HEALTHY AND SAFE WORKPLACES IN HEALTH CARE

Examining the role of safety climate

Babette Bronkhorst

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Healthy and Safe Workplaces in Health Care

Examining the role of safety climate

Gezond en veilig werken in de zorg
Een onderzoek naar de rol van een gezond en veilig organisatieklimaat

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Chapter 1

Introduction

1.1 EMPLOYEE HEALTH AND SAFETY IN A HEALTH CARE CONTEXT

Working in health care involves significant health and safety risks. Reports worldwide show that large numbers of health care employees experience physical and psychological health problems. Data from the U.S. Bureau of Labor (2014) report that the rate of musculoskeletal problems from overexertion was twice the average across all industries in hospitals, three times the average for nursing home workers, and five times the average for ambulance workers. According to the EU-OSHA (2014), European health care workers have the fifth-highest rates of musculoskeletal disorders, just behind industries such as manufacturing and construction. More specifically, in The U.K., an estimated 5.7 million days were lost due to workplace injury in the health care sector, of which 26 percent was related to musculoskeletal disorders and 51 percent to work stress (Health and Safety Executive, 2015b). Research into the psychological health of health care workers in Australia furthermore show that stress and other mental conditions accounted for a greater percentage of injuries to health care workers than to all Australian workers (Safe Work Australia, 2009). The health care sector thus poses significant physical and psychological health threats to its workforce.

However, in recent years the topic of employee health and safety in organizations has suffered as a result of the global economic crisis leading to restructuring and downsizing in the health care sector. System reforms and budget cuts have resulted in a focus on productivity and efficiency, leading to a distraction from employee health and safety (International Labour Office, 2013). At the same time, the ageing workforce and expected labor shortages provide major threats to the quality and sustainability of health care sectors worldwide (Aluttis et al., 2014). In spite of the many economic pressures, a renewed focus on employee health and safety is necessary to cope with these developments (International Labour Office, 2014). Especially since ill health among health care employees can have a large impact. Not only is the individual employee's health and well-being at stake, occupational ill health endangers the productivity, competitiveness and reputation of health care organizations and, in the end, also has consequences for society as a whole. As health care costs are rising, a healthy and safe health care workforce is not merely an important goal in itself, but instrumental in realizing an affordable and efficient health care system. This makes employee health and safety in health care a highly relevant topic for research.

1.2 HEALTH CARE UTILIZATION AS AN INDICATOR OF EMPLOYEE HEALTH AND SAFETY

The academic literature has examined employee health and safety in many different ways, including both objective and subjective measures. Subjective measures for instance include employee self-reports of their physical or psychological health status or their safety behavior at work. Examples of objective measures that serve as indicators of employee health are accident and injury data, sickness absence rates, and worker compensation claims. One objective measure that is widely used in economic and epidemiological research (Longobardi et al., 2011), but is rarely included in the field of organizational and occupational health research, is health care utilization. Health care utilization data can be understood and interpreted as a set of proxies that describe the health status of an individual (Butler et al., 2009).

Although issues concerning privacy, time and financial resources might keep researchers from using health care utilization data, it can serve as a valuable addition to the spectrum of employee health and safety measures. In current research, health care utilization data are mostly examined by looking at specific groups such as age groups, ethnic minorities or people with certain diseases such as diabetes or cancer. There is very little research examining the health care utilization of specific occupational groups or organizations and there are, as far as we know, no scientific studies examining health care utilization among employees working in health care organizations. This is surprising, as data from the U.S. hospital sector for instance show that hospital employees consume more health care services and accrue higher health care costs than the workforce at large (Thomson Reuters, 2011). Perhaps even more interesting is the variation in health care utilization between organizations in the same health care industry.

To examine this topic, this study took the form of a four-year collaborative research project between the School of Social and Behavioural Sciences at Erasmus University Rotterdam and Stichting IZZ, a collectivity of health care employees in the Netherlands. This collaboration gave us the opportunity to use the health care utilization data of employees working in health care as a starting point to investigate variation in employee health and safety across organizations. More information on the collaborative research project can be found in Appendix I.

1.3 HEALTH CARE UTILIZATION AND THE CLIMATE CONCEPT

As will be examined in more detail in the next chapter, health care utilization data show that large variations in employee physical therapy and mental health care utilization exist between health care organizations. In the nursing homes industry for example, the physical therapy utilization rates can be three times as high for similar organizations (ranging from 16 to 61 percent) and the variation is large for mental health care utilization as well (ranging from 0 to 17 percent). This brings up the question of why these variations in employee health and safety -as measured by health care utilization- between organizations exist. Studies in the field of organizational behavior and occupational health psychology have pointed to several social and interpersonal factors within organizations such as leadership, employee involvement, and social support. These factors can vary significantly between organizations and play an important role in employee health and safety (Wilson et al., 2004; Kelloway & Day, 2005; Grawitch et al., 2006). Employees' perceptions regarding these social and interpersonal aspects within the organization are reflected by the organizational climate (Wilson et al., 2004). In this study, we focus upon the climate concept and its relationship with individual level employee outcomes (for instance musculoskeletal problems, emotional exhaustion, and safety behavior in the workplace) and organizational health and safety performance (for instance health care utilization, absenteeism and presenteeism).

