



ORIGINAL ARTICLE

Why do Illegitimate Tasks Cause Pain? Qualitative Job Insecurity as an Underlying Mechanism

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Musculoskeletal complaints are widespread and highly relevant stress-related consequences calling for the detailed exploration of antecedents. We propose that illegitimate tasks (i.e., tasks that do not conform to an employee's occupational role) constitute one of these work-related antecedents. This study further examines whether illegitimate tasks are associated with concerns about deteriorating working conditions (qualitative job insecurity) as a mechanism leading to musculoskeletal pain. This hypothesis was tested in a German longitudinal sample with 109 employees using a time lag of six weeks. Supporting our assumptions, the results revealed an indirect effect of qualitative job insecurity on the relationship between illegitimate tasks and musculoskeletal pain controlling for the initial level of musculoskeletal pain. The underlying effects remained significant under control of age, sex, and type of contract. To the best of our knowledge, this is the first study to show that illegitimate tasks predict musculoskeletal complaints by raising concerns about future deterioration in working conditions. Especially when it seems unavoidable to assign tasks that do not correspond to an employee's occupational role, supervisors should make sure that illegitimate tasks are distributed fairly among team members and conveyed in an appreciative manner.

Keywords: mediator; musculoskeletal pain; stress; threat; working conditions

Introduction

Our work and personal identity are closely intertwined. From the perspective of Social Identity Theory (Tajfel & Turner, 1986), the individual's occupational role can be understood as belonging to a particular social group. Being a baker, a manager of a large company, a nurse, or the like positions the role incumbent in relation to others who hold other roles in their organization. Thus, these roles that include behavioral expectations often become part of the incumbents' identity (Ashforth & Kreiner, 1999; Haslam et al., 2009). Because individuals want to maintain a positive sense of self (Sedikides & Strube, 1997) they tend to value and protect their occupational role (Meyer, Becker, & van Dick, 2006). If one's role as an employee (i.e., *quantitative job insecurity*) or also the future quality of one's job (i.e., *qualitative job insecurity*) is under threat, well-being may be affected negatively (Callea, Urbini, & Chirumbolo, 2016; Selenko, Mäkikangas, & Stride, 2017).

According to the Stress as Offense to Self (SOS) concept (Semmer et al., 2019), working conditions that express a lack of respect can threaten the self, which can lead to

stress. This not only refers to disparaging behavior in direct social interactions, but might also be expressed indirectly and sometimes even unintentionally by the assignment of tasks. Such *illegitimate tasks* cannot be directly expected from the employee as core tasks and are perceived as unreasonable or unnecessary (Semmer et al., 2019). Illegitimate tasks frequently elicit a stress reaction that might be associated with impairments of psychological well-being (Semmer et al., 2015). In addition, the aim of this study is to show that illegitimate tasks have negative psychosomatic consequences for employees, more specific as musculoskeletal pain.

Stress reactions are accompanied by an increase in muscle tension, which may lead to muscle pain. Musculoskeletal pain is associated with high costs for individuals, organizations, and the society. Musculoskeletal disorders are a leading cause of work disability (GBD 2016 Disease and Injury Incidence and Prevalence Collaborators, 2017). Hence, prevention of work-related musculoskeletal pain should be a top priority. Besides biomechanical factors such as lifting, carrying heavy things, or prolonged sitting, psychological work demands, such as time pressure or workload, are considered important risk factors for musculoskeletal complaints (Jacukowicz, 2016; Kraatz et al., 2013). Studies investigating the role of social working conditions in relation to musculoskeletal pain concentrate on social support as a resource at work (Jacukowicz, 2016; Kraatz et al., 2013). However, a

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perspective viewing social conditions at work as adverse is widely omitted. Furthermore, studies investigating social working conditions usually apply cross-sectional designs restricting the interpretation of findings. We address these issues by investigating illegitimate tasks as a subtle social stressor potentially leading to musculoskeletal pain. Thereby, we apply a longitudinal design over a period of six weeks while controlling for musculoskeletal pain at the baseline.

Moreover, we examine qualitative job insecurity as a mechanism mediating the association of illegitimate tasks on musculoskeletal pain. Qualitative job insecurity refers to concerns about the deterioration of valued features (Hellgren, Sverke, & Isaksson, 1999), such as interesting work content, career opportunities, or social relationships with colleagues and supervisors. Qualitative job security might be endangered due to frequent exposure to illegitimate tasks. We suggest that illegitimate tasks violate norms about what can be expected from an employee and could therefore raise concerns about the future quality of work, which further may trigger musculoskeletal complaints.

The study contributes to the previous literature in various ways. First, by focusing on musculoskeletal pain, we show that illegitimate tasks could also affect psychosomatic well-being. Previous research has already been able to link illegitimate tasks with stress-related bio-physiological, cognitive-emotional, and behavioral changes (cf. Semmer et al., 2015, 2019). However, up to now, it is not confirmed whether this stress reaction can also manifest itself in more distal psychosomatic complaints, such as musculoskeletal pain. The latter may be an especially interesting stress response because individuals may not directly attribute their pain to adverse social conditions at work.

