



## Article

## The negative effects on mental health of being in a non-desired occupation in an increasingly precarious labour market



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## ABSTRACT

Precarious employment has been associated with poor mental health. Moreover, increasing labour market precariousness may cause individuals to feel ‘locked-in’, in non-desired workplaces or occupations, out of fear of not finding a new employment. This could be experienced as a ‘loss of control’, with similar negative health consequences. It is plausible that the extent to which being in a non-desired occupation (NDO) or being in precarious employment (PE) has a negative impact on mental health differs according to age group. We tested this hypothesis using data from 2331 persons, 18–34, 35–44, and 45–54 years old, who answered questionnaires in 1999/2000, 2005, and 2010. Incidence rate ratios (IRR) were calculated for poor mental health (GHQ-12) in 2010, after exposure to NDO and PE in 1999/2000 or 2005. NDO and PE were more common in the youngest age group, and they were both associated with poor mental health. In the middle age group the impact of NDO was null, while in contrast the IRR for PE was 1.7 (95% CI: 1.3–2.3) after full adjustment. The pattern was completely the opposite in the oldest age group (adjusted IRR for NDO 1.6 (1.1–2.4) and for PE 0.9 (0.6–1.4)). The population attributable fraction of poor mental health was 14.2% and 11.6%, respectively, for NDO in the youngest and oldest age group, and 17.2% for PE in the middle age group. While the consequences of PE have been widely discussed, those of NDO have not received attention. Interventions aimed at adapting work situations for older individuals and facilitating conditions of job change in such a way as to avoid risking unemployment or precarious employment situations may lead to improved mental health in this age group.

## Introduction

Scandinavian societies have been characterised as welfare states, with high levels of labour union membership, effective collective wage bargaining, and strong employment protection legislation, all contributing to relatively high job security (Muffels & Luijkx, 2008), and in turn with positive effects on mental health (Kim et al., 2012). Sweden has also been described as a ‘low-flexibility’ country (McAllister et al., 2015), among other reasons due to its previously strict application of the employment policy ‘last-in – first out’ at a specific workplace (von Below & Skogman Thoursie, 2010). Theoretically, this might lead to job immobility, due to an increased threshold for being able to get new employment with a different employer. This highlights the ‘employability’ aspect of job security, which is the conviction, based on one’s individual situation, that one can easily find a new job if necessary (Sverke, Hellgren & Naswall, 2002). However, the notion of personal employability is necessarily influenced by the objective status of the

general labour market. Already in 1995, labour force surveys showed that the proportion of persons holding the view that they can ‘obtain a similar job without moving’ had fallen from 55% to 17% between 1989 and 1993 (Aronsson & Göransson, 1999). With low self-perceived employability, an individual who finds her- or himself in an undesired, yet relatively secure employment, may choose not to leave the job, but remain in place, however dissatisfied. Such a position can be experienced as a type of ‘locked-in’ situation, which can be expected to cause psychological strain. Indeed, in a study by Aronsson & Göransson, published almost two decades ago, it was found that people holding a non-desired job reported considerably higher levels of fatigue, slight depression, and headaches than those in comparison groups (Aronsson & Göransson, 1999).

In a later study by Aronsson, Dallner, and Gustafsson (2000) examining various types of non-desired work situations, no specific differences between those not preferring their workplace and those not preferring to continue in their occupation were found. However, those

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preferring neither workplace nor occupation reported more work- and health-related problems than those with only one type of non-preference.

Since the original work by Aronsson and colleagues, there have only been a few studies focusing on the mental health consequences of remaining in non-desired work positions. Being ‘doubly locked-in’ (i.e. being both in a non-preferred occupation and a non-preferred workplace) was associated with poor mental health in one cross-sectional study (Muhonen, 2010). In another study, higher rates of long-term sick-leave were found in persons who were in a ‘locked-in’ position in either their occupation, their place of work, or both (Fahlen et al., 2009). Since there is a likelihood of bidirectional causality between labour market factors on the one hand and mental health on the other (Cornwell, Forbes, Inder & Meadows, 2009), longitudinal studies are preferable in order to disentangle causal directions. In a recent follow-up study of almost 4000 gainfully employed persons from the Swedish Longitudinal Occupational Survey of Health (SLOSH), it was found that persons described as ‘locked-in at the workplace’ had poorer well-being in terms of subjective health and depressive symptoms at follow-up after two years (Stengård, Bernhard-Oettel, Berntson, Leineweber & Aronsson, 2016).

