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Temporary Workforce Under Pressure**

Poor Occupational Safety and Health (OSH) as a Dimension of Precarity?

Abstract

The article focuses on concrete occurrences of work-related psychological stress and the strains of temporary workers. Because of their higher sickness rates and incapacity to work, our research question investigates the specific characteristics of temporary work employees compared to all other employees. We carried out a secondary cross-sectional data analysis of employee surveys from 2006 and 2012 to estimate the risks of poor working conditions and OSH deficiencies for temporary and non-temporary workers. We identify different working conditions and standards of occupational safety and health (OSH) in relation to the employment status and interpret them as a symptom of increasing labour precarity. Along with the decrease in collegiality, management segregation of the workday thus exerts discipline on workers in particular ways. Poor resources of gratification and collegiality together with difficult work-time arrangements, e. g. shift work, become characteristic features of the temporary workforce. These are connected with psychological health restrictions which leads more often to the phenomenon of attending work while ill (so called presenteeism) than its opposite – sickness absenteeism.

Keywords: *health, precarious work, temporary work, work related strains and stresses, coping resources* (JEL-Codes: I14, J21, J28, J71, K31)

Introduction

Both the issues of increasing psychosocial stress as well as precarious work have attracted an increasing amount of attention. Based on analysed healthcare data according to the ICD-10 classifications updated in 2000, an increase in depression and other mental illnesses can be reliably demonstrated from this point onwards (Lohmann-Haislah, 2012). A drastic increase in the number of workers affected by precarious working conditions is well documented in research literature (Dütsch & Struck, 2014; Keller & Seifert, 2013a; Pelizzari, 2009). For the most part, however,

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the intersection of these subjects has not yet been extensively analysed. Although the question of workplace stress for temporary workers has been organizationally identified, no systematic answer has been produced in industrial and organizational psychology and sociology, or in business administration.

Because of the higher illness rate and incapacity to work of temporary workers (Techniker Krankenkasse, 2009; Hägele & Fertig, 2008), our paper, focusing on this gap in research, determines the working conditions of temporary workers by comparing their strains and coping resources with those of non-temporary workers. Based on the relevant research and the models (Demand-Control Support, DCS and Effort-Reward Imbalance, ERI) underlying this study, we hypothesize that working conditions are a source of physical and psychological strains which thus directly affect the health situation of employees.

The organization of working conditions is reflected in the OSH standards, whereby a discrepancy between legal requirements and operational reality can often be discerned (Becker, 2015). Working conditions and OSH are strongly interrelated: 'However, frequent changes regarding workforce, working hours and working conditions, as well as time pressure, result in insufficient time for conducting a complete and effective risk assessment, determining training needs, setting up, applying and monitoring the corresponding OSH measures.' (Papadopoulos, Georgiadou, Papazoglou, & Michaliou, 2010, p. 946). For the studied group of temporary workers, we assume a similar relationship. Among temporary workers, we include those recruited by a temporary work agency and contracted out to work in various companies. The result is a triangular relationship between the employment agency (the temporary work agency or lender), the borrowing company, and the temporary worker. Most of the non-temporary workers we observe are permanent employees of one employer, for whom they also work exclusively. Compared to this relationship of two partners, the temporary workers in the triangular relation must usually cope with a diminishment of responsibility for their working conditions and OSH. This leads to the assumption that temporary work is not only precarious work, because of poor payment and a time limited usage, but that it is also precarious work because of high demands for flexibility and work that is 'uncertain, unpredictable, and risky from the point of view of the worker' (Kalleberg, 2009, p. 2).

According to Kalleberg (2011), a company's use of temporary workers may create conflicts between non-temporary and temporary workers and thereby diminish cooperation and teamwork. In the sense of a zero-sum game, Atkinsons (1984) argues: 'an individual's pay, security and career opportunities will increasingly be secured at the expense of the employment conditions of others, often women, more of whom will find themselves permanently relegated in dead-end, insecure and low paid jobs' (p. 31).

The aim of the paper is to analyse the concrete factors of work-related psychological stress and strains of temporary workers, and how they can be dealt with. We assume

that problems result from the specific contract situation of temporary workers. Compared to non-temporary workers, they are fulfilling the interests of two parties: the one they have an employment contract with (temporary employment agency) and the other where they work. One problem related to health and security could be their widespread willingness to accept poorer working conditions as a transitional solution in the hope of increasing their chances to become core workers (Galais & Moser, 2001; Specht, 2010; Wieland, 2000), although the prospects of getting a permanent position are unlikely (Hohendanner & Gerner, 2010; IAB, 2005; Lehmann, Ratzmann, & Bouncken, 2010). Conversely, core workers are reminded that their duties can be carried out under poorer conditions.

Within the German debate concerning the specific health risks of temporary workers, a study to prove the feasibility of the OSH of temporary work demonstrates the effects of an intensification of precarity (Beermann, Brenscheidt, & Siefer, 2007). Primarily based on the structural data of lending and borrowing companies, and concerning the responsible employer's liability insurance association, the study named several deficiencies: 'Measures of OSH in companies who borrow temporary workers frequently fall victim to a calculation of costs and profits, this is going to happen not only in small enterprises' (Beermann et al., 2007, p. 32)[1]. Moreover, one can 'not speak about an exhaustive integration of temporary workers into the organization of OSH' (Beermann et al., 2007, p. 32). Those individuals representing the subcontracting labour companies don't feel responsible for OSH and health promotion: '[They assign] the responsibility and care for the health aspects of employability […] towards each single employee' (Beermann et al., 2007, p. 24).

