mental health problems who are unemployed or employed for ≥12 hours per week, at baseline and after 1 and respectively 2 years of follow-up. [SD=standard deviation].

	Baseline						After 1 year						After 2 years					
	Employed N=9			Unemployed N=740			Employed N=46			Unemployed N=538			Employed N=42			Unemployed N=421		
	Mean	SD	%	Mean	SD	%	Mean	SD	%	Mean	SD	%	Mean	SD	%	Mean	SD	%
Mental health (0–100, higher is better)	54.9	29.5		39.2	23.9		63.9	25.4		43.2	24.9		65.4	25.1		44.8	24.1	
Physical health (0–100, higher is better)	61.9	10.9		51.2	27.8		66.5	27.8		50.9	27.4		69.5	24.2		54.1	27.3	
Self esteem (10–40, higher is better)	28.6	6.3		26.8	4.7		31.8	4.0		26.9	5.1		32.7	5.1		27.2	5.4	
Mastery (6–18, higher is better)	11.3	2.1		10.8	2.9		13.6	2.9		11.2	3.2		14.2	3.2		11.1	3.38	
Happiness (happy/very happy)			28.6			35.7			67.4			41.4			66.7			37.6

Table 3. Within (change form unemployment to employment) and between (unemployed vs. employed persons) associations of employment status and health- and psychological measures among persons with common mental health problems (N=749). Hybrid model, adjusted for age, sex, and education. [b=regression coefficient, SE=standard error, OR=odds ratio, CI=confidence interval]

	Within-individual change				Between-individuals difference				Effect size within-individuals change
	b	SE	OR	95% CI	b	SE	OR	95% CI	
Mental health (0–100, higher is better)	16.34	3.40			26.74	5.08			0.68
Physical health (0–100, higher is better)	9.79	2.86			14.61	5.57			0.35
Self esteem (10–40, higher is better)	3.37	0.66			5.70	1.07			0.72
Mastery (6–18, higher is better)	1.69	0.38			2.74	0.64			0.58
Happiness (happy/very happy)			3.08	1.37–6.93			7.74	2.27–26.36	

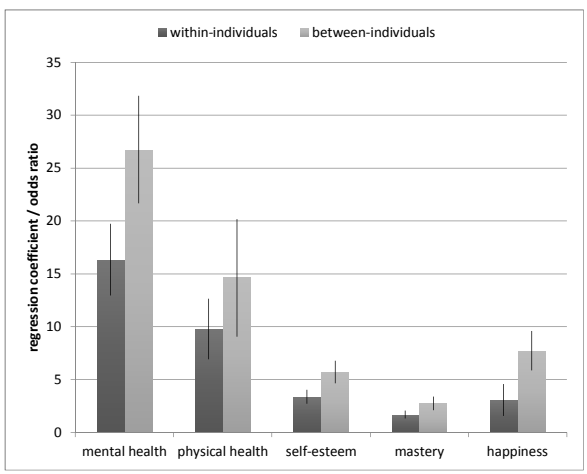

Figure 2. Within-individual (change from unemployment to employment) and between-individual (unemployed versus employed persons) associations of employment status and health- and psychological measures among persons with common mental health problems (N=749).

In the appendix (table A1), it is shown that the within-individual estimates of the fixed effects model (eg, mental health, fixed: b=16.5, SE=2.8) were similar to the within-individual estimates of the hybrid model. The estimates of the random-effects model (eg, difference in mental health between employment and unemployment status: b=18.4, SE 2.5) were larger than the within-individual estimates in the hybrid model.

Additional analyses were done to investigate whether more hours of employment was associated with better health indices. Improvement of mental health seemed to be more profound among persons who worked >32 hours per week, although the differences in mental health improvements between part-time (b=14.9, SE 4.6) and fulltime (b=18.1, SE 4.8) were not statistically significant.

