Chapter 7 General discussion

Summary of main findings

The main objective of this thesis was to investigate the organizational justice-health relationship with a special emphasis on subjective and physical well-being, potential biological pathways, and impact in different occupational groups.

Measurement of organizational justice

A challenge for research on organizational justice is operationalization and measurement of the construct. Various theories about organizational justice exist and consequently many scales have been proposed to measure the perception of unfairness at the workplace. Questionnaires based on the organizational justice scale of Moorman (1991) seem to have the widest use in health research. This thesis presents an adapted German version translated (Chapter 2). This scale comprised eleven items, of which seven items assessed procedural justice and four items measured interactional justice. The scale showed a robust internal consistency and the expected 2-factor structure reflecting procedural and interactional subscales. These psychometric properties were replicated in an independent sample (Chapter 3). In addition to boasting good psychometric properties, the scale showed consistent associations with self-rated health, and provided a key instrument for empirical research in this thesis.

Relation of organizational justice to subjective well-being

Perceived injustice at work was related to subjective well-being complaints. A robust association was found with musculoskeletal symptoms and tinnitus, two little studied health associations of organizational justice (Chapter 3 and 4). The association with tinnitus was found to be mediated by depressive symptoms and burnout (Chapter 3). Mediation by
burnout was stronger which was not surprising considering that burnout (other than depression) pertains specifically to the work context (Ahola et al., 2014; Bakker et al., 2000).

**Psychobiological correlates of injustice**

The adverse health effects of organizational justice involve psychobiological pathways. This thesis investigated if perceived unfairness at work is associated with a decreased heart rate variability (HRV, Chapter 5). HRV functions as a marker for alterations in PNS activity (i.e., vagal activity). A decreased HRV indicates a reduced parasympathetic activity. Such a reduced vagal activity was found for different work stress measurements and plays a significant role in health and disease (Jarczok et al., 2013).

The association of justice with parasympathetic nervous system dysregulation was particularly pronounced during sleep time. This finding suggests interference with usual mental and somatic restoration, and essential function of sleep (Brosschot et al., 2007). How day time stress may persevere during sleep is addressed by the perseverative cognition hypothesis, which proposes that stress impacts biology by perpetuation of stress responses through rumination and worry, which also involves unconscious processing beyond the actual stressful experience and may persist even during sleep (Brosschot et al., 2010). A dysregulated parasympathetic nervous system may function as mechanism linking perceived unfairness at work with adverse health.

Chapter 6 showed that organizational justice is also associated with impaired glucocorticoid sensitivity, operationalized as the correlation between cortisol release and hematologic parameters. These findings may indicate that among persons experiencing low levels of workplace fairness the HPA-axis has less physiological control over leukocyte migratory dynamics. There is ample data showing that glucocorticoid insensitivity has implications for psychiatric and somatic disorders (Quax et al., 2013) and therefore may present a potential mechanism linking organizational justice to impaired health. Specifically, this finding might explain how work stress may affect inflammatory diseases, such as atopic and auto-immune disorders (Barnes & Adcock, 2009).
In sum, the research in this thesis provided evidence for an association of organizational justice with impaired health in form of tinnitus and musculoskeletal symptoms, and two psychobiological pathways: i.e., vagal dysregulation and leukocyte glucocorticoid sensitivity.

**Contextual determinates influence the relation of organizational justice with health**

Support was obtained for a differential impact of organizational justice in different occupational groups. Based on social exchange theory and psychosocial contract theory it was postulated that the relevance of organizational justice differs with the type of relation the employee has with the superior and the company.

Research in this thesis provided empirical evidence of a stronger impact of organizational justice among white-collar employees than among blue-collar workers. In white-collar employees organizational justice was independently related to musculoskeletal symptoms (Chapter 4), with dysregulation of the autonomic nervous system (Chapter 5), and with a relative insensitivity of lymphocytes to cortisol regulation (glucocorticoid insensitivity, Chapter 6). Notably, no such associations were found in blue-collar workers. Such differences were anticipated on the basis of social exchange theory (Blau, 1964; Colquitt et al., 2013). This theory provides a framework for understanding different employee perceptions of relationships with supervisors and the organization. Specifically, it predicts that injustice is more detrimental when the focus of employee-employer relationships is mainly on social exchanges (i.e., mutual respect, trust, and loyalty that stretches beyond the actual employment contract) rather than economic/financial exchange (DeConinck, 2010; Kivimäki et al., 2005). Theorists have proposed that white-collar employees are more likely to have a social exchange relationship with their organization and supervisor, whereas blue-collar workers tend put more emphasis on the economic relation (Littek & Heisig, 1989). Consistent with this assertion, it was observed that blue-collar workers rated salary and remuneration as more important than white-collar workers, indicative for a more emphasis on economic exchange, while white collar workers put more value on their leadership and superiors, indicative for a social exchange orientation (Chapter 5).
**Interactions with other work stressors**

The work context might also be characterized by the presence or absence of other psychosocial work stressors other than organizational justice. Hence, a further aim of this thesis was to examine the relationship of organizational justice with health outcomes while taking into account the two most established work stress conceptualisations (i.e., the effort reward imbalance, job-demand-control model).