However, after several decades of globalisation and neoliberal economic policies, long-term employment contracts and a high level of job security have become less dominant on the labour market. Instead, precarious work, i.e. short-term contracts, involuntary part time employment, employment through ‘staff-for-hire’ enterprises, and shorter or longer periods of unemployment, have become more and more frequent (Puig-Barrachina et al., 2014). There may be some advantages for certain workers in the ‘new forms of employment’, as described in a recent Eurofound publication with this title (Eurofound, 2015). Also, voluntary changes of employment have been associated with positive consequences for the individual, such as increase of status, esteem, and financial rewards (Ng, Sorensen, Eby & Feldman, 2007), decreased physical strain (Swaen, Kant, van Amelsvoort & Beurskens, 2002), as well as better psychosocial health and less burnout (Liljgren & Ekberg, 2008). However, for the majority of those in the increasingly common ‘flexible’ forms of employment, the lack of job security seems to be harmful (Ferrie, Shipley, Stansfeld & Marmot, 2002; Meltzer et al., 2009; Virtanen, Janlert & Hammarstrom, 2011; Yoo et al., 2016; Vancea & Utzet, 2017). Public health research interest in precarious employment has grown rapidly during the past decade, and a recent review supports a linkage between mental health problems and downsizing, perceived job insecurity, and temporary employment (Benach et al., 2014). In a previous study, based on the cohort used in the present study and focusing on young individuals, a significant impact of precarious employment on poor mental health at follow-up was found (Canivet et al., 2016).

Thus, it appears as though both precarious employment and remaining in an undesired job or profession might be detrimental for mental health. Not being able to improve precarious employment conditions or to leave one’s job or one’s occupation may be interpreted by the individual as having no or low control over an important part of one’s life (Carver & Scheier, 1982). This may induce a stress response and, with prolonged exposure, poorer mental health (Ursin & Eriksen, 2010; Stansfeld & Candy, 2006).

However, the impact of these labour market situations might not be the same in different age strata. Age is related to labour market structures in Sweden. In 2015, 27% and 33% (men and women, respectively) of persons aged 20–34 held temporary employment contracts, compared to 14% and 16% in the entire working population (Statistics Sweden, 2015). Whereas it may appear more ‘natural’ to find that young individuals dominate the group of precariously employed, it is less clear how age relates to workplace or occupational non-preference. In the following, ‘job’ and ‘workplace’ refer to the context of an employment position at a particular workplace, whereas ‘occupation’ refers to the profession, or the ‘label’ of the line of work. In order

to leave a non-desired workplace one may have to start networking, developing competences or actively searching for new jobs, or have to migrate to another geographical area, etc. To leave one’s entire occupational field may require even more risk-taking such as taking personal loans to finance university studies, giving up one’s professional identity, changing employer or workplace, and perhaps even trading in job security and seniority of a permanent position for an apprenticeship, internship or temporary job to establish a new career etc. (Feldman & Ng, 2007). Thus, leaving a non-preferred occupation appears to be difficult, particularly for those who have invested significant time and energy in a career, or who have not many years of their occupational career left. Also leaving a non-preferred occupation often includes leaving the workplace. For this reason, we chose to focus in the present paper on the two factors non-desired occupation (NDO) (rather than non-desired workplace), and precarious employment (PE).

In terms of age and NDO, one way of reasoning may be that individuals who enter the labour market take whatever job they can find and thus are more willing to work even in NDOs. Also, it may be that individuals first test a number of low-qualified jobs to get work experience before deciding upon the occupational career that they want to pursue. After having gained relevant exams and more years of work experiences, these individuals may eventually get into more desired and less precarious employment positions.

Thus, even though these two phenomena – PE and/or NDO – may be more prevalent in the youngest group, they may not have strong adverse health effects over time, because individuals advance, or expect to advance in their careers. Those who were in less desired and more precarious employment in their early twenties, for example, may thus be in good health when followed up in their early thirties. This, however, may not be the case for those who have health problems already from the beginning. Evidence shows that impaired health in itself is a hinder to get into more permanent employment and advance in an occupational career (Paul & Moser, 2009).

At a later stage in life, having achieved permanent employment and advancing in a desired occupational career could be expected to constitute the ‘normal’ situation. However, those who, when entering midlife, are still in NDO or have PE may be less satisfied and more worried about their employment situation (Wyn & Andres, 2011).

Towards the end of the occupational career, many may be in the most secure and permanent employment positions. Yet, during the later stages of a career, age-related health problems can increase and long-term adverse health effects of working in certain occupations could also become more pronounced. For example, older workers may lack the physical capabilities to perform low-complexity jobs, whereas they might have the experience and skills to perform jobs with higher autonomy or possibilities to pass their knowledge on to others (Truxillo, Cadiz, Rineer, Zaniboni & Fraccaroli, 2012). Furthermore, it could be argued that over time, occupational careers and job demands change, and particularly the older workforce may begin to feel that they lag behind in the latest developments and technologies. In part, this could also relate to the fact that older workers seem to be less willing to participate in training and career development activities (Ng & Feldman, 2012). Moreover, ageism, or negative social stereotypes about older people, can lead employers and managers to inadvertently undervalue older workers’ skills and experience (Poscia et al., 2016). All this may be reflected in a decreased willingness among older workers to continue in the same occupation. However, since many older workers doubt their employability on the labour market (Bernhard-Oettel & Näswall, 2015) or simply feel that it is too late to become re-educated and start a new occupational career, they might more often choose to endure the situation, or perhaps even retire early. Nevertheless, working in a NDO and continuing to do so because there are no better alternatives may have negative health effects over time.