To sum up, the disadvantages of temporary workers appear on the social (occupational) level and on the individual (subjective) level. For our investigation, these dimensions provide some insights into the OSH situation of temporary workers compared to non-temporary workers. Our literature-based presumption is that the differences remain almost entirely unexplored, especially with respect to how systematically and structurally temporary workers are discriminated against respecting their working and health conditions. Apart from this social driven, occupational level, we will focus on the subjective level.

The article is organized into the following sections: After the introduction, we develop the question and the main thesis summarizing the state of the research. The diagnosis of a decentralized occupational safety and health standard will be connected to the increase of temporary work. The description of our concept, the methods, and the results of the quantitative analysis follows. In the last section we discuss the results with the intention of reappraising health protection routines in the field of labor assuming further growth in the precarious segment of the workforce.

1 Translated from German to English by the authors.

The Same Level of Working and Health Conditions for all Employees?

As a consequence of the increasing flexibility of the labour market since the 1990s, we have been able to observe ever more challenges to the legal guarantee of humane working conditions and to the preventative measures contained in the OSH. Not only employment relations but also OSH have been in a process of *decentralization* during the last twenty years. The structural background for this is a new orientation in the OSH: the protection standard has become a point of negotiation in the operational field (Kohte, Faber, & Feldhoff, 2014). Consequently, only those employees are able to participate in high OSH standards who are able to articulate their interests and to enforce them. This has especially negative effects on employees contracted temporarily through an employment agency and whose employment is not formally regulated by a workers' protection group or union (Becker, 2015, 2016).

On the one hand, a growing interest in operational risk prevention can be seen in practice, particularly in large companies. On the other hand, the degradation of formal specifications is often used to reduce established OSH standards. The cost pressure of the market has effects primarily in the small and medium enterprise sectors because external safety experts are not available or works councils have little power for negotiation (Beck, 2013). Risk assessments adhering to legal requirements are more frequently carried out in larger enterprises with works councils. The regulation and protection of standards diminishes with the size of the company and the lack of strong works councils (Lißner, Brück, Stautz, Riedmann, & Strauß, 2014). However, with few exceptions (such as the requirement to document a risk assessment) the same legal standards have applied in principal to all enterprise sizes and occupation groups for almost 20 years.

The discrepancy between legal specifications and operational reality is also a consequence of a continuous weakening of industry-wide controls as a result of centralization and staff cuts of the national supervisory authorities (Angermaier, 2005; Kohte, 2015). National level integration of policies in the *Common German Health and Safety Strategy* (GDA) contributes to better communication with regard to standards, but this does little to enforce or control such standards across the board (Lißner et al., 2015).

The removal of obligatory regulation in OSH with regard to limits and standard values and the creation of greater room for the negotiation of health and safety standards correspond to the existing voluntary agreements within organizations. Due to the necessity of being flexible to the market, the number of core employees is reduced. However, temporary workers are often not employed long enough to be integrated into established OSH routines.

Ergonomic research over the last two decades has provided a wealth of evidence concerning specific work-related strains. According to this research, psychological

strains play an important role in in the well-being of temporary workers. Thus, it is known 'that the entire physical load spectrum, as well as the major part of the cognitive working demands and burdens is clearly more significantly represented amongst temporary workers, than with all other dependent employees' (Fuchs & Conrads, 2003, p. 86). Elevated injury and accident risks for these workers are attributed to particularly stressful situations and highly precarious situations and experiences (Mümken & Kieselbach, 2009), as well as the demands of unpredictable working hours (Pröll & Gude, 2003). In comparison to core employees, temporary workers face additional disadvantages that play a major role in contributing to psychological strain, including low income and fewer opportunities for job development, as well as lack of inclusion in matters of OSH, and – if they are present – in workplace programs for health preservation (Dütsch, 2011; Wunenburger, 2010). A much greater level of engagement for protecting the body and mind of core employees is observed while neglecting the temporary workers (Löw-Jasny, 2000; Nienhüser & Matiaske, 2003). This ultimately comes at the cost of elevating the risk for psychological strain within the particular employee's group. As we have shown, group-specific features of the workload at the expense of temporary workers are particularly evident in terms of income, vocational training, and scope of decision-making (Becker, Brinkmann, & Engel, 2013; Becker & Engel, 2015).

Evaluating OSH and Working Conditions

Concept

Because of the debate about temporary work and its tendency of precarisation, the subjective perspective becomes important. The perception of working conditions and of the potential for insecurity is identified as one key factor in designating one's relative position within the social structure of society (Pelizzari, 2009; Vogel, 2006). However, the constitutive approaches of the perspective on precarity and on OSH can be relatively well correlated. The key categories for the measurement of precarity are generally determined by three dimensions: the individual perception of the work situation, the social relations within market driven organization, and the society-determined level of protection through wage agreements and other institutional settings (Castel & Dörre, 2009; Vives et al., 2010).

The subjective resources to stay healthy at work are important from an ergonomic or labor science perspective. They are responsible for preventing stresses and coping with strains. According to the *demand-control-support* approach (DCS) (Karasek & Theorell, 1990; Nübling, 2005), we need to evaluate these resources to cope with strain and overexertion. The social level is characterized by questions of work organization, working time, and relations to colleagues. On the societal level one aspect we will prove is the effects of wage agreements. Other important issues are career opportunities and questions of vocational training. They are often based on intercompany regulations or state-supported institutions.