Analyses showed that the associations of organizational justice with white-collar employees HRV indices (Chapter 5) and glucocorticoid insensitivity (Chapter 6) were independent of effort-reward-imbalance and the job-demand-control model. These findings confirm an added value of organizational justice in understanding the work stress and health relationship (Kivimäki et al., 2007). Further, effort-reward-imbalance and the job-demand-control were not associated with glucocorticoid insensitivity (Chapter 6). This selectivity is interpreted using the social self-preservation theory, which postulates that social stress (e.g., in form of experienced unfairness) elicit a specific set of physiological responses which most characteristically involves activation of the HPA system (Bosch, de Geus, et al., 2009; Dickerson & Kemeny, 2004; Gruenewald et al., 2004). Repeated HPA activation is thought to underlie the reduced sensitivity to glucocorticoids (Rohleder, 2012) (further elaboration is provided in Chapter 6).

Further advancing this line of inquiry, Chapter 4 examined the combination of organizational justice, the effort-reward-imbalance and the job-control-demand model in relation to musculoskeletal symptoms. Again, it was observed that the associations differ by occupational groups. In white-collar employees organizational justice and effort-reward imbalance showed an independent association with musculoskeletal symptoms, while in blue-collar workers effort-reward imbalance and job-demand-control were independently associated with pain symptoms. Further, a combination of these models appeared to provide additional gain in explaining individual differences for both occupations: among white-collar workers, the negative effect of high effort-reward-imbalance and high job strain on musculoskeletal pain appears buffered by high justice. The effect of organizational justice in blue-collar workers depends on the presence or absence of the other job stressors, which appear to be more important to them. An independent effect of organizational justice was not found.
Future research directions

Based on the research presented in this thesis I tentatively propose several directions for future research below that may help further understanding of mechanisms by which organizational justice may impact well-being and health, or to address some limitations and challenges of this research area. These are, the measurement of organizational justice, potential intervention studies, the relevance of organizational justice for specific groups of employees, the positive effects of justice, and the development of insights into the neural underpinnings of justice.

Measurement of organizational justice

The literature exhibits a strong heterogeneity in measurement approaches of organizational justice. To move this field forward, it would be greatly beneficial to reach a greater level of standardisation, ideally in the form of a consensus approach involving a single measure. Such measure would allow for a comparison of results among studies and would preferably comprise the main three justice dimensions (i.e., distributive, procedural, and interactional justice). This might for example be achieved by forming a cross-national expert panel, with the objective to reach a consensus regarding the assessment of organizational justice across contexts.

The development of a single assessment tool, and the debate required to reach this aim, may tap into two outstanding challenges. First, the addition of a time frame might be beneficial. Significant variability in justice perceptions across time are reported (Holtz & Harold, 2009). This is especially relevant because it has been argued that organizational justice is a prolonged stressor and possibly harmful to health. Consequently, an organizational justice questionnaire should be able to differentiate the long-term exposure from transient/single event exposures. Second, work in this thesis shows that specific groups are more vulnerable to perceived unfairness at work than others. It is argued that the type of exchange and psychological contract can explain this finding. Therefore, a more direct assessment of these implicit contract elements might provide useful information to identify risk groups. The impact of
organizational justice seems context dependent, and information on such contexts is therefore essential to interpretation.