Summing up, there is reason to believe that neither NDO nor PE prevalence is uniformly distributed throughout the working career. Furthermore, their impact may vary considerably across the life course.

**Table 1**

Categorisation of precarity by answers to questions about present employment, history of previous unemployment during the past three years, and self-rated risk of future unemployment. NP = non-precious, P = precarious, — = insufficient data, not included.

		Type of employment								
		Permanent			Contingent			Unknown work situation		
		Previous unemployment			Previous unemployment			Previous unemployment		
	No	Yes	NA	No	Yes	NA	No	Yes	NA	
Self-rated risk of future unemployment	NA	—	P	—	P	P	P	—	P	—
	None	NP	NP	NP	NP	P	P	—	P	—
	Low	NP	NP	NP	P	P	P	—	P	—
	Moderate	P	P	P	P	P	P	P	P	P
	High	P	P	P	P	P	P	P	P	P

To our knowledge, even though the occurrence of each of these two phenomena may influence the occurrence of the other, they have not been investigated together previously since the original study by Aronsson et al. (2000), nor has a life course perspective been applied.

The aim of the present study was firstly to assess the prevalence of NDO and PE in different age groups in a general population active in the labour market. Secondly, we wanted to investigate, in age-separated groups, the associations between these two work-related factors and mental health. A third aim was to investigate whether there was any effect modification regarding mental health, by being exposed to NDO and PE simultaneously.

## Methods

### Study population

The present cohort was established in 1999/2000 and followed up in 2005 and 2010 (Canivet et al., 2016). At baseline, a postal questionnaire was sent out to 25000 men and women, 18–80 years old. These individuals were randomly selected from the population register, such that equal representation was achieved from all municipalities in the county of Scania, Sweden. The response rate was 58% (N = 13604). All of those who responded at baseline and still residing in the county, were invited to follow-up after five and ten years. Out of 12117 respondents alive and still living in the region after 10 years, there were 8206, i.e. 67%, who also participated in the 2005 and 2010 inquiries.

The following inclusion criteria were applied for this particular study: a) age 54 or younger at baseline (since the exposure period was 1999/2000–2005, and the conventional age of retirement in Sweden is 65) (N = 5244); b) having reported working for a living in 1999/2000 or 2005, or at both occasions (N = 5757); and c) complete data from 1999/2000, 2005, and 2010 on being in a NDO (N = 3455), or in PE (N = 3089), and regarding the outcome measure, mental health (N = 7978). The following groups (measured at baseline) were excluded: those retired, on disability pension, or on long-term sick leave (N = 1548) and those who, in response to a question about self-rated risk of future unemployment, had answered that they did not wish to work a year from now (N = 342). The final study population consisted of 2331 persons, 1002 men and 1329 women.

### Outcome variable – poor mental health

Mental health was measured at all three time points of assessment, using the 12-item version of the General Health Questionnaire (GHQ-12). We used the 0-0-1-1 scoring method (range 0–12) recommended by the creators of the instrument, with poor mental health or ‘GHQ-caseness’ defined as a score of 2 or higher (Goldberg et al., 1997; Goldberg, Oldehinkel & Ormel, 1998).

### Non-desired occupation (NDO)

One question was asked at all three occasions with yes/no answer alternatives: ‘Is your current occupation the occupation you would like to have in the future?’ (Aronsson & Göransson, 1999). If the answer was no, the respondent was defined as having a non-desired occupation at that point.

### Precarious employment (PE)

We created a dichotomous variable based on a combination of data on present unemployment, episode of involuntary unemployment during the past three years (no/yes), currently temporarily vs. permanently employed, and perceived job insecurity, assessed with the question ‘How do you rate your own risk of involuntary unemployment within the coming year? (high, moderate, low, none) (Canivet et al., 2016). The following categories were created:

Non-precious employment:

- Permanent work and reporting no or low self-rated risk of future unemployment (regardless of previous unemployment episodes)
- Contingent work and reporting no self-rated risk of future unemployment and reporting no unemployment episode

Precarious employment (PE):

- All others with contingent work and/or moderate to high self-rated risk of future unemployment and/or affirmed unemployment episode
- Presently unemployed

See also Table 1.

In a sensitivity analysis, the underlying categories, i.e. contingent work, report of previous unemployment, moderate to high self-rated risk of future unemployment, and presently unemployed, were all tested separately versus ‘all others’, and all associations with poor mental health at baseline were positive and significant (chi square p values  $\leq 0.019$ ).

### Other variables

Three age groups were formed, 18–34, 35–44, and 45–54 years old (‘youngest’, ‘middle’ and ‘oldest’ age groups). Country of origin was recorded as ‘born in Sweden’ and ‘not born in Sweden’. Marital status was dichotomised as ‘married or cohabiting’ and ‘neither married nor cohabiting’. Education level at baseline was determined by the self-reported total years of formal education and dichotomised as ‘ $\leq 12$  years’ and ‘ $\geq 13$  years’. Socioeconomic status was categorised according to job title and work tasks, using the socioeconomic index (SEI) manual issued by Statistics Sweden (1982). Five groups were formed:

**Table 2**  
Sociodemographic and work-related characteristics of 2331 participants from the Scania Cohort, by age groups.