Second, we investigate how illegitimate tasks might translate into musculoskeletal pain. Concerns about future working conditions (i.e., qualitative job insecurity) might be one important explanation for the lack of switching off from experienced adverse social working conditions (Pereira & Elfering, 2014). In the context of Social Identity Theory, it has already been discussed that job insecurity threatens the individual's identity and thus negatively affects well-being and performance (Callea et al., 2016; Selenko et al., 2017). However, to the best of our knowledge, qualitative job insecurity has not yet been investigated as a possible mechanism linking adverse social working conditions to the bio-physiological stress response. Reducing qualitative job insecurity might be an important starting point for organizations to take action. If organizations manage to convey a sense of security about valued working conditions, negative consequences of occasionally unavoidable illegitimate tasks might be prevented.

In the following paragraph, we first introduce illegitimate tasks as a message of disrespect. Then, we describe how illegitimate tasks might lead to musculoskeletal pain. Finally, we turn to qualitative job insecurity as a potential mediator linking illegitimate tasks and musculoskeletal pain.

Illegitimate tasks as a message of disrespect

According to the SOS concept (Semmer et al., 2019), threat to the self is essential for developing stress. Self-esteem can be threatened by behaviors of others conveying negative social messages, for instance messages indicating disrespect or a lack of appreciation.

However, disrespect is neither necessarily tied to social interactions, nor has it to be intentional. Disrespect may also be expressed indirectly through the assignment of tasks (Semmer et al., 2015, 2019). Illegitimate tasks are tasks that violate norms about what an employee can legitimately be expected to do (i.e., one's perceived occupational role). This violation is due to the fact that tasks are perceived by the employee as (a) unreasonable (i.e., they do not correspond to the person's occupational role) and/or (b) unnecessary (i.e., they could be avoided or do not make any sense). Imagine in a hospital, the young doctor Alex who has to spend a lot of time on documentation for the insurance company. On the one hand, s/he may think that some of these documentation tasks should be done by someone else, for example a secretary. On the other hand, s/he may feel that some of these documentation tasks are unnecessary and should not have to be done at all.

When employees are assigned tasks, which are perceived as illegitimate, these tasks convey a social message of disrespect. As a consequence, individuals perceive stress. In sum, illegitimate tasks are experienced as stressful, since they constitute an offense to the self (cf. Semmer et al., 2019).

Illegitimate tasks and musculoskeletal pain

We propose that musculoskeletal pain is an expression of strain that could be induced by illegitimate tasks. Dealing with illegitimate tasks may activate a physiological and psychological reaction to adapt to the situation (Ganster & Rosen, 2013). Both physical (e.g., stress-induced increase in noradrenalin; Elfering et al., 2008) and mental stress (e.g., pain-related beliefs; Elfering et al., 2009) might elicit muscle tension and induce musculoskeletal pain.

The body mobilizes resources – activating muscles, for example – to cope with work demands, such as typing a report. In general, the muscle fibers of a *motor unit* are innervated by a central motor nerve. A muscle consists of *smaller* motor units and *larger* motor units. Both react differently: Small, low-threshold muscle units are always activated first and deactivated last. Larger motor units are only activated when the required force increases. If a motor unit has been active for a long time and is depleted, its activation is stopped and a similar nearby motor unit takes over its task (*rotation principle*).

However, stress changes reactivity and disrupts this normal rotation principle. To pick up on the typing report example above, which does not refer to a serious fight or flight reaction: Alex is sitting in front of his/her screen, writing a report that s/he knows will disappear unread somewhere in a drawer while the 'important' work piles up on his/her desk. S/he may consider writing this report to be an illegitimate task. Yet, the stress-related increase of noradrenalin probably augments the sensitivity of the

small, low-threshold motor units (Lundberg & Melin, 2002). This means that the small motor units are activated more easily. Moreover, according to the *Cinderella Hypothesis* (Hägg, 1991), if the strength the muscle has to spend is very low, the rotation principle may fail. The small units work as hard as Cinderella from the famous fairy tale. Enduring stressors may keep these low-threshold motor units activated, while larger motor units do not work as hard. Yet, depletion signals of these few activated small motor units are too weak and nearby motor units do not take over the task. This leads to long-lasting elevated muscle tension. Thus, work stressors such as illegitimate tasks increase sensitivity and prolong tension leading to musculoskeletal pain (e.g., the neck hurts while Alex is sitting in front of the computer).

In sum, illegitimate tasks indirectly express disrespect and thereby induce stress. Stress is an unpleasant state of tension that can manifest itself on a somatic level in musculoskeletal pain.

Hypothesis 1: Illegitimate tasks are positively related to musculoskeletal pain six weeks later under control of baseline musculoskeletal pain.

Qualitative job insecurity as a mediator

We propose that qualitative job insecurity mediates the relationship between illegitimate tasks and musculoskeletal pain. Qualitative job insecurity refers to the perceived threat of the quality of one's job '... such as deterioration of working conditions, lack of career opportunities, and decreasing salary development.' (Hellgren et al., 1999, p. 182). For example, the individual may perceive that his/her skills will become irrelevant for task achievement in the future or that career prospects worsen.

