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Employment Contracts: Cross-sectional and Longitudinal Relations with Quality of Working Life, Health and Well-being

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Abstract: Employment Contracts: Cross-sectional and Longitudinal Relations with Quality of Working Life, Health and Well-being: Michiel KOMPIER, *et al.* Department of Work and Organizational Psychology, Behavioural Science Institute, Radboud University Nijmegen, The Netherlands—**Objectives:** The aim of this study was to enhance (i) insight in the relationship between different types of employment contract and the quality of working life, health and well-being, and (ii) our causal understanding of these relationships by comparing employees whose contract type changes across time. **Methods:** Analyses were based on a two-year prospective cohort study. Cross-sectional analyses were based upon a sample of 2,454 Dutch employees (2004). Longitudinal data were available for 1,865 respondents (2004–2006). We distinguished among 5 contract types, and subgroups of 'Upward' (i.e., towards permanent employment) and 'Downward' (towards temporary employment) movers across time. Data were analysed with analysis of variance and cross table analysis. **Results:** Cross-sectionally, we found differences between contract types in quality of working life: generally permanent employees had better jobs, whereas temporary agency workers and on call workers had more 'bad work characteristics'. We also found a difference in health behaviour (smoking) and that psychological health was worst among temporary agency workers. In longitudinal analyses we found some evidence that a positive change in employment contract was associated with a better quality of working life and better psychological health, whereas the opposite was true for a negative contract change. **Conclusions:** The quality of working life, health and well-being are unequally distributed over employment contract groups. Temporary agency workers and on-call workers deserve special attention in terms of job design and human resource management.
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Currently 22% of the European workforce has no permanent contract, as compared to 14% in 1991[1)]. The growth of temporary, short-term employment since the 1980s is one of the most striking developments in Western working life[2)]. It has stimulated occupational health researchers to study the consequences of this shift towards flexible labour on the quality of working life and worker health and well-being[2–6)]. Many of these studies into the health effects of temporary employment and job insecurity distinguish core jobs and core employees from more peripheral jobs and employees. This distinction stems from labour segmentation theory, which poses that the labour market consists of various segments with different employment characteristics[5, 7)]. According to this theory, primary segment jobs (core jobs) are central to organizations and require higher levels of job-specific skills, pay and job security than jobs in the secondary segment. These latter jobs are more peripheral and more precarious, with lower levels of training and skills, less pay, a less attractive job content and worse working conditions, and less job security.

According to labour market segmentation theory, one would expect that these secondary jobs would have a worse quality of working life and that their incumbents would report a worse health and well-being compared to the primary jobs. Many studies have been conducted in this area (see, for overviews,[2–6)]). According to the latter of these reviews there is 'strong evidence that job insecurity adversely affects psychological health and also evidence of increases in poor self-reported physical health, workplace injuries and accidents, sickness absence, and health service use'[6)]. Also, temporary

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workers generally have poorer mental and physical health, including increased premature mortality, in the long term[6]. In another meta-analytic review of 27 empirical studies, Virtanen and co-workers[5] arrived at a comparable conclusion, i.e. there is an association between temporary employment and psychological morbidity.

In spite of these conclusions there are also studies reporting null findings or opposite findings[2, 8]. Therefore more research is still needed before more precise conclusions can be made about the relationship between temporary employment and health[5]. We believe explanations for the lack of consistency of research findings fall into two broad classes: (i) conceptual and (ii) methodological issues. The main conceptual issue is that the category 'temporary' (or peripheral) is not homogenous. For example, temporary agency and on-call workers typically occupy precarious positions that are peripheral to the organization and, thus, usually have low employment stability. Other employees may have been appointed on fixed-term contracts that last for several years or may be serving a probationary period that will be followed by a permanent appointment. These workers have temporary contracts which differ greatly with regard to the stability and future prospects of their employment relation[9]. Thus, differences in the conceptualization of 'non permanency', and, accordingly, in the composition of samples of temporary workers may account for the divergent findings regarding quality of working life and well-being.

As to methodological issues, this research area is plagued by a flux of cross-sectional, i.e. one point of time, studies. Clearly there is a need for longitudinal study designs and follow-up data that take into account the health effects over time and changes in employment status[4, 5, 10, 11].

Against this applied and theoretical background, the aim of the current study is twofold. First we aimed to enhance insight into the relationship between different types of employment contract and the quality of working life and health and well-being, by comparing five different contract types instead of a crude permanency-temporary dichotomy. Following Virtanens' recommendation to develop a consistent definition of different types of temporary employment and to systematically sample workers with this definition[5], we distinguish among: employees (i) with a permanent contract, (ii) with a temporary contract but with prospect of permanent employment, which we label a semi-permanent contract, (iii) with a fixed term contract without prospect of permanent employment, (iv) with temporary agency work, and (v) on-call work. Our second aim was to enhance our causal understanding of the interrelations between contract type, work characteristics and health and well-being by comparing employees whose employment contract changes over time, either for better (i.e. become less peripheral, more stable) or for worse (i.e. become more peripheral, less stable). Based on labour market segmentation theory we assumed that employees with permanent contracts would have the best quality of working life, whereas temporary agency employees and on-call workers would have the worst (hypothesis 1); that employees with permanent contracts would report the best health and well-being, whereas temporary agency employees and on-call workers would report the worst (hypothesis 2). We also hypothesized that a contract change for the better would be accompanied by a better quality of working life and better health and well-being (hypothesis 3), whereas a negative contract change (less stable) would be accompanied by a decrease in the quality of working life and health and well-being (hypothesis 4).

These hypotheses are tested in the context of the Study on Health at Work (SHAW[12]), a two-year prospective questionnaire study among a large and representative sample of the Dutch work force.