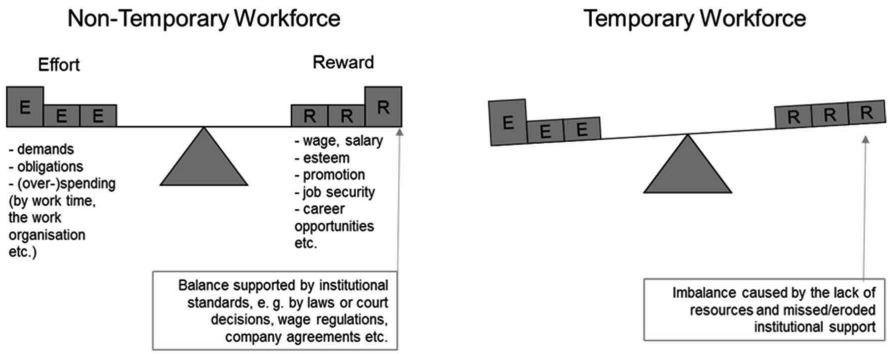
If we evaluate such aspects like satisfaction with income, recognition for performance, etc., the procedure permits the measurement of individual health-risk imbalances for the employees, the perception of social insecurity, and societal devaluation. The first represents well-known, significant hazards to health. The second and the third indicate a higher risk for social isolation and vulnerability. The determination of risks in particular is an argument of probabilities instead of significant correlations. Together they represent an instrument to prove the thesis that temporary workers have to deal more often with poor OSH than non-temporary workers.

The aspiration to use a hybrid model to explain both work stress and precarity needs a focus on a contextual factor that represents more or less the societal and the social level, which will allow for a better understanding. To clarify the research question with respect to the DCS or the more focused *effort-reward imbalance*-model (ERI), we need more explanatory aspects about the discriminating effect of the work contract. To differentiate between the temporary workforce and the non-temporary workforce, we do not have to introduce new variables into the model, but we do give some variables more meaning while we interpret them.

The ERI-model is described as a finely balanced system. The balance is established if employees receive enough or at least some reward for their efforts. However, we assume that this notion works better if highly protected and secured employees are observed. Analysing temporary workers requires a basic understanding of the limited protection they can expect in the occupational setting. An imbalance for employees in general will be developed if social security laws or any OSH regulations, or wage agreements produce disadvantages for some groups. Institutional standards are made to protect employees from the risks of deregulated working conditions. They are strengthening rewards and resources to protect the employees' health.

The problem is that temporary workers cannot be sure about the reliability of these institutional standards. They are weaker defined in comparison to the standards of the non-temporary workforce. Some of these standards are not even valid or practically overridden. In the case of temporary work, the triangulated connection between employee, employer, and the company of deployment leads practically to a structural irresponsibility towards the observance of working and OSH standards. Even laws for the equal treatment of workers cannot prevent the possibility of temporary work being abused as a permanent strategy to cut costs and to save expenses in relation to health protection. If this contextual factor of institutional standards is so important as suggested, it should result – as per the hypothesis – to a significant imbalance between effort and reward (Figure 1).

Figure 1: Effort-reward imbalances model in the case of temporary work



Regarding the rich, disposable knowledge base on demand, control and support, and the effects on health, it is sufficient to give a short summary about the state of the research. As suggested, the imbalance between great efforts spent and low rewards received reinforces chronic, work-related stress, and adverse health (Siegrist, 1996). Different studies have observed the risk of disease for different groups, for example the effects of imbalance on cardiovascular disease particularly among men. Depression is another outcome for great efforts and low rewards (Quesnel-Vallée, DeHaney, & Ciampi, 2010). More evidence is found in occupational and experimental monitoring (exemplary: Siegrist & Dragano, 2008, Li et al., 2012). The consistency of the ERI-model is plurally confirmed, although, the 'well-justified measure of work-related stress […,] grounded in sociological theory [,…] available for comparative socioepidemiologic investigations' (Siegrist et al., 2004, p. 1483) can be evaluated as 'crucial [to] advanced societies within and beyond Europe' (Siegrist et al., 2004, p. 1483).

The DCS model introduced control variables as resources for workers to cope with different work demands, which leads us to a resource sensitive argumentation due to the subject of the temporary workforce. Because of at least modest support for the hypothesis, high demands and low control results in high job strain, it is important to observe work characteristics as far as self-reported health or well-being outcomes (de Lange, Taris, Kompier, Houtman, & Bongers, 2003). For that reason, we decided to prove the control dimension by the ERI model. The analysed data set can, to some extent, be used to map the ERI model but only by taking into account considerably more strain and resource variables. In order to map resources and strains as broadly as possible, we have implemented the ERI model not on a one-to-one basis but have rather applied its mode of action to as many different strains and resources as possible.

Methods

The data sources were generated by institutionalized surveys of over 20,000 employees in Germany (Hall, Siefer, & Tiemann, 2014). The public German research institutes of BiBB Bonn and BAuA Berlin gathered the data by order of the federal ministry of labour. Compared to other studies, this employment survey is characterized by its depiction of a representative sample of the working population. Additionally, in the concomitant investigation of stress and health problems, it can reveal correlations between these two parameters. The study focusses on questions relating to the workplace (key areas of activity, work requirements, workloads etc.) and to stress, and other health impairments. A total of 20,036 employed persons aged 15 and over and with a working time of at least ten hours per week were interviewed in Germany. In this case, volunteers were excluded as well as persons undergoing their initial training. In our study, we focused on dependent employees; the self-employed were not included. The surveys were realized by computer-assisted telephone interviews (CATI). The data answers questions such as: How do employees evaluate their working conditions?

A lot of different groups of the labour market can be observed in the data set. For our research question the definition of the two, interested groups of temporary workers (TW) and non-temporary workers (NTW) includes the following features: The dependent variable is defined by the temporary employment status. The analysed record encloses reports of 476 temporary workers. Their status is defined by the triangular relation between the worker, the lender, and the borrower: 'A temporary worker is contracted by an employer (lender), but is doing the job under another taskmaster (borrower)' (BiBB, BAuA, 2014).