Illegitimate tasks may foster qualitative job insecurity. Encountering adverse social conditions at work such as illegitimate tasks may create a bias predisposing people to perceive greater threats. For instance, when people receive illegitimate tasks at work, they may develop an enhanced risk perception (cf. Shoss, 2017). Particularly, this should be related to concerns about the future deterioration of working conditions (i.e., valued features of one's job).

First, going back to our example, Alex might have the impression that the responsibility for reporting is particularly on him/her. Such illegitimate tasks threaten Alex's perceived occupational role as a doctor and therefore express a lack of respect (Semmer et al., 2015, 2019). Thus, receiving such tasks might trigger the worry about how s/he will be perceived by colleagues or supervisors: For example, the feeling of not being important enough to others could arise due to being obliged to carry out such tasks rather than treating patients.

Second, illegitimate tasks are also task-related stressors. Fulfilling these illegitimate tasks could also mean that less time is available for other, non-illegitimate tasks that need to be done. This could lead to quality-impairing time pressure, which impedes goal achievement and thus stresses the individual (Semmer, Kälin, & Elfering,

2008). This would probably also lead to concerns about deteriorating job quality.

Qualitative job insecurity concerns perseverative thoughts. Stressful working conditions (e.g., quantitative demands or social conflicts) might provoke perseverative thoughts (Wendsche & Lohmann-Haislah, 2017). Pereira and Elfering (2014) found that social work stressors affected detachment and subsequently sleep quality on Sunday evening but not on Saturday. They explain this result by individuals anticipating next week's work stress on Sunday. Thus, individuals may worry about their future working conditions, specifically qualitative job insecurity. This should concern both the future accomplishment of tasks and access to job resources.

In sum, illegitimate tasks express disrespect (Semmer et al., 2015), endanger the accomplishment of core tasks, and thus may raise concerns about the quality of the social work environment as well as the future allocation of tasks (Meier, Semmer, & Spector, 2013). Antecedents of qualitative job insecurity, such as poor interpersonal working conditions, so far have been underexplored (Jiang, Xu, & Wang, 2020). As one of the few studies addressing this issue, Glambek et al. (2014) found workplace bullying to increase qualitative job insecurity six months later. Work-related bullying may include direct unfair criticism, but also intentional inappropriate task allocation in the form of excessive workload or work tasks that are not relevant or even degrading for the job (cf. Glambek et al., 2014). Thus, it is likely that rather subtle negative social messages, such as illegitimate tasks, may induce qualitative job insecurity. Illegitimate tasks were described in qualitative studies as a blockade of personal development (Cregård & Corin, 2019). Alex might be concerned about whether s/he will be entrusted with challenging tasks in the future or whether his/her career will progress in this current situation. Moreover, if there is a lack of perceived social acceptance due to illegitimate tasks, the social relationships might deteriorate too. If employees feel that they are not appreciated, they may seek less feedback and less support on their work (Ashford, Blatt, & VandeWalle, 2003; Deelstra et al., 2003). Alex might wonder who s/he can rely on when s/he needs support at work and who s/he could ask for. Thus, it might also affect his/her relationships with his/her supervisors, colleagues, and the organization. It was already found that qualitative job insecurity undermines the identification with the organization and thus impairs the individual's performance (Callea et al., 2016).

Even with permanent employment and good employee protection, concerns about the loss of valued features of the job might accompany everyday work rather quickly. Callea et al. (2019) argue that qualitative job insecurity is salient in employees' daily experience. Especially when focusing on short- and medium-term developments, qualitative job insecurity is likely to be relevant for employees in 'countries with solid social security systems, strong employment legislation and high degrees of unionization' (Vander Elst et al., 2014, p. 144). Musculoskeletal pain can be also salient in employees' short- and medium-term experience.

In general, job insecurity may impede health and well-being in various ways (for a review see De Witte, 2016). In addition to an imbalance between effort and reward, a lack of fairness and the perceived breach of the psychological contract, three explanations for the negative effects of qualitative job insecurity have been mentioned more recently. First, Callea and colleagues (2019) found that qualitative job insecurity is negatively associated with well-being. The authors suggest that job insecurity might affect the predictability and controllability of one's own work situation. Therefore, the person perceives it as more difficult to act adequately, that is, to deal in a good way with the situation at work (Callea et al., 2019).

Second, recent research has shown that job insecurity undermines trust in the organization, which in turn affects employee's health and well-being (Richter & Näswall, 2019).

Third, job insecurity threatens social identity. Callea and colleagues (2016) found that qualitative job insecurity diminishes desirable organizational behavior and performance by reducing identification with the organization.

Following to the SOS concept (Semmer et al., 2019), a common element might be that the threat to valued features of the job may also threaten the perceived occupational role of the individual, and thus his/her identity. Indeed, the occupational role defines what can be expected of the role-incumbent. If this occupational role is threatened by qualitative job insecurity, the predictability of the work-situation also decreases. This threat might also be experienced as an expression of a lack of fairness by colleagues and/or supervisors (as representatives of the organization). As such, it might undermine trust in the organization and the future respectful assignment of tasks, which in turn leads to strain.