Subjects and Methods

Sample

The sample was chosen out of an online respondent panel of Intomart / GfK and selected to represent the Dutch working population, exclusive of self-employed people. At baseline (May 2004), 3,100 members were invited to participate in this survey via email. A total of 2,502 participants completed the base-line questionnaire (80% response rate). At the follow-up measurement (2006) 1,921 participants returned the questionnaire. The first cross-sectional part of this study is based upon an effective sample of 2,454 employees from the baseline survey (2004; 56.2% male; average age at baseline was 39.5 years, SD=11). Complete longitudinal data were available for 1,865 respondents (76%, i.e. 24% loss to follow up). Loss to follow up varies from 23% (permanent workers) to 30% (temporal agency workers) and did not differ between contract type groups. The study was approved by our local Institutional Review Board.

Measures

1) Employment contract type

There were five answer alternatives to the question '*In which kind of employer-employee relationship do you work?*': 1=permanent contract; 2=temporal contract with the chance of receiving a permanent contract ('semi permanent contract'); 3=temporal contract without the chance of receiving a permanent contract ('temporal without prospect'); 4=temporary agency contract; and 5=on-call contract.

2) Personal characteristics: age, sex, level of education

Age (in years) and *sex* were recorded (1=men;

2=women). *Level of education* had 5 levels: 1=primary education or lower education; 2=lower vocational education; 3=secondary education or middle vocational education; 4=higher vocational education; 5=college/university education.

3) Quality of working life: working hours, overtime, psychosocial work characteristics, physical work load

We recorded *number of contractual work hours* (1 item: '*How many contractual work hours per week?')*, and *weekly number of actual work hours (including overtime). Number of weekly overtime hours* was calculated as the difference between these two variables. We also calculated the percentage of overtime workers (yes/no) in each contract group.

Psychosocial work characteristics. *Pace of work* (4 items, coefficient α was 0.79) and *autonomy* (4 items, α was 0.81) were measured by using items from[13] (e.g. '*Do you have to work quickly?*'; '*Do you decide on your own when to deal with a task?*'). *Emotional work load* was assessed by 3 items (e.g. '*Do you get emotionally affected by your work?*'; α was 0.78), derived from the Copenhagen Psychosocial Questionnaire[14]. All scales were assessed on a 4-point Likert scale from 1 (never) to 4 (always). *Social support from supervisor* and *Social support from colleagues* were each measured with 4 items (e.g. '*My supervisor shows interest in my opinion*'; and, '*My colleagues seem to be interested in me as a person*'). We calculated mean scores for each scale with answer alternatives ranging from 1 (fully disagree) to 5 (fully agree). Cronbach's α coefficients were 0.89 and 0.82, respectively. We also assessed *Supervisory tasks* (1 item: '*Do you supervise colleagues?*'[13]). We used 3 answer categories: 0=no supervisory tasks; 1=supervise 1–4 colleagues; 2=supervise more than 4 colleagues.

Physical work load was assessed by using 5 items[13]. Two items addressed *dynamic work load* (α=0.85) ('*Carry more than 5 kilos weight during work*'; '*Force exertion with arms/hands*'). We also measured *Repetitive work (Making same arm/hand movements, excluding computer work* (1 item); *Static work load* ('*Working in the same position for a long time*') (1 item); and *Computer work* ('*Working behind computer screen or with computer*') (1 item). Answer alternatives ranged from 1 (never) to 5 (6–8 h a day). Please note that for all of the psychosocial and physical work characteristics higher scores reflect more of the phenomenon under study, i.e. higher work pace, higher support, higher static work load etc.

4) Health: Health behaviour, musculoskeletal complaints, general health

Health behaviour was assessed through two questions from the National Health Test 2003[15].

Physical exercise was recorded by asking the respondents how many week days they exercised 20 min intensively (item 1) and/or minimum 30 min moderately per day (item 2): answer alternatives from 0 (days) to 7 (days per week). According to the Dutch combination-norm[15] those respondents who exercised three days or more for 20 min intensively and/or who exercised five days or more 30 min or more moderately per day were norm-fit, whereas the others did not achieve the exercise-standard.

Smoking was assessed by asking the respondents whether they were a smoker (1) or non-smoker (2). Smokers were asked their daily cigarette consumption. *Alcohol consumption* was measured by asking the respondents how many glasses of alcohol they drank per week, including 0. The *usage of medication* was assessed by a self-developed question ('*Do you take medications which are prescribed by a doctor?*') which was recoded into 2 categories: 1=yes, taking medication prescribed by a doctor; 2=not taking medication prescribed by a doctor.

Complaints of the musculoskeletal system: we recorded 5 symptoms (complaints of neck, shoulder, arm/elbow, hands/wrist and back), five answer alternatives were possible: 1=never; 2=sometimes, but short-lived; 3=sometimes, but permanent; 4=often, but always short-lived; 5=often and permanent. Cronbach's alpha was 0.77 (2004-data).

Our self-report question about the *general health* of the respondents stems from[15] ('*How would you describe your general health on average?*'). Answer alternatives were: 1 (excellent); 2 (very good); 3 (good); 4 (moderate); 5 (bad).

5) Well-being: work engagement, depression, emotional exhaustion and work satisfaction

Work engagement was measured through 4 items (e.g. '*I am enthusiastic regarding my work*') from the subscale 'Dedication' from the UBES[16]. There were 5 answer possibilities on a Likert scale from 1 (never) to 5 (always).

Symptoms of depression were assessed with the CES-D10 scale[17] (10 items, e.g. '*I have feelings of depression*'). Respondents responded on a 4-point scale whether statements were true in the previous week: 1=max. 1 day; 2=1 to 2 days; 3=3 to 4 days; 4=5 to 7 days.