In Germany, this employment group consists of 880,000 people, mainly male (71%). Women as temporary workers are, in the majority of cases, found in the service sector, men in the production sector. A second attribute is the age of the workforce. Temporary workers are mainly younger than non-temporary workers. The qualification structure is also different; a lot of non-skilled laborers are employed by a lender – ultimately a higher proportion than in the staff of companies who are borrowing them (BiBB, BAuA, 2014).

Focalized on the branches of trade where temporary workers can be found (43 of 62) the basis of comparison within the data set of 2012 is reduced from 16,421 to 15,167. This group of employees represents the weighted sample which can be compared to the 452 temporary workers indicating their affiliated branch of trade.

The above-mentioned structural attributes of the temporary workers can also be displayed by the analysed record. 63.2% of the group is comprised of men compared to 53.8% of the non-temporary workers. 22.8% (compared to 9.0%) are non-skilled workers and 43.2% (compared to 27.4%) are younger workers between 15 and 34 years of age (Table 2).

A stratified random sample to control these three attributes reduces the group of non-temporary workers to 2,586 people. Both the weighted and the stratified sample will be used to prove and to discuss the differences between the two groups. If the distinctions can be consolidated after disabling the influence of the ascriptive personnel attributes sex, age, and education, we will get stronger clues on the groups different working conditions.[2] The advantage of this methodological approach is that the findings (discriminating effects of working conditions) can be verified. Because the number of cases due to the stratified random selection is so low, it is important not to rely solely on these samples.

Table 1: The observed groups of temporary workers (TW) and non-temporary workers (NTW) 2006 and 2012 (rounded values, grey lines: BiBB/BAuA employment survey 2012)

Group	N	% Female	Age (Mean Value)	% Highest Professional Level	% Migrants
TW 2006	267	31%	35 years	28% unskilled, 64% skilled, 8% academic or similar	34%
TW 2012	452	37%	38 years	22% unskilled, 68% skilled, 10% academic or similar	27%
Weighted NTW 2006	16.030	45%	41 years	11% unskilled, 77% skilled, 13% academic or similar	15%
Weighted NTW 2012	16.421	46%	42 years	9% unskilled, 65% skilled, 26% academic or similar	17%
Stratified NTW 2006	3.086	31%	36 years	27% unskilled, 65% skilled, 8% academic or similar	19%
Stratified NTW 2012	2.586	37%	39 years	21% unskilled, 70% skilled, 10% academic or similar	20%

TW – temporary workers, NTW – non-temporary workers, 'academic or similar' counts all studied workers and workers on a higher skill level (like masters, technicians, or engineers)

To compare the working conditions of temporary and non-temporary workers, we analyzed the data by two secondary cross-sectional studies. The self-reported data from employees in 2006 and 2012 was evaluated by mean values between both groups and over the two periods.

To identify the main differences between temporary workers and non-temporary workers, we ran a logistic regression which provides a differential interpretation. The labor contract status separating the temporary workers from the non-temporary workers is defined as the dependent variable. Both groups are characterized by mea-

2 The stratification of work related data usually indicates a strong prediction power of the migrant status; the dataset record 26.5% of the temporary and 20.1% of the non-temporary workers. For our analysis, it was primarily useful to control the variables sex, age, and education; all other variables reduced the sample size too strongly.

suring their specific working and health conditions with a set of different independent variables. They are designed as summarized indices easy to be reproduced. Regarding the state of the research and our assumptions, the analysis focused on four groups of variables: the reported strains (physical and psychological), the reported coping resources and rewards, the work time arrangements, and the subjective health (or disease) effects. These dimensions are operationalized by a group of variables as described below (Table 1).

42 variables are summarized to ten indices, and five more single variables are factored in the analysis. Four indices measure strains and stress by 16 single variables. 14 variables indicate resources and rewards. All are additively summarized to four more indices. Another two indices signal the status of physical (seven variables) and psychological health (five variables).

Table 2: Construction of the indices

Indices	Description	Number of Variables	Cronbach's Alpha
Efforts and stresses			
E1	physical stress of the work environment	6	**0.82**
E2	physical-mechanical stress	2*	**0.68**
E3	psychological stress of flexible requirements	4	**0.62**
E4	psychological stress of pressure to perform	4	**0.64**
Resources to cope with stress			
R1	resources of collegiality	3	**0.61**
R2	one's own work resources of decision-making scope and to frame the own work	3	**0.56**
R3	resources of gratification	5	**0.73**
R4	resources of the work organization	3**	**0.53**
Health indicators			
H1	aspects of physiological health	7	0.72
H2	aspects of psychological health	5	0.79

E1 consists of the questions: working ...exposed to fumes, dusts or gases, vapours; ...exposed to cold, heat, moisture, humidity or draughts; ...with oil, grease, dirt, grime; ...exposed to powerful shocks, jolts, and vibrations that can be felt physically; ...under harsh light or in light conditions that are poor or too low; ...exposed to noise
E2 consists of the questions: working on your feet; Lifting and carrying loads of more than 20 kg (male) or 10 kg (female)
E3 consists of the questions: facing new tasks which you have to think through and get familiar with; work is disturbed or interrupted, e. g. by colleagues, inferior materials, machine malfunctions or phone calls; expected to do things you have not learned, or you are not proficient in; have to keep an eye on different work processes or sequences at the same time
E4 consists of the questions: work under strong pressure of time or performance; instructed to produce a precise number of items, provide a certain minimum performance or do a par-