One possible expression of this strain might be musculoskeletal pain. Previous research has already shown qualitative job insecurity to be positively related to psychosomatic complaints (De Witte et al., 2010) and musculoskeletal pain (Vander Elst et al., 2014).

In sum, we propose that the disrespect inherent in the illegitimate tasks and/or the hindrance to the fulfillment of core tasks changes individuals' perception and dealing with working conditions leading to concerns about the future quality of work. This qualitative job insecurity is the mechanism maintaining stress-induced tensions, causing musculoskeletal pain over a period of six weeks.

Hypothesis 2: Qualitative job insecurity mediates the association between illegitimate tasks and musculoskeletal pain six weeks later under control of baseline musculoskeletal pain.

Method

Procedure and participants

Data refers to a German longitudinal study with two waves with a time lag of six weeks. Using snowball sampling, 128 employees of different organizations voluntarily took part in an online survey resulting in 120 completed questionnaires (due to missing data). Data of 109 participants (64% women) of the initial survey (baseline) and the follow-up could be matched. The majority of the participants (50%) were in the

age group between 20 and 35 years, 28% in the age group between 36 and 50 years, and 22% in the group of older employees between 51 and 65 years. Participants worked in a variety of jobs (e.g., in administration, healthcare, teaching and social sector, engineering) with most (77%) having a permanent employment contract. Participants gave informed consent. The study was conducted in accordance with the Declaration of Helsinki and the code of the German Association of Psychology.

Measures

Illegitimate tasks

Illegitimate tasks were measured by the Bern Illegitimate Tasks Scale (Semmer et al., 2015), which contains eight items (e.g., 'Do you have work tasks to take care of, which you believe should be done by someone else?'; '... which keep you wondering if they make sense at all?'). Response format was a five-point Likert scale (1 = *very rarely/never*; 5 = *very often*). Cronbach's alpha was 0.88.

Qualitative job insecurity

We assessed qualitative job insecurity with nine (of ten) items of a scale developed by De Witte et al. (2010) which measures different work aspects that can be threatened by job insecurity (e.g., 'dealing with your colleagues'; 'the content of your work'). One item ('salary') was excluded because it was held as inappropriate in relation to illegitimate tasks. The participants were asked a future-oriented question during baseline assessment (t1): 'How do you think the following aspects of your work will develop in the near future?' The item scale ranged from 1 (*strongly improving*) to 5 (*strongly deteriorating*). Cronbach's alpha was 0.80.

Musculoskeletal pain

Musculoskeletal pain was assessed with five items (Müller et al., 2008) measuring pain intensity: 'How strong did you experience complaints or pain in the following body regions during the last six weeks?' In left or right shoulder, arm, elbow or hand (two items), neck or back (one item), and left or right buttocks, hip, leg, knee or foot (two items). Response format was a five-point Likert scale (1 = *no pain*; 5 = *very strong pain*). Cronbach's alpha at both baseline and follow-up was 0.78.

Control variables

Age and sex might be relevant for the perception and development of pain (Elfering et al., 2018), qualitative job insecurity (Jiang et al., 2020), and illegitimate tasks (Semmer et al., 2019). We included type of contract (temporary vs. permanent employment) in order to control the influence of uncertain contractual conditions on perceived job insecurity (Keim et al., 2014). We also controlled for musculoskeletal pain at the beginning of the study.

Construct validity

We conducted a confirmatory factor analysis using AMOS 25 (Arbuckle, 2017) to examine the construct validity of our measures. We specified a measurement model with latent variables at the first measurement point. Our measurement model included three factors (illegitimate tasks – consisting of the respective subscales unnecessary

und unreasonable tasks according to Semmer et al. [2015], qualitative job insecurity, and musculoskeletal pain). This model fitted the data reasonably well, $\chi^2(83) = 116.23$, $p = 0.01$, comparative fit index (CFI) = 0.93, root mean square error of approximation (RMSEA) = 0.061, 90% CI [0.031, 0.086], and standardized root mean square residual (SRMR) = 0.085. This model fit the data better than a one-factor model, $\Delta\chi^2(3) = 99.52$, $p < 0.001$, and a two-factor model combining illegitimate tasks and qualitative job insecurity items on one factor and musculoskeletal pain items on the other factor, $\Delta\chi^2(2) = 38.99$, $p < 0.001$.

Statistical analyses

The analyses were performed using IBM SPSS software package (version 25) and AMOS 25 (Arbuckle, 2017). First, we calculated mean, standard deviation, and zero-order correlations. Second, to test the hypotheses and the longitudinal mediation, we specified a path model (AMOS) controlling for musculoskeletal pain at baseline. To avoid possible over-control within the models, we tested our hypotheses in each case without (basic model) and by inclusion of the control variables (model with

covariates). For both models we used bootstrap method with 10,000 samples and bias corrected confidence intervals (confidence level of 95%).

Results

Descriptive results

Descriptive statistics are presented in **Table 1**. Illegitimate tasks were positively correlated with qualitative job insecurity at baseline as well as with musculoskeletal pain, both at baseline and follow-up. Moreover, qualitative job insecurity was associated with musculoskeletal pain at both measurement points.