Emotional exhaustion was measured through the 5 emotional exhaustion items from the Utrechtse Burnout Schaal (UBOS[18]) (e.g. '*I feel mentally burnt out*'). Answer alternatives were 1=never; 2=sometimes per year or fewer; 3=sometimes per month; 4=sometimes per week; 5= almost every day.

General satisfaction with work was measured by a question about work satisfaction from[13] ('*To what extent are you —all in all— satisfied with your work?*'). Answer alternatives ranged from 1 (very unsatisfied) to 5 (very

satisfied). Please note that for all four well-being indicators higher scores reflect more of the phenomenon under study, i.e higher work engagement, more depressive symptoms, more emotional exhaustion, and more general work satisfaction.

Statistical analyses

In order to test hypothesis 1 (employment contract groups have different quality of working life) and hypothesis 2 (different health and well-being) we distinguished between five groups (2004 data). Group 1 had a permanent contract (N=1,973, 80.4%), Group 2 had a semi permanent contract (N=149, 6.1%). Group 3 had a temporal contract without prospect (N=150, 6.1%). Group 4 worked for a temporary agency (N=56, 2.3%), and Group 5 had an on call contract (N=126, 5.1%). We conducted analyses of variance using the type of employment contract as independent variable and (i) personal, (ii) quality of working life, (iii) health and (iv) well-being variables as dependent variables. By using pair-wise comparisons (Tukey's least significant difference tests), we investigated which contract groups differed from each other ($p<0.01$). For health and well-being indicators, analyses were first conducted without controlling for the employees' age, and then controlling for this variable. For categorical variables χ^2 tests were conducted.

In order to test hypothesis 3 (upward contract change accompanied by better quality of working life, health and well-being) and hypothesis 4 (downward change accompanied by worse quality of working life, health and well-being), employees were categorized into different change groups. The first group consists of all employees with a 'better' (more stable) employment contract at the second point of time (2006) compared to the first point of time (2004), called 'Upward movers' (N=235). The second group includes all employees with a 'worse' (less stable) employment contract at the second point of time (2006). These employees are called 'Downward movers' (N=152).

The group of 'Downward movers' includes various types of contract change: from permanent to semi-permanent, from temporary agency workers to on call worker, from 'with prospect' to 'without prospect', *etc*. Similarly, the group of 'Upward movers' also includes all kinds of transitions, from temporary agency worker to permanent worker, from on call employee to temporary agency worker, *etc*. Therefore, in order to obtain a more detailed picture, two more homogeneous subgroups were created. The first, a subgroup of 'Upward movers', consists of those moving out of a temporary agency contract or out of an on call contract into a 'better' contract at the second point of time ('Out of Temp/On call') (N=84). The second group, a subgroup of the 'Downward movers', consists of those employees moving into a temporary agency contract or an on call contract in the course of time ('Into Temp/On-call') (N=58).

We first considered potential baseline differences: To determine if these upward and downward changing employment groups differ from each other at the first point of time (2004), i.e. before the actual change, analyses of variance were performed, using the different personal, quality of working life, health and well-being variables as 'dependent' variables.

Next, we considered over time differences (hypothesis 3 and 4). Longitudinal data were analyzed using two 2 × 2 repeated measure analyses of variance with Group ('Upward movers' versus 'Downward movers', respectively 'Out of Temp/On call' versus 'Into Temp/On call') as between-subject factor and Time (T1: 2004 and T2: 2006) as within-subject factor.

Results

Personal characteristics

The five contract groups differed with respect to gender ($\chi^2(4)=55.39$, $p<0.001$), age ($F(4, 2449)=89.81$, $p<0.001$), and education ($F(4, 2449)=6.72$, $p<0.001$). There were more men (59%) than women (40.5%) with a permanent contract. Compared to men, about twice as many women worked in temporary agency contracts (64% vs. 36%) and on call contracts (68% vs. 32%). Permanent employees (41.4 yr) were older than workers in other contract groups (average ages 30–33). (Semi)Permanent employees and 'without prospect' employees were better educated than temporary agency and on-call employees.

Quality of working life (hypothesis 1)

The groups differed with respect to number of contractual hours worked (Table 1). Permanent and semi-permanent workers worked longer hours per week, whereas, not unsurprisingly, on call workers worked the least hours. On average the respondents reported working four weekly overtime hours (no significant between group differences). However, the percentage of overtime workers differed among the contract groups: it was highest among (semi) permanent employees and lowest among temporary agency workers. There were also differences with respect to psychosocial work characteristics: Permanent workers reported a higher work pace than temporary agency and on call workers, and more autonomy than any other group. Temporary agency workers reported less autonomy than any other contract group. Permanent employees held more supervisory tasks than all other contract groups. The groups do not differ with respect to social support from co-workers and supervisors. Contract groups differ with respect to dynamic work load (temporary agency workers > permanent employees/semi permanent employees), repetitive work (temporary agency workers > all other contract groups), static work load (least among on call