		18–34		35–44		45–54	
() = numbers missing		N	Valid %	N	Valid %	N	Valid %
Gender	Male	357	44.0	328	41.9	317	43.0
	Female	455	56.0	454	58.1	420	57.0
Born in Sweden	Yes	765	94.9	720	92.4	674	92.0
(13)	No	41	5.1	59	7.6	59	8.0
Married or cohabiting (baseline)	Yes	542	67.8	628	80.8	597	82.0
(27)	No	257	32.2	149	19.2	131	18.0
Education level (baseline)	≥ 13 y	409	50.7	399	51.4	355	48.7
(20)	≤ 12 y	397	49.3	377	48.6	374	51.3
Socioeconomic status (baseline)	Manual	346	45.2	282	38.4	228	32.9
(140)	Non-manual	419	54.8	452	61.6	464	67.1
Poor mental health (baseline)	No	593	73.0	586	74.9	603	81.8
	Yes	219	27.0	196	25.1	134	18.2
<b>Exposed to non-desired occupation (NDO), from 1999/2000 to 2005:</b>							
No – No		382	47.0	498	63.7	575	78.0
Yes – No		181	22.3	140	17.9	73	9.9
No – Yes		90	11.1	57	7.3	41	5.6
Yes – Yes		159	19.6	87	11.1	48	6.5
<b>Dichotomised:</b>							
No (at both times)		382	47.0	498	63.7	575	78.0
Yes (at least once)		430	53.0	284	36.3	162	22.0
<b>Exposed to precarious employment (PE), from 1999/2000 to 2005:</b>							
No – No		469	57.8	549	70.2	535	72.6
Yes – No		155	19.1	111	14.2	86	11.7
No – Yes		97	11.9	74	9.5	61	8.3
Yes – Yes		91	11.2	48	6.1	55	7.5
<b>Dichotomised:</b>							
No (at both times)		469	57.8	549	70.2	535	72.6
Yes (at least once)		343	42.2	233	29.8	202	27.4

non-manual workers on a ‘high’, ‘medium’, or ‘low’ level and manual workers on a ‘high’ or ‘low’ level (dichotomised as non-manual and manual in the multivariate analyses and in the interaction analyses).

The study was approved by the Regional Ethical Review Board at Lund University, Sweden (1999-99; 2005-471, and 2010-392).

#### Statistical methods

The relationships between background factors and poor mental health in 2010 are presented as percentages and age-adjusted incidence rate ratios (IRR), which is a good estimate of relative risks, using a modified Poisson regression model with robust standard errors (Zou, 2004). In the multivariate analysis, NDO is tested against the outcome with the stepwise addition of background factors (country of origin, gender, marital status, socioeconomic status), PE, and in the final step, poor mental health at baseline. The tests for effect modification were performed with simple dummy variables. The synergy indexes were calculated as proposed by Rothman (1986), according to which a synergy index > 1 indicates a synergistic effect, and a synergy index < 1 an antagonistic effect. The population attributable fractions (PAF) (i.e. the proportion of disease cases over a specified time that would be prevented following elimination of the exposures, assuming the exposures are causal) (Rockhill, Newman & Weinberg, 1998) for NDO and PE in poor mental health were calculated, separately in each age group, using the formula:  $PAF = pd \times (IRR - 1) / IRR$  (Rockhill et al., 1998) where  $pd$  is the proportion of cases exposed to NDO and PE, and IRR is the IRR for poor mental health, after full adjustment with the same covariates as in Table 4.

Two standard statistical analysis programs were used, i.e. SPSS version 22.0 and Stata version 12.

#### Results

The proportion of individuals with poor mental health in the study population decreased slightly over the follow-up period, with 24% GHQ-cases in 1999/2000, 23% in 2005, and 19.5% in 2010. As can be seen in Table 2, being exposed in 1999/2000 or in 2005 at least once to NDO, as well as being exposed at least once to PE, were both more common in the youngest age group than in the middle age group, which in turn were exposed to higher degrees than those in the ‘oldest age group’.

Table 3, with results from the entire group, confirmed that young age was related to poor mental health at follow-up in 2010, as was female gender. Both NDO and PE were related to the outcome. The age-adjusted IRR of the dichotomised version of NDO (i.e. NDO in 1999/2000 or 2005; yes vs. no) was 1.4 (1.2–1.6) and the corresponding figure for PE was 1.5 (1.2–1.7). However, there was no clear-cut tendency for a stronger relationship between poor mental health and being exposed twice (1999/2000 and 2005) vs. once.

In Table 4, NDO was tested against poor mental health in 2010, with forward stepwise addition of background factors, PE, and, finally, baseline poor mental health as the most important possible confounder. In the youngest group, the associations between NDO and PE on the one hand and poor mental health on the other hand each represented risk increases of approximately 40% (IRR 1.4 in the next-final steps). However, after adjusting for poor mental health at baseline, none of the associations in the youngest age group remained statistically significant.