Test of hypotheses

In line with Hypothesis 1, illegitimate tasks (time 1) were positively associated with musculoskeletal pain six weeks later (0.13, $p = 0.04$) when controlling for musculoskeletal pain at time 1 (**Table 2**). When additionally controlling for sex, age, and type of contract, the association was reduced to $p < 0.10$ (0.11, $p = 0.08$). The fit statistics for this model were: $\chi^2(1) = 0.099$, $p = 0.75$, CFI = 1.00, RMSEA = 0.000, 90% CI [0.000, 0.175], and SRMR = 0.007.

Table 1: Means (M), standard deviations (SD), and zero-order correlations of the study variables (N = 109).

Variables	M	SD	1	2	3	4	5	6
1. Sex ^{a)}								
2. Age ^{b)}			-0.03					
3. Type of contract ^{c)}			-0.09	0.28**				
4. Illegitimate tasks (t1)	2.60	0.71	-0.22*	0.06	0.05			
5. Qualitative job insecurity (t1)	2.97	0.42	-0.10	0.17	0.09	0.24*		
6. Musculoskeletal pain (t1)	1.80	0.69	-0.19*	0.07	-0.09	0.24*	0.24*	
7. Musculoskeletal pain (t2)	1.85	0.71	-0.28**	0.05	-0.02	0.30**	0.33***	0.75***

^{a)} 1 = female, 2 = male.

^{b)} 1 = 20–35 years, 2 = 36–50 years, 3 = 51–65 years.

^{c)} 1 = temporary employment, 2 = permanent employment.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed).

Table 2: Effect of illegitimate tasks (t1) on musculoskeletal pain (t2).

	Basic model					Model with covariates				
	Est.	S.E.	Std. Est.	C.R.	95% CI	Est.	S.E.	Std. Est.	C.R.	95% CI
Illegitimate tasks (t1)	0.13	0.06	0.13	2.10*	[0.022, 0.268]	0.11	0.06	0.11	1.73 [†]	[-0.001, 0.245]
Musculoskeletal pain (t1)	0.74	0.07	0.72	11.31***	[0.593, 0.867]	0.73	0.07	0.71	11.04***	[0.573, 0.853]
Sex ^{a)}						-0.17	0.09	-0.12	-1.85 [†]	[-0.347, 0.018]
Age ^{b)}						-0.01	0.06	-0.01	-0.22	[-0.119, 0.105]
Type of contract ^{c)}						0.05	0.11	0.03	0.45	[-0.175, 0.267]

Note. Bootstrap samples for percentile bootstrap confidence intervals (CI): 10,000. Level of bias corrected confidence intervals: 95% (two-tailed).

Abbreviation: Est. = unstandardized coefficient; Std. Est. = standardized coefficient; S.E. = standard error; C.R. = critical ratio (Est./S.E.); 95% CI = 95% confidence interval of unstandardized coefficients; ^{a)} 1 = female, 2 = male; ^{b)} 1 = 20–35 years, 2 = 36–50 years, 3 = 51–65 years; ^{c)} 1 = temporary employment, 2 = permanent employment.

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Hypothesis 2 was tested with qualitative job insecurity (time 1) as mediator between illegitimate tasks (time 1) and musculoskeletal pain (time 2). Again, we first ran the analysis only controlling for musculoskeletal pain at time 1. Results showed a significant indirect effect of illegitimate tasks on musculoskeletal pain six weeks later. The indirect path was significant (0.03, $p = 0.02$; 95% CI [0.005, 0.092]), confirming Hypothesis 2 (Figure 1 and Table 3, basic model). The total effect of illegitimate tasks on musculoskeletal pain was: 0.14, $p = 0.02$; 95% CI [0.027, 0.275]. The fit statistics for this

model were: $\chi^2(1) = 3.95$, $p = 0.05$, CFI = 0.97, RMSEA = 0.165, 90% CI [0.016, 0.349], and SRMR = 0.068.

The indirect effect remained significant under additional control of sex, age, and type of contract (see Figure 2 and Table 3, model with covariates); indirect effect: 0.03, $p = 0.02$; 95% CI [0.005, 0.093]). The total effect of illegitimate tasks on musculoskeletal pain was: 0.12, $p = 0.04$; 95% CI [0.004, 0.255]. The fit statistics for this model were: $\chi^2(5) = 6.91$, $p = 0.23$, CFI = 0.98, RMSEA = 0.059, 90% CI [0.000, 0.156], and SRMR = 0.053.