**Intervention studies**

In light of the adverse health effects of injustice at work Kivimäki et al. (2004, p. 934) recommended “that the focus of workplace health interventions should be broadened to cover justice in managerial treatment”. This raises the question of how to go about the promotion of perceived justice at work to improve health. A general suggestion stated by Greenberg (2004, p. 360) is that "the key to minimizing stress is to help employees believe that (...) negative outcomes are fair". Looking at the specific justice dimensions, employers might, for example, improve distributive justice perceptions by ensuring that situations are perceived as equitable. However, ambiguity related to the appropriate allocation-standards makes distributive justice illusive (Greenberg, 2004). “The trick to promoting distributive justice, therefore, is to supplement the information workers have about reward distributions and to assure workers of their concern by casting the dual spotlight of procedural and interactional justice onto them” (Greenberg, 2004, p. 360). This implies that in order to improve distributive justice perceptions interactional and procedural justice could be improved (i.e., fairness of decision-making process and interpersonal interactions; see Table 1.1). Greenberg (2004) formulated three specific guidelines. First, the basis for resource allocation should be explained in a dignified and respectful manner. Second, employees should be given a voice and should be heard. Third, accurate, unbiased procedures should be used, which have been implemented transparently.

Improving justice at work has only rarely been examined as a preventive strategy (see for an exception, Greenberg (2006)). This is partly because interventions to promote organizational justice face several challenges such as acceptance and trust of the company and practices and the practical implementation of procedural justice rules (Greenberg, 2009). In addition, managers are often unaware of injustice to be a problem. The unawareness of injustice issues by managers may be stressful on its own (Cropanzano et al., 2005). Another challenge, and one of the main outcomes of the studies presented in this thesis, is that organizational justice does not exert their health effects uniformly across all occupational groups. This thesis
revealed psychobiological consequences of perceived injustice especially for white-collar employees (Chapter 4, 5 and 6). In consequence, future interventions should take differences between occupational groups into account and therewith potentially enhance the effectiveness of these interventions.

**What aspect of organizational justice is relevant to whom?**

This thesis has shown that organizational justice has a differential impact on specific groups of employees. The studies that were most influential in contributing to an understanding of how organizational justice affects physical health were mostly restricted to white-collar employees and to the interactional and procedural justice components (De Vogli, Brunner, et al., 2007; De Vogli, Ferrie, et al., 2007; Elovainio, Ferrie, et al., 2010; Gimeno et al., 2010; Kivimäki et al., 2005; Kivimäki et al., 2008). By differentiating blue-collar workers from white-collar workers, this thesis could show that especially white-collar employees appear vulnerable to procedural and interactional injustice. One might speculate that for blue-collar worker – due to their stronger emphasis on economic exchange – distributive justice might be more important. This prediction could be tested in future research.

**Positive effects of organizational justice?**

Low organizational justice appears to harm health. This finding could suggest that perceived justice promotes health (Greenberg, 2010). While intuitively obvious, there is little direct evidence to support this notion. To date, “mechanisms have not yet been articulated that would explain how the fair treatment of an individual would promote health and well-being” (Greenberg, 2010, p. 232). Hence, future research could take a more positive stance toward organizational justice by focusing on its positive consequences. Positive psychology suggests that positive factors such as sense of coherence (i.e., comprehensibility, manageability, and meaningfulness), optimism, and benefit-finding and growth may facilitate biological systems in a manner that is beneficial to health (Aspinwall & Tedeschi, 2010; Dubois et al., 2012). Eisenberger and Cole (2012) suggest that social inclusion and social exclusion affect health through the same pathways (i.e., SNS and HPA axis), but involve distinct neural circuits.
Social threat (i.e., social exclusion) activates the basic neural alarm systems, enabling autonomic and endocrine responses that affect health through the amygdala, dorsal anterior cingulated cortex, anterior insula, and periaqueductal gray. Social inclusion (i.e., to be valued by others), on the other hand, is associated with reward-related neural regions, like the ventromedial prefrontal cortex, ventral striatum, and septal area. The activation of the reward system has inhibitory relationships with threat-related physiological and neural responses, and, in consequence, with related health implications. Thus, one might speculate that the same mechanism may apply for perceived justice and injustice.

A meta-synthesis on fairness perceptions provided evidence that fairness activates reward circuit, whereas unfairness activates brain regions associated with pain, emotions, and disgust (Beugré, 2013). Against this background, perceived injustice at the workplace will have harmful effects, whereas justice will have health-promoting consequences. To feel valued by others and perceiving social support are integral parts of organizational justice (e.g., (Greenberg, 2006; Lind & Tyler, 1988; Tyler & Blader, 2000, 2003)) and the same neurophysiological mechanisms for social (dis)connection might account for positive health effects of justice and negative ones for injustice.