Table 1. Employment contract group and quality of working life

Type of contract [a]	Contractual work hours	Overtime hours/ % yes	Pace of work [b]	Autonomy [b]	Emotional workload [b]	Support supervisor [b]	Support colleagues [b]	Supervisory tasks [b]	Dynamic workload [b]	Repetitive work [b]	Static workload [b]	Computer work [b]
	Mean(SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
1	32.2$^{(3/4/5)**}$ (9.7)	4.2 (6.4) 58.3%	2.4$^{(4)*(5)**}$ (0.6)	3.0$^{(2)*(3/4/5)**}$ (0.6)	1.7 (0.6)	3.4 (0.9)	4.0 (0.7)	1.4$^{(2/3/4/5)**}$ (0.5)	1.6$^{(4)*}$ (0.9)	1.9$^{(4)**}$ (1.2)	2.7$^{(5)**}$ (1.4)	3.0 $^{(5)**}$ (1.4)
2	30.4$^{(3/5)**(4)*}$ (10.2)	3.3 (5.4) 59%	2.3 (0.5)	2.9$^{(1)*(4)**}$ (0.7)	1.7 (0.6)	3.6 (0.8)	4.1 (0.7)	1.2$^{(1)**}$ (0.4)	1.6$^{(4)*}$ (0.9)	2.0$^{(4)*}$ (1.3)	2.8$^{(5)*}$ (1.4)	3.0$^{(5)**}$ (1.5)
3	26.2$^{(1/2/5)**}$ (12.5)	3.1 (5.2) 47.3%	2.3 (0.6)	2.8 $^{(1/4)**}$ (0.7)	1.7 (0.7)	3.5 (0.9)	4.0 (0.7)	1.2 $^{(1)**}$ (0.4)	1.6 (0.8)	2.0 $^{(4)*}$ (1.3)	2.7 (1.4)	2.8 $^{(5)**}$ (1.6)
4	25.2$^{(1/5)**(2)*}$ (13.6)	2.8 (5) 34.1%	2.2$^{(1)*}$ (0.6)	2.4$^{(1/2/3)**(5)*}$ (0.7)	1.6 (0.6)	3.2 (1.1)	3.9 (0.7)	1.1$^{(1)**}$ (0.4)	2.0$^{(1/2)*}$ (1.2)	2.6$^{(1)\ **\ (2/3/5)*}$ (1.5)	3.0$^{(5)**}$ (1.5)	2.6 (1.6)
5	13.0 $^{(1/2/3/4)**}$ (11.2)	2.0 (10.4) 38.0%	2.2$^{(1)**}$ (0.6)	2.8$^{(1)**\ (4)*}$ (0.7)	1.6 (0.7)	3.5 (0.8)	3.9 (0.7)	1.1$^{(1)**}$ (0.3)	1.8 (0.9)	1.9$^{(4)*}$ (1.1)	2.3$^{(2)*(1/4)**}$ (1.3)	2.1$^{(1/2/3)**}$ (1.4)
Total sample	31.1 (10.5)	4 (6.4) 56.8%	2.4 (0.6)	3 (0.7)	1.7 (0.6)	3.4 (0.9)	4 (0.7)	1.4 (0.5)	1.6 (0.9)	1.9 (1.2)	2.7 (1.4)	3 (1.5)
F–values/ χ^2	*F*(4,2278)= 62.99**	*F*(4,2228)= 3.025, ns χ^2(df=4, N=2,233) = 22.46**	*F*(4,2449)= 7.71**	*F*(4,2449)= 21.46**	*F*(4,2449)= 3.14, ns	*F*(4,2060)= 2.28, ns	*F*(4,2218)= 1.38, ns	*F*(4,2449)= 25.85**	*F*(4,2449)= 2.87, ns	*F*(4,2449)= 4.39*	*F*(4,2449)= 4.45*	*F*(4,2449)= 13.19**

Average scores (standard deviations: SD) for total sample and for each of 5 contract groups. The F-test represents the overall group effect as deviation from the grand mean. The group numbers given in parentheses display differences between that particular contract group with other contract groups. [a] 1=permanent employees; 2=semi-permanent employees; 3=temporal employees without prospect; 4=temporary agency workers; 5=on-call workers. [b] = Higher scores reflect more of the phenomenon under study; i.e. higher work pace, more autonomy, *etc.* *=p<0.01, **=p<0.001, ns=not significant. $^{(1/2/3/4/5)}$=significant difference (Tukey's lsd-test) between the average score for the particular group and another contract group (in brackets).

Table 2. Employment contract group and well-being

Type of contract	Engagement (1–5) [b]		Depression (1–4) [b]		Emotional exhaustion (1–5) [b]		General work satisfaction (1–5) [b]	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
1 Permanent	$3.9^{(4/5)**(3)*}$	(0.8)	$1.5^{(4)**(3)*}$	(0.4)	2.0	(0.8)	$3.9^{(4)**}$	(0.9)
2 Semi permanent	$3.9^{(4/5)**}$	(0.8)	$1.5^{(4)*}$	(0.4)	2.0	(0.7)	$4.0^{(4)**}$	(0.8)
3 Temporal without prospect	$3.6^{(1/4)*}$	(0.8)	$1.6^{(1)*}$	(0.5)	2.2	(0.9)	$3.8^{(4)*}$	(0.9)
4 Temporary agency	$3.3^{(1/2)**(3)*}$	(1.1)	$1.7^{(1)**(2)*}$	(0.5)	2.1	(0.9)	$3.4^{(1/2)**(3)*}$	(1.1)
5 On-call workers	$3.4^{(1/2)**}$	(1)	1.6	(0.5)	1.8	(0.9)	3.7	(0.9)
Total sample	3.8	(0.8)	1.5	(0.4)	2.0	(0.8)	3.9	(0.9)
F-values	$F(4,2446)=18.74**$		$F(4,2446)=6.16**$		$F(4,2446)=3.16$, ns		$F(4,2449)=4.57*$	
	$F(4,2445)=11.08**$ [f]		$F(4,2445)=3.62*$ [f]		$F(4,2445)=3.09$, ns [f]		$F(4,2448)=4.27*$ [f]	

Average scores (standard deviations: SD) for total sample and for each of 5 contract groups. The *F*-test represents the overall group effect as a deviation from the grand mean. The group numbers given in parentheses display differences between that particular contract group with other contract groups. [b] =Higher scores reflect more of the phenomenon under study; i.e. higher engagement, more depressive symptoms, *etc*. *=p<0.01, **=p<0.001, ns=not significant. [f]*F*-values controlled for employees' age. $^{(1/2/3/4/5)}$ =significant difference (Tukey's lsd-test) between the average score for the particular group and another contract group (in brackets).

workers), and amount of computer work (least among on call employees).