Persons with intermediate or high education had a higher likelihood of being employed than persons with low education. However, the majority of employed persons at baseline or follow-up had low education (58%). Table 4 shows a positive within-individual association between paid employment and mental health among low educated persons (b=8.9, ES 0.23). Among intermediate- and high-educated persons, the within-individual association of employment with mental health (b=28.1, ES 0.72) was significantly larger than among low-educated persons. Within-individual associations of employment status with self-esteem, mastery, and happiness seemed

Table 4. Within (change from unemployment to employment) and between (unemployed versus employed persons) associations of employment status and health- and psychological measures among low- and intermediate/high educated persons with common mental health problems (N=749). Hybrid model, adjusted for age, sex, and education. [b=regression coefficient, SE=standard error, OR=odds ratio, CI=confidence interval]

	Low education level								Intermediate and high education level							
	Within				Between				Within				Between			
	b (effect size)	SE	OR	95% CI	b	SE	OR	95% CI	b (effect size)	SE	OR	95% CI	b	SE	OR	95% CI
Mental health (0–100, higher is better)	8.93 (0.23)	4.05			26.32	5.14			28.14 [a] (0.72)	4.86			27.25	5.11		
Physical health (0–100, higher is better)	9.44 (0.34)	3.62			13.02	5.64			10.36 (0.37)	4.53			17.20 [a]	5.62		
Self esteem (10–40, higher is better)	2.83 (0.60)	0.83			5.46	1.08			4.22 (0.90)	0.99			5.99	1.08		
Mastery (6–18, higher is better)	1.58 (0.55)	0.48			2.57	0.65			1.88 (0.65)	0.62			2.98	0.65		
Happiness (happy/very happy)			1.94	0.72–5.27			7.40	2.13–25.73			6.91	1.74–27.30			8.77	2.52–30.54

[a] Significant difference intermediate/high compared to low educational group.

to be more profound among intermediate- and high- than low-educated persons. However, these educational differences were not statistically significant.

Discussion

The findings of the current study support the presence of selection and causation mechanisms contributing to health inequalities between employed and unemployed persons. A difference in self-rated health, self-esteem, mastery, and happiness between employed and unemployed persons was found, supporting the selection hypothesis. Within-individual improvements of self-rated health, self-esteem, mastery, and happiness among persons who entered employment were found, supporting the causation hypothesis. The change in mental health within individuals was significantly larger among higher- compared to low-educated persons. This suggests that the causation mechanism is more important in explaining mental health inequalities between employed and unemployed persons among higher- compared to low-educated persons.

This study provided evidence that employment is beneficial for health, especially mental health. The current study corroborates the findings of earlier observational studies. Different theories have described the mechanism through which employment has a positive influence on health and wellbeing. Already in 1982, Jahoda (29) described that employment provides people with five latent functions: (i) time structures; the possibility to fill the day with planned activities, (ii) collective purpose; the feeling of being useful, of being needed by other people, (iii) social contacts; enlarging the social horizon outside the family, (iv) social status; even a low status, for example as a manual worker, is better than no status at all, and (v) activity; being active, even due to external forces such as the need to earning a living, is better than being passive. Jahoda's model was endorsed by a study among a representative sample of the German population, which showed that employed persons generally reported more access to the latent functions of employment compared to unemployed persons, and all latent functions were associated with psychological well-being (30).

During the two-year follow-up period, less than 10% of the study population entered paid employment, which was comparable with a German study (8%) among disabled persons on vocational rehabilitation (31). In this latter study, a fixed-effects model was applied to estimate within-individual changes of mental and physical health among persons with disabilities in vocational rehabilitation. However, within-individual changes in the SF-12 mental and physical health score were smaller in the German study (+6 and +3, respectively), compared to the current study (+16 and +10, respectively). Participants of the German study received disability benefits due to chronic disabilities, whereas participants of the current study received unemployment benefits. The mental health problems of participants of the current study may have been the result of the unemployment situation. Entering paid employment may contribute to recovery of mental health problems to a larger extent when these health problems are the result of the unemployment situation.

In the current study, mental health benefits of employment were more profound among mid-to-high-

compared to low-educated workers. The causation mechanism may be more important in contributing to health inequalities between unemployed and employed persons among mid-to-high- compared to low-educated persons. Mid-to-high-educated workers may have better psychosocial working conditions, higher financial rewards and more job security, which are associated with mental health. A Dutch study among a representative sample of the Dutch working population showed that lower-educated employed persons were more likely to have jobs with low job control, low rewards and high physical job demands (32). Future research could investigate educational differences in the impact of entering paid employment on health.

Due to recent developments towards a more flexible labor market, research has put large emphasis on the negative effects of job insecurity on the health of workers (33–35). Participants of the current study who entered paid employment generally had high levels of job insecurity. During follow up, 15 out of 64 employed persons lost employment (23%), which indicates that there were in–out employment trajectories. Job insecurity has been shown to be associated with negative health outcomes (33). However, as temporary workers are subject to health-related selection into employment, some studies have shown that temporary employment is associated with better health (33). The between-individual differences in mental as well as physical health provided evidence for the health-related selection into paid employment. Although job insecurity was generally high, a positive within-individual association between employment status and all health and psychological measures was found among persons who entered paid employment. Hence, this study shows that after a prolonged period of unemployment, gaining paid employment with high job insecurity is better for health than having no job at all.