In the middle age group, there was a weak association between NDO and poor mental health (IRR 1.0 in the final model), while the relationship between PE and poor mental health at follow-up remained

**Table 3**

Sociodemographic and work-related characteristics of 2331 participants from the Scania Cohort, in relation to the outcome poor mental health (defined as GHQ-caseness), measured in 2010.

() = numbers missing		N	Valid %	% cases poor mental health	IRR <sup>a</sup>	95% CI <sup>b</sup>
Age groups	18–34	812	34.8	23.8	1.7	1.4 – 2.1
	35–44	782	33.5	20.2	1.4	1.2 – 1.8
	45–54	737	31.6	14.0	1	.
	Total	2331	100.0	19.5		
Gender	Male	1002	43.0	16.2	1	
	Female	1329	57.0	22.0	1.4	1.2 – 1.6
Born in Sweden (13)	Yes	2159	93.1	19.2	1	.
	No	159	6.9	23.3	1.3	0.9 – 1.7
Married or cohabiting (baseline) (27)	Yes	1767	76.7	18.6	1	.
	No	537	23.3	22.2	1.1	0.9 – 1.3
Education level (baseline) (20)	≥ 13 y	1163	50.3	20.4	1	.
	≤ 12 y	1148	49.7	18.6	0.9	0.7 – 1.1
Socioeconomic status (baseline) (140)	Manual	856	39.1	18.5	1	.
	Non-manual	1335	60.9	20.2	1.2	0.97 – 1.4
Poor mental health (baseline)	No	1782	76.4	14.9	1	
	Yes	549	23.6	34.4	2.2	1.9 – 2.6
<b>Exposed to non-desired occupation (NDO), from 1999/2000 to 2005:</b>						
No – No		1455	62.4	16.4	1	.
Yes – No		394	16.9	26.4	1.5	1.2 – 1.8
No – Yes		188	8.1	20.2	1.2	0.8 – 1.6
Yes – Yes		294	12.6	25.2	1.4	1.1 – 1.8
<b>Dichotomised:</b>						
No (at both times)		1455	62.4	16.4	1	
Yes (at least once)		876	37.6	24.7	1.4	1.2 – 1.6
<b>Exposed to precarious employment (PE), from 1999/2000 to 2005:</b>						
No – No		1553	66.6	16.5	1	.
Yes – No		352	15.1	26.1	1.5	1.2 – 1.8
No – Yes		232	10.0	22.4	1.3	1.0 – 1.7
Yes – Yes		194	8.3	27.8	1.6	1.2 – 2.0
<b>Dichotomised:</b>						
No (at both times)		1553	66.6	16.5	1	
Yes (at least once)		778	33.4	25.4	1.5	1.2 – 1.7

<sup>a</sup> IRR, age-adjusted incidence rate ratio.

<sup>b</sup> CI, confidence interval.

statistically significant in the final model, with the IRR of 1.7 (1.3–2.3). The oldest age group showed the opposite pattern: the association with NDO was statistically significant; IRR 1.6 (1.1–2.4) also after full adjustment, while the association between the outcome and PE was weak.

It is in the oldest age group only that potential confounders, other than baseline mental health, retained statistically significant associations with poor mental health in the final step. The IRR for female gender was 1.7 (1.1–2.5) and for non-manual occupation 1.8 (1.1–3.0) in this group.

Analyses regarding the synergistic impact on mental health of exposure, at least once, to NDO and PE simultaneously, by age groups, gender, and socioeconomic status, are presented in Table 5. No synergy index was higher than 1.3, thus indicating a weak synergistic effect. In the oldest age groups, on the contrary, a SI of 0.4 suggested that simultaneous exposure to PE somewhat acted as a ‘buffering’ factor against the effect of NDO on mental health in this group. In an attempt to explain this finding, further analyses were performed. Both NDO and PE were more common in workers vs. in employees in all age groups (data not shown). Since non-manual occupation was independently associated with poor mental health in the oldest group, while not so in the young or middle age groups (see Table 4), socioeconomic status was also entered in the interaction analysis described above, whereby the synergy index increased from 0.4 to 0.7.

The population attributable fractions of NDO and PE in poor mental health are presented in Table 6.

## Discussion

In this study, we firstly investigated the prevalence of non-desired occupation (NDO) and precarious employment (PE) in 1999/2000 and in 2005 in a general population-based sample active in the labour market, and the impact of these two factors on mental health in 2010. In order to view these within a life-course perspective, results were presented separately for three age groups; 18–34 years, 35–44 years, and 45–54 years, respectively.