ticular work in a specified time; have to reach the very limits of your capabilities; have to work very quickly
R1 consists of the questions: feel as a part of a community in your workplace; consider the collaboration between you and your colleagues to be good; receive help and support for your work from your colleagues if required
R2 consists of the questions: plan and schedule work; influence the assigned workload; decide when to take a break
R3 consists of the questions: satisfaction ...with your income from this activity; ...with the present career opportunities; with the type and content of your work; ...with the opportunities for applying your skills; ...with the opportunities for continuing training and learning more
R4 consists of the questions: satisfaction ...with your present working hours; ...with the work equipment, including furniture and software; ...with the physical working conditions
H1 consists of the questions: low back pain, lumbago; pain in the arms; pain in the hands; pain in the hips; pain in the knees; swollen legs; pain in the legs, feet
H2 consists of the questions: night-time sleeping disorders; general tiredness, faintness or fatigue; nervousness or irritability; depression; physical exhaustion
* The aspect of the frequency of physiologically stressful sitting at the workplace was not questioned anymore, that's why index B2 consists of only two variables and can't be compared to 2006.
** For the index R4 only three instead of four variables can be used. The aspect of satisfaction with the room and the surroundings of the workplace was omitted.

The indices – summarized on the basis of the results of a factor analysis (principal components) – present more or less satisfactory values, sometimes even high values of consistency measured by Cronbach's Alpha. This value is calculated by correlating all single items. The average of the correlation values stands for a good reliability if it is higher than 0.70 (Bortz & Döring, 2006). Only four of ten indices fulfil this criterion (E1, R3, H1, H2), four are higher than 0.60 (E2, E3, E4, R1), and two higher than 0.50 (R2 and R4). To keep it comparable with the analysis of the 2006 data, we did not change the indices even if some reliability values of indices are not as satisfactory as the others, but two indices (E3 and R4) had to be changed because of omitted variables as marked in the table.

The variables E1 to E4, R1, R2, H1, H2 for the indices in the designed model measure the frequency of appearance of certain working conditions. Each single scale is structured by four steps (Likert scale), and those surveyed were allowed to answer each question by 'yes', 'more or less yes', 'more or less no', and 'no'. Depending on the number of involved variables, the addition to indices produces different ranges, however logistic regression models copes with this. The variables R3 and R4 are constructed by the same method, but instead of appearance, the variables measure the satisfaction with certain gratification conditions and the organization of work. For instance, the indices R3 leaves the ERI model slightly open by asking about income, the chance for promotion to a higher rank, and the possibility to get further training (in the ERI model bundled as job promotion). Other aspects like esteem and job security variables aren't captured in the model, because of the absence of a differential effect. Because we are looking for group-separating differences and a

'recommendation' of the factor analysis, R3 also reflects the satisfaction with the content of work and the possibilities to bring in one's own capabilities. As a whole we label this index 'resources of gratification' because its negative characteristics work similarly to the effort-reward imbalance. Although we can expect analogical effects on health, this question has yet to be clarified. All in all, high values of these indices signal high strains or unsatisfactory working conditions, and low values stand for high rewards or satisfactory and healthy situations at work.

Results of Descriptive Data Analysis

From the analysis of the 2006 data, it is known that a lot of different stresses, strains, and coping resources are significant for temporary work. But based on single variables, there are many poor working and health conditions for non-temporary workers. If we assume the risk for poor health through cumulative strain is higher than the risk of different single stress factors, the picture is changed slightly. Instead of supposed differences between the two groups caused by psychological stresses, we found a lack of resources. Less income, a lack of vocational training, and barely no scope in decision-making are typical characteristics of the working and health conditions of temporary workers (Becker et al., 2013).

The main picture of psychological stresses, strains, and coping resources is shifting from the situation in 2006. The significance of physical stress is increasing, while psychological stress seems to appear less frequently than before. However, the general tendency remains a recurrent incidence of both forms of stresses and strains. Most employees indicate their work situation as restricted by many of these conditions.

The allocation of coping resources shows fewer changes. That is, temporary workers expose more frequently than non-temporary workers the absence of gratifications and the insufficient decision-making scope in the work situation. Furthermore, collegiality is still highly evaluated. The resources to cope with strains from the work organization functions even better than in 2006 – possibly an explanation for the light tendency seen in the reduced frequency of psychological stresses (Tables 3-5).

Table 3: Comparison of mean values: In- and decreasing stressful working conditions and coping resources (higher values mean higher frequency of stresses or less coping resources)

	Range	MV 2006	MV 2012	Direction of change
Efforts and stresses				
E1: physical stress of the work environment	6;24	11.9	18.0	+
E2: physical-mechanical stress	2;8*	(*)	4.3	*
E3: psychological stress of flexible requirements	4;16	11.5	8.5	-
E4: psychological stress of pressure to perform	4;16	11.5	8.6	-

	Range	MV 2006	MV 2012	Direction of change
Insufficient Resources				
R1: resources of collegiality	3;12	3.9	3.8	=
R2: resources of decision-making scope	3;12	6.3	6.1	=
R3: resources of gratification	5;20	10.9	10.7	=
R4: resources of the work organization	3;12*	(*)	6.3	*
Poor Health Situation				
H1: physiological health restrictions	7;14	(*)	12.5	*
H2: psychological health restrictions	5;10	6.1	8.4	+
ABS: sickness absenteeism (fall ill, stay at home)	1;2	1.5	1.5	=
PRS: presenteeism (fall ill, come to work)	1;2	(*)	1.4	*
Insufficient Work Time Arrangements				
SHW: shift work	0;1	0.4	0.5	+
DPN: work time planning disregarding private needs	0;1	(*)	0.5	*
WWE: work at weekends	0;10	1.9	1.9	=

* no comparable value from 2006, Shortcuts: MV – Mean Value

Table 4: Comparison of mean values (TW and NTW): group-specific strains and resources (Grey coloured cells: Significant differences/disadvantaged group)