**Studying the neural correlates and determinants of perceived justice**

Examining the neural basis of unfairness may advance organizational justice theory and inform us about potential modifications of justice perceptions (Becker, Cropanzano, & Sanfey, 2011). Beugré (2009) proposes a model of neuro-organizational justice that explores the role of the brain in the formation of fairness judgments and in reacting to perceived unfair situations. In his *fairness theory of mind* Beugré (2009) proposes two pathways between a triggering event (i.e., distributive, procedural, or interactional fairness stimulus) and justice judgments (i.e., a given situation is perceived as fair or unfair) involving two different brain systems: the reflective and the reflexive system. The first pathway, the cognitive neuro-organizational justice path, comprises an activation of cognition-induced neural structures (e.g., increased activation of the lateral and medial prefrontal regions while amygdala and medial orbitofrontal cortex activation is decreased). When these specific brain areas are activated a more elaborated cognitive information processing (‘thought process’) about the fairness or
unfairness of a situation will occur. Such a process involves the reflective system (or C-system for the 'C' in reflective), including brain areas responsible for controlled processes (Lieberman, 2007; Lieberman, Gaunt, Gilbert, & Trope, 2002). These processes are resources consuming and therefore only occur when the situation is a novel one.

In the case of a familiar situation, a more spontaneous process should occur, involving the reflexive system. This X-system (for the 'X' in reflexive) is responsible for automatic processes and provides a continuous stream of consciousness that is experienced as ‘the world out there’ (Lieberman, 2007; Lieberman et al., 2002). In this case, the second pathway, the affective neuro-organizational justice path, is dominant and emotion-inducing neural structures in the brain are activated (e.g., amygdala, ventromedial prefrontal cortex). Whether this process is used depends on the availability of fairness prototypes. “These fairness prototypes represent standards, expectations, or thresholds against which current events are assessed. This indicates that justice or fairness exists when there is congruence between what people expect on the basis of salient or appropriate normative rule and what they obtain” (Beugré, 2009, p. 133).

Thus, if a distributive, procedural or interactional stimulus of the environment matches existing ‘mental scripts’ (i.e., distributive, procedural or interactional prototypes) a relative automatic and intuitive fairness processing might occur. Accordingly, a triggering fairness event might automatically lead to an emotional arousal, like anger, when an existing and appropriate prototype is available. This leaves us with the question how fairness prototypes are formed. Fairness standards might be based on genetics but might also include cultural learned components (Beugré, 2009). Accordingly, people may have different fairness prototypes, which may trigger different automatic stress responses. It might therefore be essential to examine these prototypes in further research.

Distributive justice in terms of an equal distribution of the total sum (as studied in an Ultimate Game) is associated with an activation of more emotional areas of the brain (e.g., anterior cingulated cortex, anterior insula, dorsolateral prefrontal cortex) (Harle & Sanfey, 2012; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003). By contrast, perceiving procedural justice seems to activate parts of the brain connected to (more reflective) social cognition, and emotion regulation (e.g., ventrolateral prefrontal cortex and the superior temporal sulcus) (Dulebohn, Conlon, Sarinopoulos, Davison, & McNamara, 2009). This highlights the distinctiveness of the justice components and their related brain activities. For example,
overlaps of neuronal activation patterns of justice components with those of theoretically connected constructs, such as trust (Holtz, 2013; Riedl & Javor, 2012), social belonging (Eisenberger, Lieberman, & Williams, 2003; Masten et al., 2009; Slavich, Way, Eisenberger, & Taylor, 2010), uncertainty (Singer, Critchley, & Preuschoff, 2009), might inform us why injustice is so harmful.

Although integrating neuroscience into biopsychosocial research promises to advance the field of psychosomatic research (Lane, Waldstein, Chesney, et al., 2009; Lane, Waldstein, Critchley, et al., 2009), it seems fair to say that neurobiological occupational stress research is still in its infancy, and inferring neurobiological pathways linking organizational justice to health remains speculative at this point.

Concluding remarks

The objective of this thesis was to shed light on the association of organizational justice and health. This thesis contributes to the literature in several ways. First, a German organizational justice scale was validated comprising a procedural and interactional sub-dimension. Second, the association of organizational justice with tinnitus was found, and subsequent analyses showed that this association was to a large extent driven by burnout. Third, organizational justice is independent of other work place stressors associated with musculoskeletal symptoms. Fourth, organizational justice revealed to impact white-collar employees most. Fifth, two novel psychobiological pathways were identified by which perceived unfairness might affect health: parasympathetic nervous system dysregulation and glucocorticoid insensitivity.

Employees are sensitive to perceived injustice at work, as demonstrated by adverse physical and psychological effects. However, the vulnerability to organizational justice differs by type of relationship with the supervisor and the company. In consequence, such contextual differences should be taken into account in future research as well as in future intervention studies.