As expected, both NDO and PE were more prevalent in the youngest age group: in fact, NDO (at least once in 1999/2000 or 2005) was affirmed by 53% of the individuals in this group, and PE by 42.2%. In the middle age group both factors were less prevalent (36.3 and 29.8%, respectively), with a further decrease in the oldest age group (22.0 and 27.4%, respectively). These findings corroborate earlier studies. In the original survey by Aronsson & Göransson (1999), the proportion of cases of non-preferred occupation declined steadily with advancing age. Precarious employment also tended to be less prevalent among strata in the older work force in a large Spanish study (Vives et al., 2011). A Eurofound survey from 2015 found that the temporary employment rates were highest among the youngest employees and decreased gradually until employees were in their fifties (Eurofound, 2015). Still, more than a quarter of the respondents in the oldest age group in our study reported PE at least once.

Our second and main aim was to investigate the impact of NDO and PE on mental health. The results are in general concordance with other studies that have shown associations between poor mental health and PE (Yoo et al., 2016; Benach et al., 2014) and between poor mental



**Table 4**

Incidence rate ratios (95% confidence intervals) of poor mental health, defined as GHQ-caseness, at follow-up in 2010, in different age groups, and in relation to non-desired occupation (NDO) in 1999/2000 or 2005, with forward stepwise addition of sociodemographic factors, precarious employment (PE) in 1999/2000 or 2005, and poor mental health in 1999/2000. Scania Cohort; N = 2166.

Age group			Model 1 <sup>a</sup>		Model 2 <sup>b</sup>		Model 3 <sup>c</sup>		Model 4 <sup>d</sup>	
			IRR <sup>e</sup>	95% CI <sup>f</sup>	IRR	95% CI	IRR	95% CI	IRR	95% CI
18–34	NDO	Yes vs. no	1.4	1.1 – 1.8	1.5	1.1 – 2.0	1.4	1.1 – 1.9	1.3	0.99 – 1.8
	Gender	Female vs. male			1.3	1.02 – 1.8	1.3	1.0 – 1.7	1.2	0.9 – 1.6
	Married/cohabiting	No vs. yes			1.0	0.8 – 1.3	1.0	0.7 – 1.3	0.9	0.7 – 1.2
	Born in Sweden	No vs. yes			1.0	0.6 – 1.8	1.0	0.5 – 1.8	1.0	0.5 – 1.8
	Socioeconomic status	Non-manual vs. manual			1.0	0.8 – 1.3	1.0	0.8 – 1.4	1.0	0.8 – 1.3
	PE	Yes vs. no					1.4	1.1 – 1.8	1.3	0.97 – 1.8
	Poor mental health	Yes vs. no							1.9	1.4 – 2.4
35–44	NDO	Yes vs. no	1.2	0.9 – 1.6	1.2	0.9 – 1.5	1.1	0.9 – 1.5	1.0	0.7 – 1.4
	Gender	Female vs. male			1.1	0.8 – 1.5	1.1	0.8 – 1.5	1.1	0.8 – 1.5
	Married/cohabiting	No vs. yes			1.0	0.7 – 1.4	0.9	0.7 – 1.3	0.9	0.7 – 1.3
	Born in Sweden	No vs. yes			1.9	1.3 – 2.9	1.9	1.3 – 2.8	1.8	1.2 – 2.6
	Socioeconomic status	Non-manual vs. manual			1.3	0.9 – 1.7	1.4	1.01 – 1.9	1.3	0.95 – 1.7
	PE	Yes vs. no					1.8	1.3 – 2.4	1.7	1.3 – 2.3
	Poor mental health	Yes vs. no							2.1	1.6 – 2.8
45–54	NDO	Yes vs. no	1.6	1.1 – 2.3	1.9	1.3 – 2.7	1.9	1.3 – 2.8	1.6	1.1 – 2.4
	Gender	Female vs. male			1.7	1.1 – 2.6	1.7	1.1 – 2.6	1.7	1.1 – 2.5
	Married/cohabiting	No vs. yes			1.3	0.9 – 2.0	1.3	0.9 – 2.0	1.3	0.8 – 1.9
	Born in Sweden	No vs. yes			0.9	0.4 – 1.9	0.9	0.4 – 1.9	0.8	0.4 – 1.6
	Socioeconomic status	Non-manual vs. manual			2.1	1.3 – 3.4	2.1	1.3 – 3.4	1.8	1.1 – 3.0
	PE	Yes vs. no					0.9	0.6 – 1.4	0.9	0.6 – 1.4
	Poor mental health	Yes vs. no							2.2	1.5 – 3.2

<sup>a</sup> Model 1: Unadjusted.

<sup>b</sup> Model 2: Model 1 + Adjusted for Gender, Married/Cohabiting, Country of origin, and Socioeconomic status (baseline values).

<sup>c</sup> Model 3: Model 2 + Adjusted for PE in 1999/2000 or 2005.

<sup>d</sup> Model 4: Model 3 + Adjusted for poor mental health at baseline.

<sup>e</sup> IRR, incidence rate ratio.

<sup>f</sup> CI, confidence interval.