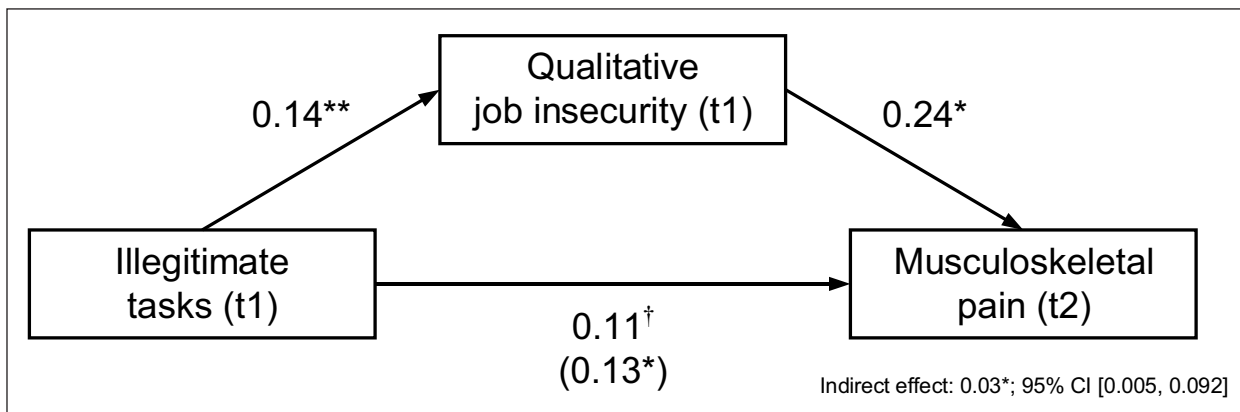


Figure 1: Indirect effect of qualitative job insecurity (t1) between illegitimate tasks (t1) and musculoskeletal pain (t2) controlling for musculoskeletal pain at baseline (unstandardized coefficients).

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed), $N = 109$, Bootstrap sample size = 10,000.

Table 3: Indirect effect of qualitative job insecurity (t1) between illegitimate tasks (t1) and musculoskeletal pain (t2).

Main effects	Basic model					Model with covariates				
	Est.	S.E.	Std. Est.	C.R.	CI 95%	Est.	S.E.	Std. Est.	C.R.	CI 95%
Illegitimate tasks (t1) → Musculosk. pain (t2)	0.11	0.06	0.11	1.66 [†]	[-0.007, 0.237]	0.08	0.06	0.09	1.32	[-0.032, 0.217]
Illegitimate tasks (t1) → Qual. job insecurity (t1)	0.14	0.06	0.24	2.61**	[0.022, 0.258]	0.14	0.06	0.24	2.61**	[0.023, 0.258]
Qual. job insecurity (t1) → Musculosk. pain (t2)	0.24	0.11	0.14	2.22*	[0.059, 0.429]	0.24	0.11	0.14	2.24*	[0.048, 0.429]
Musculosk. pain (t1) → Musculosk. pain (t2)	0.71	0.07	0.71	10.94***	[0.566, 0.839]	0.70	0.07	0.69	10.68***	[0.553, 0.826]
Sex ^{a)} → Musculosk. pain (t2)						-0.17	0.09	-0.12	-1.87 [†]	[-0.345, 0.028]
Age ^{b)} → Musculosk. pain (t2)						-0.03	0.06	-0.03	-0.51	[-0.137, 0.092]
Type of contract ^{c)} → Musculosk. pain (t2)						0.04	0.11	0.02	0.34	[-0.187, 0.256]
Indirect effect via Qual. job insecurity (t1)	Est.	S.E.	Std. Est.	p	CI 95%	Est.	S.E.	Std. Est.	p	CI 95%
Illegitimate tasks (t1) on musculosk. pain (t2)	0.03	0.02	0.04	0.016	[0.005, 0.092]	0.03	0.02	0.04	0.018	[0.005, 0.093]

Note. Bootstrap samples for percentile bootstrap confidence intervals (CI): 10,000. Level of bias corrected confidence intervals: 95% (two-tailed).

Abbreviation: Est. = unstandardized coefficient; Std. Est. = standardized coefficient; S.E. = standard error; C.R. = critical ratio (Est./S.E.); 95% CI = 95% confidence interval of unstandardized coefficients; ^{a)} 1 = female, 2 = male; ^{b)} 1 = 20–35 years, 2 = 36–50 years, 3 = 51–65 years; ^{c)} 1 = temporary employment, 2 = permanent employment.

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

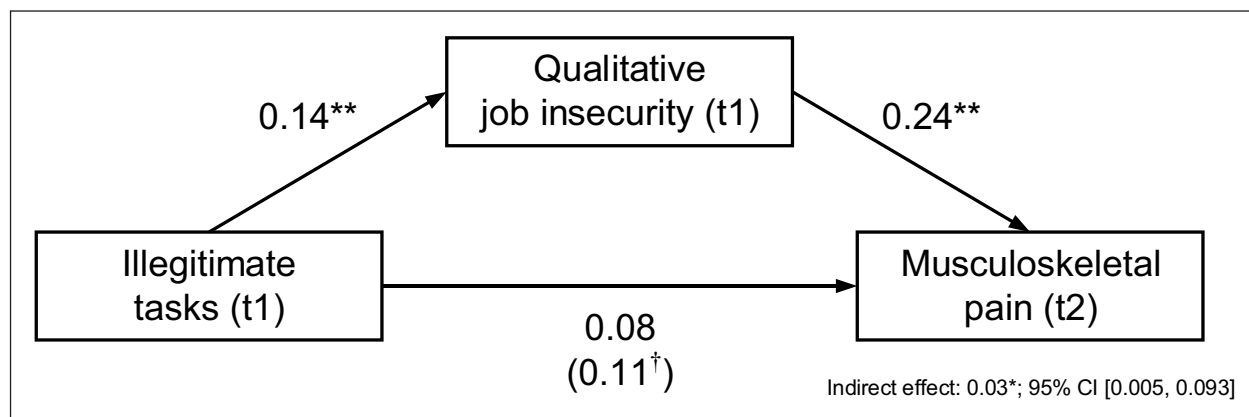


Figure 2: Indirect effect of qualitative job insecurity (t1) between illegitimate tasks (t1) and musculoskeletal pain (t2) controlling for musculoskeletal pain at baseline, sex, age, and type of contract (unstandardized coefficients).