The strength of the current study is the combination of fixed and random effects in the hybrid model, which enables the disentanglement of selection and causation processes in paid employment in an observational study. The fixed-effects model provides a way to estimate causal effects in analysis where units (individuals) are measured repeatedly over time. The essence of a fixed-effects method is that each individual serves as his or her own control, which is accomplished by making comparisons *within* individuals (19). The fixed effects in our model were expressed by within-individuals associations, estimating the effect of entering paid employment on several outcome measures, including health. These estimates can be interpreted as causal relations in the causation process under the assumption that effects of confounding variables, whether measured or not, will have remained stable over time (20). The hybrid model extends the fixed-effects model with estimations of the differences *between* individuals with and without paid employment, reflecting the selection process. It is of interest to note that the observed effects within and between individuals were of similar magnitude, although the within-individuals associations were usually a little lower. This may be linked to the fact that the effects of entering paid employment were constrained to the two-year follow-up time, whereas the differences between those employed and those not employed at baseline may reflect longer time periods.

To be able to appreciate the benefits of the hybrid model, results of two alternative modeling techniques (ie, the fixed- and random-effects models) are presented in an appendix (www.sjweh.fi/show_abstract.php?abstract_id=3675). The estimates of the fixed and hybrid model are comparable, although the hybrid model has the advantage of also providing information about differences between individuals with and without paid employment. The estimates of the random-effects model are larger than the within-individual estimates of the fixed-effects and hybrid models. The random-effects model estimates the health difference between being employed and being unemployed, combining persons who move from unemployment to employment with persons who remain employed or unemployed. This reflects a combination of the selection as well as the causation mechanisms. The observed differences between employed and unemployed persons in the random-effects model may be the result of short-term effects of entering paid employment as well as long-term effects of being (un)employed in the years before the study. This is therefore not suitable to disentangle the selection and causation mechanisms. However, an advantage of the random-effects model is the higher power because all persons are included in the model. A limitation of the fixed-effects and hybrid models is that only persons who enter or exit paid employment are used to estimate within-individual changes. A limitation of the fixed-effects and hybrid models is therefore the larger SE and CI of the estimates, especially with logistic regression analyses, compared to random-effects models. The large majority of the study population was not involved in paid employment. However, some of the participants had small part-time jobs. During the follow-up period of the study, some of the part-time employed persons lost their jobs. All employment transitions in- and out of the labor force were included in the analyses of the within-individual associations of employment and health. Therefore, it is not only the effect of entering paid employment (N=56), but also the effect of exiting paid employment (N=15) that contribute to the within-individual associations of employment and health. A sensitivity analysis, excluding the transitions out of the workforce showed larger (19–26%) within-individual improvements of health. Therefore, the within-individ-

ual association of employment and health that were presented in this study may reflect a conservative estimate of the effect on entering paid employment on health

We should consider that reversed causality may have played a role in the within-individual associations between health and employment, whereby improvement of mental health may increase the likelihood of entering paid employment. A good way to deal with reversed causality is to use time-lags between the independent and dependent variables. However, with annual waves, such a lagged model cannot address well the short-term effects of work on health and vice versa. In our study, a lagged analysis was not feasible since data on three consecutive measurements were not available for all participants and the proportion of persons who entered paid employment was small. Larger studies are needed to determine the causal relation of employment transitions on perceived health.

The study population consisted of a very specific group of long-term unemployed persons with common mental health problems, diagnosed by a physician, primarily living in the four largest cities of the Netherlands. This may limit generalizability of the study findings to other populations, such as unemployed persons with other health problems. In addition, it would be of interest to evaluate whether these findings depend on macro-level contexts and policies. A recent study in the USA showed that the association of unemployment with poor health was lower when the generosity of state unemployment benefits was higher (36). Therefore, differences in benefit regulations may influence the impact of entering paid employment on health among persons on unemployment benefits.

In a recent report on the health of the British working age population, Black (37) appealed for changing perceptions of fitness for work. Instead of sticking to the idea that one cannot work unless 100% fit, it is recommended that a campaign should be launched to make employers, healthcare professionals, and the general public aware that work is in general good for health. This study provides evidence that entering paid employment has a positive impact on self-reported health; thus work should be considered as an important part of health promotion programs among unemployed persons.

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