Hypothesis 1 receives support: permanent workers had relatively high autonomy and more supervisory tasks. Temporary agency workers, on the other hand, had the least autonomy, a higher dynamic work load and performed more repetitive work.

Health and well-being (hypothesis 2)

As regards health behaviour there was no significant association between the contract groups and physical exercise (χ^2(df=4, N=2454)=7.34, p<0.12), alcohol consumption (full sample: 74% 'drinkers'), number of alcoholic drinks of alcohol consumers (on average 8 drinks per week), or medication usage (full sample: 29% users). However, the contract groups differed with respect to smoking: Temporary agency workers (30.4%) and on call workers (30.2%) were more often smokers (χ^2(df=8)=36.6, p<0.001) (full sample: 25.3%). There were no significant differences among the five contract groups with respect to musculoskeletal complaints (full sample: 1.8), nor with respect to self reported health (full sample: 2.8). After statistically controlling for the employees' age, these results remained the same (statistics obtainable from first author).

As regards well-being, the five contract groups differ with respect to engagement (Table 2). Permanent and semi-permanent employees were more engaged, especially when compared to temporary agency employees and on call workers. According to Schaufeli and co-workers[16], the norm score for the Engagement-scale is 3.84. (Semi) permanent employees thus reported a normal level of engagement, whereas temporal employees without prospect (3.6), temporary agency (3.3) and on-call employees (3.4) reported a below standard engagement score. There is also a relation between contract groups and the amount of depressive symptoms: Temporary agency employees reported more depressive symptoms than (semi) permanent employees. Temporary agency employees were also less satisfied with their work compared to (semi) permanent employees and temporal employees without prospect. We found no differences among the contract groups with respect to emotional exhaustion. When statistically controlling for the employees' age we found similar results.

Overall, hypothesis 2 received some support, although more for well-being than for health. Support for health differences was limited (only for smoking). Differences in well-being were clearer: permanent and semi-permanent employees were more engaged, whereas temporary agency and on-call employees scored below the norm. Temporary agency workers also report more depressive symptoms and less work satisfaction.

Upward movers and Downward movers

Before testing hypotheses 3 and 4, we first tested potential baseline differences between 'Upward movers' and 'Downward movers' (see also Table 3: Time 1 scores). 'Upward movers' (30.9) were younger than 'Downward movers' (34.0) (F(1, 385)=7.79, p<0.01). Both groups did not differ with respect to gender (χ^2(df=1, N=387)=3.6, p=0.06), or level of education (F(1, 385)=3.6, p=0.06).

As regards the quality of working life the groups did

Table 3. Longitudinal results for 'Upward movers' and 'Downward movers'

	'Upward movers' (N=235)		'Downward movers' (N=152)		*F*-values [a]		
					Group	Time	Group × Time
	T1 Mean (SD)	T2 Mean (SD)	T1 Mean (SD)	T2 Mean (SD)			
Personal characteristics							
Sex (% men, n)	40.9 (96)	40.9 (96)	50.7 (77)	50.7 (77)			
Age	30.9 (10)	32.9 (10)	34.0(11.7)	36.0(11.7)			
Education	3.33 (1.0)	3.51 (1.0)	3.13 (1.1)	3.34 (1.0)		T***	
Quality of working life							
Number contract hours	27.6 (12.5)	30.2 (11.5)	28.9(12.3)	29.3(11.7)		T*	
Overtime hours	2.7 (4.1)	3.4 (6.4)	4.0 (5.0)	3.25 (5.5)			
(% yes)	(52%)	(63%)	(66%)	(51%)			
Pace of work	2.24 (0.6)	2.32 (0.6)	2.30 (0.6)	2.23 (0.6)			G × T *
Autonomy	2.85 (0.7)	2.89 (0.7)	2.79 (0.7)	2.70 (0.6)	G *		
Emotional work load	1.66 (0.7)	1.69 (0.6)	1.66 (0.6)	1.60 (0.6)			
Support supervisor	3.50 (0.8)	3.57 (0.9)	3.21 (1.0)	3.55 (0.9)	G*	T**	
Support colleagues	3.99 (0.7)	4.07 (0.6)	3.98 (0.8)	3.96 (0.7)			
Supervisory tasks	1.18 (0.4)	1.22 (0.4)	1.34 (0.5)	1.16 (0.4)[b]**		T**	G × T ***
Dynamic workload	1.65 (0.9)	1.55 (0.9)	1.67 (1.0)	1.56 (0.8)		T*	
Repetitive work	1.99 (1.3)	1.86 (1.2)	1.95 (1.2)	1.74 (1.2)		T*	
Static workload	2.55 (1.4)	2.59 (1.4)	2.54 (1.4)	2.70 (1.5)			
Computer work	2.73 (1.5)	2.91 (1.6)	2.72 (1.5)	2.77 (1.5)			
Health							
Physical exercise,	0.66 (0.5)	0.60 (0.5)	0.74 (0.4)	0.65 (0.5)		T**	
% combinorm (1=yes; 0=no)	(66%)	(60%)	(74%)	(65%)			
Smoking (1=yes, 2=no)	1.76 (0.4)	1.74 (0.4)	1.70 (0.5)	1.70 (0.5)			
% smokers	(24%)	(26%)	(30%)	(30%)			
Cigarettes per day (current smokers)	13 (7)	13 (7)	15 (8)	15 (7)			
Alcohol consumption	0.72 (0.5)	0.74 (0.4)	0.82 (0.4)	0.8 (0.4)			
(0=no; 1=yes), % yes	(72%)	(74%)	(82%)	(80%)			
Glasses of alcohol/wk, drinkers	7 (6)	7 (6)	7.5 (7)	8 (7)			
Medication usage (1=yes;	1.72 (0.5)	1.71 (0.5)	1.76 (0.4)	1.66 (0.5)		T*	
2=no), % yes	(28%)	(29%)	(24%)	(34%)			
Musculoskeletal complaints	1.71 (0.8)	1.66 (0.7)	1.89 (0.9)	1.80 (0.9)			
General health	2.69 (0.7)	2.63 (0.8)	2.82 (0.8)	2.69 (0.8)		T*	
Well-being							
Work engagement	3.72 (0.9)	3.73 (0.9)	3.56 (0.9)	3.61 (0.9)			
Depression	1.52 (0.3)	1.49 (0.4)	1.63 (0.5)	1.52 (0.4)		T**	
Emotional exhaustion	1.97 (0.8)	1.96 (0.8)	2.07 (0.9)	1.91 (0.8)			
General work satisfaction	3.87 (0.8)	3.93 (0.9)	3.68 (1.0)	3.76 (0.9)	G*		