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed), $N = 109$, Bootstrap sample size = 10,000.

Discussion

The goal of this longitudinal study was to contribute to the literature on work-related health by examining the effect of illegitimate tasks on musculoskeletal pain considering qualitative job insecurity as a potential linking mechanism. In a two-wave study with a six-week time lag in between we found that the assignment of illegitimate tasks was positively related to the threat of losing valued job features, which in turn was positively related to musculoskeletal pain.

Illegitimate tasks were positively associated with musculoskeletal pain six weeks later. However, when controlling for age, sex, and type of contract the effect were reduced to $p < 0.10$. Considering the concept of SOS (Semmer et al., 2019), adverse social conditions – such as social stressors with colleagues or supervisors directly expressing disrespect – are known to be related to psychosomatic health complaints (Pereira & Elfering, 2014). For instance, Marras et al. (2000) showed negative feedback during lifting tasks to increase muscle tension beyond biomechanical need. However, adverse social conditions can also be subtle and indirect in nature, such as illegitimate tasks (Semmer et al., 2019). These tasks refer to work contents with position-inappropriate role expectations perceived by the individual as unreasonable and/or unnecessary (Semmer et al., 2015). Thus, in addition to high level of work demands and a poor social support system at work (Kottwitz et al., 2017; Kraatz et al., 2013), the content of the tasks is also related to the perception of musculoskeletal pain. The current study adds on previous research on adverse social working conditions by showing illegitimate tasks to be positively related to musculoskeletal pain. Although this finding needs to be replicated with a larger sample, it seems to suggest that the content of work tasks requires careful consideration. Moreover, no direct negative social interaction seems to be necessary to negatively affect the psychosomatic well-being of employees.

In addition, our results suggest that illegitimate tasks are positively associated with qualitative job insecurity. Recent studies have shown that negative social interactions could lead to insecurity regarding one's own working situation (Glambek et al., 2014). Our results show that the

content of the assigned tasks also relates to qualitative job insecurity. Frequent exposure to illegitimate tasks could raise both concerns in the individual about the quality of future work content as well as social relations at work and, consequently, about future career opportunities (i.e., how one is treated and what work content one will have to face). Qualitative job insecurity refers to exactly this concern about the deterioration of valuable features of one's work (Hellgren et al., 1999).

We found an indirect relationship between illegitimate tasks and musculoskeletal pain six weeks later via qualitative job insecurity. Qualitative job insecurity could be perceived as a violation of the individual's perceived job control (Callea et al., 2019) or create distrust in the organization (Richter & Näswall, 2019). This might be based on a threat to the self with regard to the occupational role of the individual in this organization (cf. Callea et al., 2016). It seems plausible that adverse social working conditions, such as illegitimate tasks, might trigger concerns about deteriorating working conditions. This qualitative job insecurity might be salient in everyday life and preserve strain reactions, including elevated muscle tension. This is in line with recent research on perseverative thoughts linking perceived unfairness and health complaints (such as musculoskeletal pain; Elfering et al., 2016).

Strengths and limitations

There are several limitations to our study. First, our sample size was rather small, implying limited power of the analysis. To address these limitations we calculated mediation using bootstrapping for the estimation of indirect effects (Hayes, 2009).

Second, the reliance on self-reports might inflate correlations (Podsakoff et al., 2003). However, all of our concepts seem to be best assessed by self-reports as, for example, trained observers only have limited and indirect access to what is going on inside a person's mind (Semmer, Grebner, & Elfering, 2004). Further, we temporally separated the measurements of perceived pain (dependent variable).

Third, and linked to this, we used a two-wave design to test the mediation. It is critical to note that the mediator

(i.e., qualitative job insecurity) was assessed at the same time as illegitimate tasks (at baseline measurement). Future research should use a longitudinal design with three measurement points assessing the relevant variables at different measurement occasions.

Finally, an advantage of our approach is that we controlled for the baseline dependent variable allowing us to investigate changes in musculoskeletal pain. However, a time lag of six weeks might be a relatively short interval when examining musculoskeletal pain. Most longitudinal studies of musculoskeletal pain focus on longer follow-up measurements (Kraatz et al., 2013). Part of the rationale for a longer time lag may be the idea that such somatic effects might require a longer time to change. Yet, research on shorter time lags is still lacking, but can provide important information on the development of health impairments (Dormann & Griffin, 2015). Although our time lag of six weeks is short, we still found illegitimate tasks to be positively associated with musculoskeletal pain. This may underscore that musculoskeletal pain can already be elicited in short time periods.