**Table 5**

Interaction analyses, by age groups, gender, and socioeconomic status, with synergy indices, regarding exposure, at least once, to non-desired occupation (NDO) and precarious employment (PE) in 1999/2000 and 2005, and poor mental health in 2010. Scania Cohort; N = 2133.

a. By age groups									
Exposures	IRR	18–34		SI	35–44		SI	45–54	
		IRR	95% CI		IRR	95% CI		IRR	95% CI
None	1			1			1		
NDO only, never PE	1.3	0.9 – 1.9		1.1	0.7 – 1.7		1.8	1.1 – 3.1	
PE only, never NDO	1.5	0.97 – 2.2		1.7	1.2 – 2.5		1.1	0.6 – 1.8	
Both NDO & PE	1.9	1.4 – 2.7	1.1	1.9	1.3 – 2.7	1.2	1.4	0.8 – 2.6	0.4
a. By gender									
Exposures	IRR	Female		SI	Male		SI		
		IRR	95% CI		IRR	95% CI			
None	1			1					
NDO only, never PE	1.5	1.1 – 2.0		1.4	0.9 – 2.1				
PE only, never NDO	1.3	0.95 – 1.8		1.9	1.2 – 2.8				
Both NDO & PE	1.8	1.4 – 2.3	1.0	2.5	1.7 – 3.5	1.2			
a. By socioeconomic status (missing = 140)									
Exposures	IRR	Non-manual		SI	Manual		SI		
		IRR	95% CI		IRR	95% CI			
None	1			1					
NDO only, never PE	1.3	1.0 – 1.7		1.9	1.2 – 2.9				
PE only, never NDO	1.5	1.1 – 2.0		1.4	0.8 – 2.3				
Both NDO & PE	1.8	1.4 – 2.4	1.0	2.7	1.8 – 3.9	1.3			

**Table 6**  
Population attributable fraction (%) of poor mental health at follow-up in 2010, for exposure to non-desired occupation (NDO) and precarious employment (PE) in 1999/2000 or 2005, by age group.

Age group	NDO	PE
18–34	14.2	12.2
35–44	- <sup>a</sup>	17.2
45–54	11.6	- <sup>a</sup>

<sup>a</sup> Did not contribute to increased burden of poor mental health in this age group.

health and NDO (Aronsson & Göransson, 1999; Muhonen, 2010; Sandmark & Renstig, 2010). However, to our knowledge, this is the first study since the work by Aronsson (Aronsson et al., 2000) that investigates the simultaneous effect of these two labour market factors and examines age-related patterns in this respect, i.e. viewing these labour market mechanisms in a life-course perspective.

We found that the effect of NDO and PE differed markedly across the age groups, e.g. exposure to those labour market situations had a differential meaning, depending on the stage in the job career among our respondents. Both NDO and PE seemed to have comparatively weaker negative effects on mental health among the young than in the other age groups. In this study, all respondents had worked at least during one of the data collection time points. It may thus be that those not in education nor employment (NEET group) are underrepresented. Instead, our results may paint the picture for those who were healthy enough to get employed and willing to compromise employment security or occupational preferences for establishing themselves on the labour market. Therefore, our results do not necessarily contradict the finding that unemployment can have detrimental effects for young workers (Vancea & Utzet, 2017). Rather, our findings add to the picture, as well as they make clear that several factors seem to operate in a complex manner, which would need to be taken into account when comparing studies from different times and places and using different types of labour market exposures. For instance, the effect of potentially buffering factors such as labour market policies or the extent of social insurance could vary by context and cohort. In a different line of thinking, a ‘scarring’ effect of unemployment in youth has been proposed as an explanation for why the difference in mental health between those who had been exposed to labour market insecurity and those who had not, tended to become more pronounced over time in two other studies (Daly & Delaney, 2013; Strandh, Winefield, Nilsson & Hammarstrom, 2014).

Over-qualification, i.e. a mismatch between the time and financial resources spent in education and the availability of employment at a corresponding level, is more frequent among young people (Quintini, 2011), and this could become a more important source of NDOs in the future. A recent Italian study presenting results from a large-scale, nationally representative survey of young people showed that poor mental health was strongly related to poor employment security, i.e. the causal model should acknowledge the possibility of bi-directional causation (Fiori, Rinesi, Spizzichino & Di Giorgio, 2016). Moreover, the strength of the (cross-sectional) association had increased between the two assessment time points in 2005 and 2013. The authors pointed out that both insecure employment and poor mental health are steadily rising in frequency, which in theory could imply a self-amplifying causal mechanism in the form of a ‘vicious spiral’, although driven by the increase of precarious employment situations in the globalised economy.

In the middle age group, NDO had no impact on mental health, while PE was associated with a 70% (after full adjustment) higher risk of poor mental health at follow-up. This pattern was reversed in the oldest group in our study, where the risk of poor mental health at follow-up was increased by 60% in those exposed to NDO at least once,

and where exposure to PE entailed no risk increase.

The clear discrepancy in susceptibility patterns between the middle and the oldest age groups was not an expected finding, and we can only speculate on its causes. PE was almost as frequent in the oldest age group as in the middle age group, but at this point in life, the participants may have acquired an economic stability, leading to less vulnerability to the consequences of precarious employment on mental health. One might imagine that PE could be a more direct threat to the general life situation for people in middle-age than for persons by the end of their career, if for no other reason than that persons in this age group often are economically responsible for children living at home.