	TW 2012			Weighted NTW 2012			T-Test for mean value equality (adopted: unequal variances)	
	N	MV	SD	N	MV	SD	T	p
E1	450	17.2	4.99	2578	18.1	5.03	3.63	0.000
E2	450	4.0	1.95	2582	4.3	1.97	3.46	0.001
E3	450	9.2	2.70	2579	8.4	2.49	-5.79	0.000
E4	449	8.6	3.09	2581	8.6	2.80	0.47	0.635
R1	448	4.2	1.71	2543	3.7	1.35	-5.57	0.000
R2	444	7.4	2.73	2530	5.9	2.41	-10.98	0.000
R3	401	12.5	2.97	2337	10.4	2.41	-13.30	0.000
R4	437	6.8	1.57	2556	6.2	1.53	-6.93	0.000
H1	446	12.0	1.86	2577	12.4	1.72	-3.64	0.000
H2	443	8.3	1.63	2573	8.4	1.68	-1,01	0.311
ABS	449	1.5	0.50	2579	1.4	0.50	-0.24	0.810
PRS	451	1.4	0.48	2572	1.4	0.49	0.67	0.503
SHW	166	0.2	0.43	703	0.4	0.50	5.15	0.000
DPN	448	0.8	0.38	2579	0.9	0.25	5.78	0.000
WWE	412	2.0	2.03	2355	1.9	1.95	-1.48	0.140

Abbreviations: MV – mean value, N – numbers, SD – standard deviation, p – p-value

Table 5: Significant differences between TW and NTW over the period (mean values)

	TW 2006	TW 2012	NTW 2006	NTW 2012	Diff. 2006, disadvantages for:	Diff. 2012, disadvantages for:	Development of diff. between TW and NTW within 5 years
E1	12.5	17.2	11.8	18.1	TW	NTW	Increasing
E2	(8.3)*	4.0	(8.6)*	4.3	NTW	NTW	(*)
E3	10.3	9.2	11.6	8.4	NTW	TW	Increasing
E4	11.1	8.6	11.6	8.6	NTW	X	Decreasing
R1	4.1	4.2	3.9	3.7	X	TW	Increasing
R2	7.4	7.4	6.2	5.9	TW	TW	Increasing
R3	12.3	12.5	10.8	10.4	TW	TW	Increasing
R4	8.6	6.8	8.2	6.2	TW	TW	Increasing
H1	(6.4)*	12.0	(6.2)*	12.4	X	NTW	(*)
H2	6.1	8.3	6.1	8.4	X	X	Equal
ABS	1.5	1.5	1.6	1.4	X	X	Equal
PRS	(*)	1.4	(*)	1.4	(*)	X	(*)
SHW	0.4	0.2	0.4	0.4	X	X	Equal
DPN	(1.6)*	0.8	(1.5)*	0.9	X	X	(*)
WWE	1.6	2.0	2.0	1.9	NTW	X	Decreasing

* no comparable 2006 values, Abbreviations: diff. – differences, TW – temporary workers, NTW – non-temporary workers, X – no group differences

Results of the Logistic Regressions (LR)

The logistic regression is useful to predict the existence of specific attributes associated with the objects of investigation. Thus, group membership can be estimated based on probabilities. This kind of regression analysis works similarly to the linear regression model; however, the dependent variable has to be dichotomously structured. The calculated regression coefficients (RC) of the LR can be used for the valuation of Odds-Ratios (OR) of each independent variable in the model.

Firstly, we calculated the LR with the data of the weighted sample including 2,469 cases. The inclusion rate 16.3% of 15,167 cases is a result of missing variables which leads to the exclusion from the LR procedure. Besides the group-specific working conditions, this model can identify the influence of demographical and educational particularities. The frequent answers of employees without any professional level within the group of temporary workers results in an OR value of 4.44. This means the probability of identifying a temporary worker is four times higher if it is known that the worker does not have a skilled or an academic professional level. Another significant influence of age can be verified even if it is a small effect. The younger the surveyed person, the higher the chance that they were a temporary

worker. More important than age but less important than the professional level is the frequency of shift work. The ability to identify a temporary worker rises more than two times (OR 2.42) if he or she works in shifts. As in the 2006 survey, the indices of coping resources show more relevance for differences between the two groups than stresses and strains. Lately only 2.8% of the temporary workers were recognized by model 1 (based on a weighted sample).

Model 2 controls three of the personal attributes: sex, age, and professional level. It reduces the sample to 562 comparable cases. The inclusion rate 18.4% of 3,049 cases (3.7% of 15,167 cases) is the result of a higher data quality; there are fewer missing values within the cases. At least this model shows a much better identification rate of 23.8%. As expected – and as we have already shown in the analysis of the 2006 data – migrants play a more important role within the sample, but the group is not so important that it produces significant results. All other influences of personal attributes were eliminated, though the intercorrelation between them and the other tested variables do not work anymore. The picture does not change completely, but some variables show more effects than before in the weighted model. The stratification of the sample leads to a two times higher risk of presenteeism[3] (OR 2.26) and shift work (OR 2.29) for temporary workers. Furthermore, the lack of resources of gratification (OR 1.27), scope to decide (OR 1.21), and collegiality (OR 1.16) prove to be important attributes of temporary work too. Even the summarized indications for psychological health show a significant prediction value (OR 1.26).

The four variables which are differentiated to the disadvantage of non-temporary workers are the same four as in the weighted sample model 1. The higher risk of sickness absenteeism (OR 0.56) and physiological health restrictions (0.79), the lack of resources of the work organization (OR 0.76), and the risk of weekend working times (OR 0.86) are significant attributes of their working conditions. But none of the mentioned aspects double (or more than double) the risk to non-temporary workers. This means the disadvantageous working conditions for temporary workers are more distinctive for them than for the non-temporary workers.