Average scores (standard deviations: SD) and percentages are presented for Time 1 and Time 2. *F*-values refer to main and interaction effects of Group and Time. [a]=*F*-values have 1,385 df, but: number contract hours: 1, 299 df; overtime hours: 1, 281; support supervisor: 1, 278; support colleagues: 1, 289; physical exercise: 1, 352; cigarettes per day: 1, 95; alcohol consumption: 1, 377; glassses of alcohol: 1, 286; depression: 1, 384 df. *=p<0.05; **=p<0.01; ***=p<0.001. [b]=significant time trend within that subgroup.

not differ with respect to contractual work hours (F(1, 328)=0.01, p=0.94). There was a difference in number of overtime hours F(1, 314)=4.57, p=0.03) and percentage of employees working overtime (χ^2(df=1, N=316)=6.19, p=0.01): 'Downward movers' reported more overtime hours (4 h and 66% vs. 2.7 h and 52%). As to psychosocial work characteristics, 'Upward movers' supervised other employees less often (1.18 vs. 1.34; F(1,385)=13.81, p<0.01), but reported more social support from their supervisor at baseline (3.5 vs. 3.21;

$F(1,314)=6.62$, $p<0.05$). There were no group differences regarding physical work load. With respect to health, 'Downward movers' reported a higher alcohol consumption at baseline (82% vs. 72% for 'Upward movers'; $\chi^2(df=1, N=382)=4.61$, $p<0.05$). 'Downward movers' also reported more symptoms of depression (1.63 vs. 1.52, $F(1, 384)=4.52$, $p<0.05$) and less general work satisfaction (3.68 vs. 3.87, $F(1,385)=4.07$, $p<0.05$).

We also baseline compared the two specific subgroups 'Out of Temp/On-call' vs. 'Into Temp/On-call'. Again there was an age difference, and also a difference in gender composition ('Out of Temp/On-call': more women). It also appeared that 'Into Temp/On-call' employees consumed more alcohol (91%) than 'Out of Temp/On-call' (76%).

Over time differences (hypothesis 3 and 4)

Next, longitudinal data were analyzed using two 2 × 2 repeated measure analyses of variance with Group as between-subject factor and Time as within-subject factor. We first compared 'Upward movers' to 'Downward movers' over time.

For the examination of hypotheses 3 and 4, assuming that the effect of Time is different for upward movers than for downward movers, we concentrated on Time × Group interaction effects. In addition to these interaction effects, effects were also found of Group (autonomy, support from supervisor, general work satisfaction; 'Upward movers' having 'more positive' scores), and of Time (education, number of contractual hours, support supervisor, dynamic workload, repetitive work, physical exercise, use of medication, general health, and depressive symptoms; for details see Table 3).

As regards quality of working life, there was a significant interaction effect for supervisory tasks ($F(1,385)=16.34$, $p<0.001$), and for pace of work ($F(1,385)=6.2$, $p=0.01$). Whereas 'Upward movers' came to supervise more people over the course of time, 'Downward movers' had a decrease in supervisory tasks. Also, 'Upward movers' reported a higher work pace over time, whereas 'Downward movers' reported a decrease in work pace. As to health and well-being variables, no significant interaction effects of Time and Group were found. Therefore it appears that, when comparing 'Upward movers' to 'Downward movers' over time, hypotheses 3 and 4 received some but not much support. We also considered potential T1 versus T2 quality of working life differences within the large group of stable contract workers (N=1,478, most of them permanent contract workers, 59% males, mean age at T1 was 41 yr). T1 and T2 scores for the stable group are largely comparable. There was no increase in educational level (full table available upon request from the first author).

Next in a similar analysis of variance, two specific change subgroups ('Out of Temp/On call' vs. 'Into Temp/On-call') were compared. There were significant interaction effects (Group × Time) for supervisory tasks ($F(1,140)=5.06$, $p=0.026$) and for social support from colleagues ($F(1,82)=4.8$, $p=0.031$). 'Out of Temp/On call' reported more support from colleagues across time, and a comparable number of supervisory tasks. 'Into Temp/On-call', on the other hand, reported a decrease in collegial support and supervisory tasks across time. We also found significant Group × Time interaction effects for 'Engagement' ($F(1,140)=6.26$, $p=0.014$) and the 'Usage of medication' ($F(1,140)=8.27$, $p=0.005$). 'Out of Temp/On-call' reported more engagement at Time 2, and they reported a comparable usage of doctor prescribed medication (app. 25%) at both time points. 'Into Temp/On-call' reported a decrease in engagement as well as an increase in the usage of medication (from 29% to 47%). Again, in addition to these interaction effects, some effects of Group (alcohol consumption, 'Into Temp/On call' were more often drinkers) and Time (education, musculoskeletal complaints) were also found (see Table 4).