NDO was related to poor mental health in the oldest age group. It is conceivable that finding oneself in the ‘wrong’ occupation could involve a desire to withdraw from a physically or mentally demanding job, without daring to do so because of a perceived sense of low employability towards the approaching end of one’s vocational career. Unfortunately, we lacked a measure of perceived employability in this study, preventing us from testing this hypothesis.

The analysis of interaction between NDO and PE represents an important additional approach for gaining information concerning the causal mechanisms discussed in this study, e.g. regarding the different patterns of impact of NDO and PE on mental health in the different age groups. We found no indication of a strong synergistic effect on mental health regarding simultaneous exposure to NDO and PE; the effect of simultaneous exposure was essentially additive. This supports the notion that the underlying causal mechanism might be similar, e.g. a loss of control, since synergy presupposes two different causal mechanisms, which could interact synergistically. The somewhat intriguing finding in the oldest group of a tendency of a ‘buffering’/antagonistic effect of simultaneous exposure could be explained by a three-way interaction with socioeconomic status. However, we were unable to explore this further due to sample size limitations. As was shown in Table 4, non-manual occupation was independently associated with poor mental health in the oldest group only. Hence, it appears as if having ‘ended up’ in an NDO when entering the later part of one’s career may be more deleterious for those in non-manual occupations. It has been pointed out that the social gradient of the effect of psychosocial work factors on mental health is less clear and uniform (Laaksonen, Rahkonen, Martikainen & Lahelma, 2006; Hammig & Bauer, 2013; Stadin et al., 2016) than other work-related factors that link low social class to adverse health (Marmot, 2006). One could speculate that if these individuals worked in high-strain non-manual occupations, they might be more susceptible to the previously discussed situation where a sense of ‘loss of control’ will emerge when the individual dares not attempt to find a less taxing job because of perceived low employability. An alternative explanation could be that some individuals in the oldest age group had chosen to leave their secure employment in favour of a precarious employment situation in order to escape from a strained job situation. If so, this change of occupation or workplace may have reduced the risk of adverse mental health outcome, even when accounting for the potential effect of their new PE status.

Female gender was an independent risk factor for poor mental health in the oldest, but not the other age groups. One could speculate that this seemingly increased relative importance of ‘clear’ labour market factors versus gender with increasing age, may be related to a generally increasing female workforce participation over time.

PE, and partly so NDO, can be seen as reflecting different consequences of the globalised and deregulated labour market, and they are both common phenomena in the population. Therefore, their contribution to poor mental health may be considerable. Vives et al. in 2011 found that, according to the population attributable fraction calculations, and assuming the relationship is causal, 23% of poor mental health cases in the Spanish waged-working population would not have occurred without the presence of precarious employment (Vives et al., 2011). The corresponding figures in our study were lower,

but still substantial, with 14.2% and 12.2% for NDO and PE in the youngest age group, 17.2% for PE in the middle age group, and 11.6% for NDO among the oldest.

### Strengths and limitations

The main strengths of our study are the longitudinal design with three measurement points over a time span of a decade involving a large number of randomly invited individuals from the general population and the adjustment for a number of relevant potential confounders. Since we cannot exclude reverse causation, i.e. poor mental health being the reason why people end up in non-desired work positions, we adjusted for baseline mental health. An additional strength is the analysis of interaction between the two main exposures, which yielded valuable information concerning the causal mechanisms. The most important limitation might be the loss of individuals inherent in a panel design, which most likely would lead to an underestimation of the found effects, since individuals with poor health and social marginalisation are less prone to participate in this type of study. Adjusting for poor mental health at baseline could also yield an underestimation of the effects, since poor mental health could be caused by exposure to PE and NDO before baseline. Using the third follow-up only for assessing the outcome has the advantage of reducing dependent misclassification, but it introduces most likely an element of predominantly non-dependent misclassification, since the exposure status might have changed over the last five years. This would also lead to an underestimation of the real effects of those exposures. Thus, we assume that there could be several factors that might lead to an underestimation of the true impact of NDO and PE on mental health. Another important limitation is the lack of a measure of perceived employability, which could have been helpful to shed more light on the involved mechanisms.

### Conclusions

Although the occurrence of NDO and PE both diminished with increasing age, their impact on mental health varied considerably over age. Thus, we found moderate associations with both factors in youth, and strong associations with PE in the middle age group. However, PE could not be linked to impaired mental health in the oldest age group, while, unexpectedly, NDO showed a strong negative effect in this age group. A possible interpretation of the latter finding is that, due to fear of not being able to obtain another employment, some individuals approaching the end of their vocational career may hesitate to leave a secure employment situation, despite its negative impact on their mental health. Interventions could therefore be aimed at adapting work situations for individuals approaching their end of working life and supporting older individuals to shift job without risking unemployment or a precarious employment situation.

### Conflict of interest

The authors declare that they have no conflicting interests.

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