Another finding seems to be modest in appearance but not less important. The tested strains do not affect any of the two groups in a striking manner. This means all tested strains are effective for both the group of temporary and non-temporary workers, but they have different possibilities to control these psychological stresses through coping resources. Non-temporary workers refer more often to reliable rela-

3 While sickness absenteeism is a classic subject in the human resource management of companies (see, for example, the absentee reports published by Badura and colleagues, the most recent being Badura, Ducki, Schröder, Klose, & Meyer, 2015), its 'opposite', the so-called 'presenteeism', has only in recent times attracted attentive consideration. The interest in the phenomenon of presenteeism derives primarily from the costs which arise for the company. In addition, sociological studies have also questioned the reasons why employees work despite illness (Johns, 2008).

tionships to colleagues (OR 1.16), because of the scope to frame their own work (OR 1.21), and because of more gratification (OR 1.27). On the other hand, temporary workers seem to be more satisfied with organizational details such as the work equipment (OR 0.97) and the physical working conditions (OR 0.98).

To sum up the findings of the LR, we established a statistical verification of each employee group's specific working conditions. The control of personal attributes allows a more detailed picture to be drawn with a typical configuration of resources to cope with stresses of working time arrangements and health restrictions for almost a quarter of the temporary workers. According to this, shift work (OR 2.29) and the absence of a decision-making scope (OR 1.66) become characteristic features of the temporary workforce. Poor resources of gratification (OR 1.27) and collegiality (OR 1.16) relate to psychological health restrictions (OR 1.26) which leads more often to the phenomenon of presenteeism (OR 2.26) than sickness absenteeism (OR 0.56). This specific mixture of disadvantages in resources and psychological problems is not sustainable for the health of the analysed temporary workforce. They seem to be an engine for precarity as we will discuss in the following section.

Table 6: Results of logistic regressions Grey coloured lines and meaning of the symbol '↘': significant influence (p<0.5) of the variable on the groups of temporary (TW) or non-temporary workers (NTW)

	Model 1: Weighted Sample (N=2,469, 16.3% of 15,167 cases)				**Model 2: Randomly Stratified Sample by sex, age, professional level** (N=562, 3.7% of 15,167 cases)			
	↘	**RC (B)**	**P**	**OR (Exp(B))**	**↘**	**RC (B)**	**P**	**OR (Exp(B))**
Effort and stresses								
E1 – work environment stress		-.04	.111	.96		-.03	.244	.97
E2 – mechanical stress		-.05	.510	.96		-.02	.821	.98
E3 – flexibility stress		.08	.082	1.08		.04	.481	1.04
E4 – performance stress		.00	.956	1.00		.04	.381	1.04
insufficient coping resources								
R1 – collegiality resources		.11	.055	1.11	TW	.15	.046	1.16
R2 – scope resources	TW	.18	.000	1.19	TW	.19	.000	1.21
R3 – gratificational resources	TW	.25	.000	1.29	TW	.24	.000	1.27
R4 – organizational resources	NTW	-.24	.001	.79	NTW	-.27	.003	.76
poor health situation								
H1 – physical restrictions	NTW	-.17	.006	.84	NTW	-.23	.002	.79
H2 – psychological restrictions		.14	.052	1.15	TW	.23	.008	1.26
ABS – sickness absenteeism	NTW	-.50	.012	.61	NTW	-.58	.006	.56
PRS – presenteeism		.32	.176	1.37	TW	.82	.001	2.26

	Model 1: Weighted Sample (N=2,469, 16.3% of 15,167 cases)				Model 2: Randomly Stratified Sample by sex, age, professional level (N=562, 3.7% of 15,167 cases)			
	↘	RC (B)	P	OR (Exp(B))	↘	RC (B)	P	OR (Exp(B))
insufficient work time arrangements								
SHW – shift work	TW	.88	.000	2.42	TW	.83	.002	2.29
DPN – disregarding private needs		.50	.073	1.65		.51	.132	1.66
WWE – work at weekend	NTW	-.13	.010	.88	NTW	-.15	.014	.86
demographic data								
migrant		.12	.695	1.13		.58	.119	1.79
age (increasing)	NTW	-.03	.001	.97		-.01	.549	.99
sex (male)		.14	.543	1.15		-.19	.480	.83
prof. level: unskilled	TW	1.49	.002	4.44		-.46	.488	.63
prof. level: skilled		.45	.317	1.57		-.52	.394	.59
quality of regression								
intercept term		-4.91	.000	.01		-3.59	.026	.03
correctly identified (TW)	2.8%				23.8%			
Nagelkerke R-square	0.21				0.27			

Abbreviations: OR – Odds Ratio (Exp(B)), p – p-value, prof. – professional, RC – Regression coefficient (B)

Summary and Open Questions

The group differences are significantly less ambiguous than five years ago: Temporary workers indicate their situation of psychological stress more often related to all kind of flexibility requirements. They are less able to utilize the different proved resources. For non-temporary workers the physiological strains are more important than before. Obviously, the stated relief of psychological stresses and the improved allocation of organizational resources in the aggregate perspective were priority benefits for occupational workforces that are not hired as temporary workers.

After all the years, the resources of gratification and the scope for decision-making are still an indicator of the greatest difference between the two groups. The deficiency becomes even more important compared to the situation in 2006 because the non-temporary workers could meliorate their situation. It is also an indicator of the developments of the preceding years, in which the non-temporary workforces and their representatives like unions reached much better wage agreements.