In sum, this more contrast-full comparison shows supportive evidence for hypotheses 3 and 4. The upward moving group reported more supervisory tasks and collegial support across time, whereas the downward moving group reported a decrease in supervisory tasks and support from colleagues. The former group reported an increase in work engagement and a comparable medication uptake, whilst in the latter group work engagement decreases and doctor prescribed medication usage increases.

Discussion

The present study's rationale was (i) to provide further evidence for the relationship between types of employment contract and the quality of working life, health and well-being, by comparing five different types of employment contract instead of a permanent-temporary dichotomy, and (ii) to enhance our understanding of the causal interrelations among contract type, work characteristics and health and well-being by comparing employees whose employment contract changed over time, either for better (i.e. became less peripheral, more stable) or for worse (i.e. became more peripheral, less stable).

Were our four hypotheses supported?

We found some support for hypothesis 1. From Tables 1 and 2 it follows that permanent workers were more often in 'active jobs' (more autonomy and more responsibility/supervisory tasks), i.e. jobs with a higher motivating potential[19]. Temporary agency workers had lower autonomy than any other group. Temporary agency workers were also more often in jobs with higher dynamic workload, and in repetitive work.

Table 4. Longitudinal results for 'Out of Temp/On-call' and 'Into Temp/On-call'

	'Out of Temp/On call' (N=84)		'Into Temp/On call' (N=58)		*F*-values		
					Group	Time	Group × Time
	T1 Mean (SD)	T2 Mean (SD)	T1 Mean (SD)	T2 Mean (SD)			
Personal characteristics							
Sex (% men, n)	28.6 (24)	28.6 (24)	46.6 (27)	46.6 (27)			
Age	29.9 (10.9)	31.9 (10.9)	34.2(14.6)	36.2(14.6)			
Education	3.0 (0.9)	3.29 (1.0)	2.97 (1.0)	3.16 (1.0)		T**	
Quality of working life							
Number contract hours	19.5 (14.4)	24.9 (13.7)	22.9(13.2)	22(13.2)			
Overtime hours	2.51 (4.5)	3.83 (6.1)	3.07 (3.7)	3.0 (5.8)			
% yes	(42%)	(60%)	(61%)	(42%)			
Pace of work	2.21 (0.6)	2.28 (0.6)	2.19 (0.7)	2.16 (0.6)			
Autonomy	2.71 (0.7)	2.76 (0.7)	2.72 (0.7)	2.64 (0.7)			
Emotional work load	1.64 (0.7)	1.59 (0.6)	1.58 (0.6)	1.62 (0.6)			
Support supervisor	3.40 (0.8)	3.67 (0.8)	3.46 (0.9)	3.38 (0.7)			
Support colleagues	3.87 (0.6)	4.12 (0.5)	3.97 (0.7)	3.81 (0.6)			G × T*
Supervisory tasks	1.16 (0.4)	1.18 (0.4)	1.24 (0.4)	1.10 (0.3)[b]*			G × T*
Dynamic workload	1.73 (0.9)	1.61 (0.9)	1.67 (1.0)	1.68 (0.9)			
Repetitive work	2.05 (1.2)	1.90 (1.1)	1.90 (1.2)	1.64 (1.2)			
Static workload	2.40 (1.4)	2.57 (1.4)	2.48 (1.4)	2.53 (1.5)			
Computer work	2.48 (1.5)	2.90 (1.7)	2.41 (1.5)	2.41 (1.6)			
Health							
Physical exercise	0.62 (0.5)	0.63 (0.5)	0.79 (0.4)	0.66 (0.5)			
(1=yes; 0=no), % yes	(62%)	(63%)	(79%)	(66%)			
Smoking (1=yes, 2=no)	1.75 (0.4)	1.74 (0.4)	1.72 (0.5)	1.69 (0.5)			
% smokers	(25%)	(26%)	(28%)	(31%)			
Cigarettes per day (current smokers)	14 (6.5)	16 (8)	13 (7)	14 (7)			
Alcohol consumption (0=no; 1=yes), % yes	0.76 (0.4) (76%)	0.75 (0.4) (75%)	0.91 (0.3) (91%)	0.85 (0.4) (85%)	G*		
Glasses of alcohol/wk/drinkers	7 (8)	7 (8)	8 (7.5)	10 (8)			
Medication usage (1=yes; 2=no) % yes	1.74 (0.4) (26%)	1.77 (0.4) (23%)	1.71 (0.5) (29%)	1.53 (0.5) (47%)			G × T**
Musculoskeletal complaints	1.78 (0.8)	1.71 (0.7)	2.01 (0.9)	1.81 (0.9)		T*	
General health	2.71 (0.7)	2.61 (0.7)	2.83 (0.9)	2.76 (0.8)			
Well-being							
Work engagement	3.45 (1.0)	3.67 (0.9) [b]*	3.58 (1.0)	3.38 (1.0)			G × T*
Depression	1.53 (0.4)	1.49 (0.4)	1.66 (0.6)	1.59 (0.5)			
Emotional exhaustion	1.77 (0.7)	1.97 (0.8)	1.90 (0.9)	1.85 (0.8)			
General work satisfaction	3.71 (0.9)	3.80 (0.9)	3.84 (0.9)	3.62 (0.9)			

Average scores (standard deviations) and percentages are presented for Time 1 and Time 2. *F*-values refer to main and interaction effects of Group and Time. [a]= *F*-values have 1,140 df but: number contract hours: 1, 74 df; overtime hours: 1, 69; support supervisor: 1, 86; supporrt colleagues: 1, 82; physical exercise: 1, 124; cigarettes per day: 1, 30; alcohol consumption: 1, 136; glasses of alcohol: 1, 98 df. *=p<0.05; **=p<0.01. [b]=significant time trend within that subgroup.