We chose this shorter time lag for two reasons: First, longer time lags contain the risk of systematic dropout. A person who developed impaired well-being – such as musculoskeletal pain – might stop participating due to health-related absenteeism, might quit or might be assigned to less stressful activities, underestimating the impact of work stress (healthy worker effect; Garst, Frese, & Molenaar, 2000; Zapf, Dormann, & Frese, 1996). Underlining this point, our dropout was low. Second, Grebner, Semmer, and Elfering (2005) found effects of job-related stressors on employees' well-being to be rather short-term than long-term in nature. For future research, multiple measurements in shorter follow-up periods might be reasonable to better understand underlying processes. For instance, it would be interesting to take into account working conditions and pain perception of career beginners to investigate the role of working conditions in the development of musculoskeletal pain. Furthermore, a comprehensive picture of the demands and resources of work and non-work situations would be helpful for understanding the development of musculoskeletal pain (Buscemi et al., 2017).

Theoretical and practical implications

In line with the SOS concept, our results support the idea that tasks that are not in line with the occupational role of the individual may affect well-being even in the form of musculoskeletal pain. Both the lack of respect and an additional effort that has to be made to perform illegitimate tasks, consuming time and energy that would be necessary to perform 'important' tasks, may lead to concerns about the individual's occupational development. These concerns about the future threat to the occupational role may be a cause for the development of qualitative job insecurity, which should be given more attention in future research.

It should be emphasized that qualitative job insecurity is both a stressor that can affect health and performance of employees and a consequence that is driven by

stressful working conditions (Callea et al., 2019; De Witte et al., 2010; De Witte, Pienaar, & De Cuyper, 2016). Over and above, our results indicate that concerns about the deterioration of working conditions might be a potential mechanism linking stressors and strain reactions. Once insecure, the individual's qualitative job insecurity may become an enduring stressor that prolongs the initial negative tension.

Adverse social aspects at work, such as the assignment of illegitimate tasks by supervisors, do not always have to be a conscious decision. Over the previous decades, work intensification and increasing demands on employee flexibility have been frequent challenges for the working population (Kompier, 2006). These requirements may also increase the risk that supervisors will have to assign tasks that cannot be directly expected from the employee as core tasks – tasks that are perceived as illegitimate.

Based on our findings, practical implications arise particularly for supervisors, but also for the overall organization. Social stressors do not have to be grave (like bullying) to be an offense to the self. Accordingly, supervisors should be sensitive not only with respect to direct but also to indirect ways of expressing disrespect as by assigning illegitimate tasks. Regarding job design, supervisors should ensure to support the experience of success and to install a climate of appreciation and respect. A recent meta-analysis found a better communication in organizations to be negatively related to perceived job insecurity in general (Keim et al., 2014). Similar to illegitimate tasks that violate expectations by not corresponding to an employee's occupational role, poor organizational communication is thought to enhance uncertainty about what is expected from the employee.

According to our results, it is plausible that illegitimate tasks increase uncertainty about future violations of occupational norms about task-related expectations and about social relationships at work; thus, worrying about the future quality of one's job. Being sensitive further includes that assigning tasks has to be done in a fair and respectful way (Scheel et al., 2019) to avoid or reduce threats to the self.

From the perspective of the employee, proactive coping could also buffer the negative effects of job insecurity (Koen & Parker, 2020; Stiglbauer & Batinic, 2015). However, the question of identification might also be crucial for the effects on health and well-being (Ciampa et al., 2019). If an individual is highly identified with the organization in which he or she works, he or she may perceive illegitimate tasks as tasks that serve the overall goal of the organization. This perceived benefit to his/her organization may buffer negative consequences of illegitimate tasks. On the other hand, if the individual is highly identified with his or her professional role, illegitimate tasks violating norms about legitimate role expectations will probably place a greater burden on the individual.

Besides replicating our findings, there is a need for intervention studies enhancing the sensitivity to potential illegitimacy of assigned tasks in order to improve the employees' psychosomatic health. Recent research indicated that workplace leadership interventions could

reduce perceived job insecurity, for example, during organizational change (Abildgaard, Nielsen, & Sverke, 2018; Barrech et al., 2018). Implementing knowledge about illegitimate tasks might help to develop programs decreasing job insecurity and increasing employees' health.

Conclusion

Many aspects might be involved in the development of pain. However, with this study we can contribute an important piece of the puzzle and thus increase the opportunities for intervention by organizations to prevent musculoskeletal pain. Our results underline the importance of being sensitive to the potential illegitimacy of task assignments. It is also important, however, that the employee is not concerned about a deterioration of valued features of his/her work.

Competing Interests

The authors have no competing interests to declare.

Author Contributions

All authors participated in the writing and approved the final manuscript. MUK wrote the first draft of the manuscript. WK did the analyses and was responsible for the protocol.

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How to cite this article: Kottwitz, M. U., Otto, K., Elfering, A., Vásquez, M. E. G., Braun, S., & Kälin, W. (2021). Why do Illegitimate Tasks Cause Pain? Qualitative Job Insecurity as an Underlying Mechanism. *Scandinavian Journal of Work and Organizational Psychology*, 6(1): 3, 1–12. DOI: <https://doi.org/10.16993/sjwop.125>

Submitted: 30 June 2020

Accepted: 25 March 2021

Published: 05 May 2021

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