Furthermore, we assume that there is a higher sensibility to the topics of psychological stress and a higher relevance of occupational risk assessments, which lets the regular employees recognize slight improvements. It is possible that the new law for minimum wages established in 2015 could better the situation of temporary work-

ers too. Maybe we can observe an overcoming of some aspects of the 'effort-reward imbalance' within the next period of survey – this has to remain an unclarified question at the moment.

Discussion: Employed – but Constantly Less Protected?

The results of the secondary, cross-sectional data analysis of the 2006 and 2012 employee surveys show a picture of the poor working conditions of the temporary workforce. Temporary contract workers must reckon with a higher risk for health restrictions and for less protection. The major reason for the differences between temporary workers and non-temporary workers is the lack of resources to cope with psychological stress and other, work-related strains. There are some more stress factors, especially work time arrangements like shift work, which are related more often to temporary than non-temporary workers. Our conclusion is that a lack of job security, a reduced income level, and less prospects of promotion are not the only detriments to temporary workers. They are also confronted with weak and less reliable conditions of OSH because of the poor availability of resources to cope with psychological stress and other work-related strains. In other words, OSH and the conditions for a healthy work life form another important dimension of precarity. Based on our research we should take the health conditions of temporary workers strongly into account to get a better understanding of OSH as a – yet underestimated – dimension of precarity.

The reason for the disadvantage of the temporary workers lies in the specific employee relationship between the three parties: the temporary employment agency as a lender of manpower, the borrowing employer, and the employee. The borrower gives instructions to the worker and is responsible for the workplace OSH conditions. OSH is also subject to the oversight of the lenders, but in the concrete occupational situation they have barely any possibilities to control the safety routines and instructions of the lender. The temporary worker is interested in coping with the tasks without conflict and trouble neither to the lender nor to the borrower. According to other studies, many temporary workers accept worse working conditions than non-temporary workers, because there is a lack of responsible persons who they can contact in the case of unsafe practices and stressful situations, or because they hope maintaining silence about OSH faults will increase their chances of a permanent position in the borrowing company. Both lead to insufficient OSH standards.

Compared to the incapacity of non-temporary workers, the higher rate of inability to work within the group of temporary workers shows the structural results of these OSH disadvantages. Interestingly the group also reports that they go more often to work if they fall ill than the non-temporary workers. Apart from a higher risk for a fast abrasion of health, both findings are indicators of an adjustment pressure on temporary workers.

A broad distribution of different symptoms of psychological stresses and work-related strains suggests – not surprisingly – a job-differentiated perspective. Yet some combined working conditions and multiple adverse health symptoms proved to be indicators of temporary labour. Additionally, we have to acknowledge work-related constraints of psychological health and the absence of a decision-making scope at work. Some of these individually effective, subjective factors increase the vulnerability of contract workers – especially if they are confronted by a combination of these. The lack of coping resources does not allow the temporary laborers to fight or to strongly overcome their individual disadvantages.

Social factors depend on the formal and informal negotiations and rules of the occupational organization. Agreements between works committees and management often regulate certain details of the employment conditions such as timetables, shift planning, systems of information management, and the permitted measures to limit workload. Even in companies without any works councils' regulation, a culture has been established to rule the standards of employment informally. These kinds of social factors are allocated in a very unequal way which implies a decrease of collegiality. Inferiority of values which evaluate the sense of community and the quality of colleagues' support is an indicator of temporary work too. If there are further poor conditions such as a higher probability of receiving no worthwhile information or a lack of influence on the workload – as we found – the revised employees can be classed as a discriminated group. They are kept in profound uncertainty about their available socially supportive resources.

Particular findings on the disparity in gratifications reveal how societal factors affect uncertainty at the workplace. The lower income and career chances of temporary workers are the result of poor wage agreements or other state-driven or state-supported institutions (Castel & Dörre, 2009), although we have to keep in mind the impact that temporary labour is having in declassing their workers through societal rules. Not being satisfied with the income, with the career opportunities, and with the qualification possibilities are obvious indicators of jammed promotion chances (Dütsch & Struck, 2014). Even if OSH actors recognize these aspects as relevant working conditions, their chances to intervene remain limited as long as they don't apprehend the declassing effect and do not operate on the inter-company level.

In conclusion, we can find significant differences between the two groups of temporary and non-temporary workers especially at the expense of the former if we analyse them along the three dimensions: individual, social, and societal. They mirror a general development of the workfare society: The well documented tendency of higher precarity and vulnerability (Castel & Dörre, 2009) corresponds to the discriminatory OSH practices we have described. What is called declassing or exclusion by atypical forms of occupations (Noller, Vogel, & Kronauer, 2004), we would characterize as jammed promotion chances. Uncertainty over the collegial and social resources corresponds with the lack of social security for certain employee groups by

absent or less valid work councils or collective bargaining (Dörre, 2006). The importance of the subjective meanings of precarious work (Kalleberg, 2011) is strongly associated with the lack of coping resources differently by each temporary worker but almost always as a deficiency. At least the low-status, temporary work designated as 'dead-end, insecure and low paid jobs' (Atkinson, 1984) is characterized by congruous working conditions and OSH practice. We cannot ignore that this gives rise to more accentuated symptoms of a 'precarious workfare society' (Dörre, 2016). Beyond the practical problems, and even if we know that we must ask for all individual, social, and societal factors, for some questions we do not have any answers yet. The thesis of the temporary workforce under pressure is only founded on the comparison of the two groups of temporary workers and non-temporary workers. The debate about precarity always accented the mid-range segment of the social structure, which is particularly affected by erosion tendencies. Indeed, the correlation between different employment levels and OSH routines (Becker & Engel, 2015), or to generalize between social status and health (Siegrist & Marmot, 2008), encourage us to look for more finely differentiated incidents to prove the thesis.

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