Hypothesis 2 also received some support, although more for well-being than for health. Support for health differences was limited, as we only found one significant difference in health behaviour: smoking was more prevalent among temporary agency and on call workers. Differences in well-being were more pronounced: (semi)permanent employees were more engaged, whereas temporary and on call employees scored below the norm

score. Temporary agency workers also reported more depressive symptoms and less work satisfaction.

Hypotheses 3 and 4 were also supported, but mainly for the two specific change groups ('out of' vs. 'into' temporary agency or on-call work). The first ('Out of') group reported more supervisory tasks and collegial support across time, whereas the latter ('Into') group reported a decrease in supervisory tasks and support from colleagues. The former group reported an increase in work engagement and a comparable medication uptake, whilst in the latter group work engagement decreased and doctor prescribed medication usage increased.

Overall, hypothesis 1 was largely supported, whereas hypothesis 2 was supported for well-being (psychological health) but less for physical health and health behaviour, with the exception of smoking. Hypotheses 3 and 4 were supported, but mainly for two more specific change groups.

Study limitations and assets

This study is not without limitations. In our longitudinal analyses we concentrated on changes in contract type, either 'for better' or 'for worse'. We demonstrated that these changes are related to changes in work and in well-being. What we do not know is whether these contract changes were voluntarily or involuntarily, self-initiated (autonomy) or other-initiated (no autonomy). As workers' control is such a basic feature of the psychosocial work environment[20] and strongly contributes to later psychological health[21, 22], this factor might moderate the relation between contract change and 'outcome variables', such that an involuntarily downward contract change may have a more negative impact on well-being. Another weak point of this study is that we did not directly collect self-reports on job insecurity, a factor that may act as a potential mediator between contract type and health and well-being (see below).

We believe that there are some strong points as well. In our design we incorporated recent recommendations by[5], i.e. (i) to use a random sample from the whole population; (ii) to use a clear differentiation of types of contract; (iii) to further examine the causal effect of temporary work on health with prospective study designs and 'total populations', 'and in follow-up studies of people who change from one employment status to another'. Our differentiation of contract type, though self-reported, does not contain any self-evaluation. In addition we employed valid measures of the quality of working life, health and well-being, and used both positive and negative parameters (e.g., engagement) of well-being.

Theoretical implications and recommendations

Obviously, not all temporary jobs necessarily provide inferior status and job insecurity (e.g., president of the US, trainer of Real Madrid). Changes for a less stable contract type may also be self-initiated. Therefore one might argue that our labels to characterize changes of contract type ('upward' respectively 'downward') are suggestive and over-interpretations of the actual type of changes. Following this argument, 'more core' vs. 'more peripheral' or 'more stable' vs. 'less stable' changes would provide better alternatives. We conceive our 'upward-downward' dimension as a merely neutral, descriptive, not a normative dimension.

Referring to labour-segmentation theory, one theoretical implication of this study is that, in order to understand health and well-being differences between core and more peripheral jobs, we need a more detailed categorization of contract type instead of a simple fixed-temporary dichotomy[2, 5].

In agreement with the same authors, we recommend that future research needs to further examine the mechanisms through which temporary employment is associated with psychological morbidity. Our results on quality of working life suggest that one route is through an increased exposure to 'bad work characteristics'[5]. Furthermore, it seems highly probable that job insecurity may act as a mediating factor. Therefore future studies should collect data on perceived job insecurity[4]. We also believe that for theoretical advancement in this field the Effort-Reward Imbalance Model[23, 24] might be a fruitful framework. The central hypothesis of ERI theory is that lack of reciprocity between costs (effort) and gains (including money, esteem, career opportunities and job security) defines a state of emotional distress with special propensity to autonomic arousal and associated strain reactions. We thus recommend that future research collects data on effort and these kinds of rewards by contract type. Not only the E-R ratio but also the 'separate Effort and Reward prevalences' may differ by contract type, and these differences may well be associated to cross-sectional and longitudinal differences in health and well-being.

Prospective cohort studies offer the best observational design for questions on the aetiology of ill health[5]. If we want to learn more about temporal dynamics between variables, we need longitudinal designs. However, several follow up measures (more points in time) are better than two time points. Therefore future studies may utilize several time points for data collection after a change of contract. This would make it possible to better understand health related processes before and after a change of contract type (e.g. 'healthy worker' and 'healthy hire' effect[5]). In this study we tested whether 'upward' and 'downward' changing contract groups differed from each other at baseline, i.e. before the actual change of employment contract. They did. 'Upward movers' were younger, supervised other people less often, received more supervisory support, and drank less alcohol than

'Downward movers', who were also more depressed and less satisfied with work at baseline. Our findings suggest that a good psychological health and organizational network are predictors of a transition towards (more) permanent employment (cf. 'healthy hire effect'[5]).

Practical recommendations

According to Virtanen *et al.* [5] temporary employment and on call work is more likely to represent 'bad job' characteristics than more regular forms of employment. In this study we arrived at a similar conclusion. Moreover, we found that at least one aspect of health behaviour (smoking) is worse among temporary agency and on call workers, that their engagement is below standard, and that temporary agency workers have more symptoms of depression and less work satisfaction. Therefore special attention is in order for temporary agency workers and on call workers in terms of healthy job design (e.g., challenging work) and human resource management. These workers need to be treated as 'normal', not as secondary colleagues and receive proper information, feedback, training and support. Companies may also stimulate upward transitions and career paths.

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