However, before going into further detail on the climate concept, we must first explain that this study is presented in the form of a number of scholarly articles (see also Table 1.1). An advantage of this is that all chapters (except Chapters 1 and 8) stand alone and can be read without needing to read the other chapters. A disadvantage is that there is some overlap between the chapters, for example in the introductions, the definition and dimensions of the climate concepts. The main differences are in the research question the chapters aim to answer, the methods and analyzing techniques used, and the conclusions they draw based on theory and empirical analyses. We also use different climate concepts (organizational climate, safety climate, physical safety climate, and psychosocial safety climate) in different chapters, but this will be explained in the next paragraph. As some of the scholarly articles are multiple authored, and for consistency, the pronoun 'we' is used throughout the entire study.

Table 1.1 Outline of the study based on research questions

Chapter	Title	RQ	Empirical work	Article
1	Introduction	-	-	-
2	How 'healthy' are health care organizations? Exploring employee health care utilization rates among Dutch health care organizations	RQ1	Secondary data-analyses of health care utilization data from 136,804 employees working in 417 health care organizations	Bronkhorst, B. (2017). How 'healthy' are health care organizations? Exploring employee health care utilization rates among Dutch health care organizations. *Health Services Management Research*, *30(3)*, 156-167.
3	Organizational climate and employee mental health outcomes: A systematic review of studies in health care organizations	RQ2	Systematic review of 21 studies examining organizational climate and mental health outcomes	Bronkhorst, B., Tummers, L., Steijn, B., & Vijverberg, D. (2015). Organizational climate and employee mental health outcomes: A systematic review of studies in health care organizations. *Health Care Management Review*, *40(3)*, 254-271.
4	Comparing 'healthy' and 'unhealthy' hospitals: do safety climate perceptions play a role?	RQ2	Comparative case-study of 4 hospitals including 17 semi-structured interviews	Submitted to an international peer-reviewed journal
5	Safety climate, worker health and organizational health performance: Testing a physical, psychosocial and combined pathway	RQ3	Survey of 8,761 employees working in 177 health care organizations	Bronkhorst, B. & Vermeeren, B. (2016). Safety climate, worker health and organizational health performance: Testing a physical, psychosocial and combined pathway. *International Journal of Workplace Health Management, 9(3)*, 270-289.
6	Behaving safely under pressure: The effects of job demands, resources, and safety climate on employee physical and psychosocial safety behavior	RQ3	Survey of 6,230 employees working in 52 health care organizations	Bronkhorst, B. (2015). Behaving safely under pressure: the effects of job demands, resources, and safety climate on employee physical and psychosocial safety behavior. *Journal of Safety Research*, *55*, 63-72.
7	Improving safety climate and behavior through a multifaceted intervention: results from a field experiment	RQ4	Field experiment including 520 employees working in 5 health care organizations	Bronkhorst, B., Tummers, L. & Steijn, B. (2018). Improving safety climate and behavior through a multifaceted intervention: results from a field experiment. *Safety Science*, *103*, 293-304.
8	Conclusions and discussion	Main	-	-

1.4 THE CLIMATE CONCEPT: ORGANIZATIONAL CLIMATE AND SAFETY CLIMATE

The climate concept can be described using two different approaches to climate. The first approach is referred to as a global approach to climate (Patterson et al., 2005) or as a molar climate (Schneider et al., 2013). In this approach, the climate concept is referred to as 'organizational climate' and captures the general sense employees have about whether their organization provides a positive environment for employees (Ehrhart et al., 2014). A commonly used definition of organizational climate is 'the perceptions employees have of the policies, practices, and procedures employees experience and the behaviors they observe getting rewarded and that are supported and expected' (Schneider & Reichers, 1983; Ostroff et al., 2003; Schneider et al., 2013).

However, the generic nature of the organizational climate concept is not always useful for the prediction of specific outcomes, nor can it be used to indicate specific behaviors or practices that could help to develop interventions in organizations to enhance those specific outcomes (Schneider et al., 2013). Schneider (1975) was the first to recognize this issue and proposed that the focus of climate concepts should match the strategic performance-related outcome they are associated with. A second approach to climate followed, which is referred to as a domain-specific approach (Patterson et al., 2005) or as focused climates (Schneider et al., 2013). This approach uses specific types of climate that are strategically tied to the subject of interest, such as service climate, innovation climate or ethical climate. When the focus is on employee health and safety as a strategic performance-related outcome, the climate concept is referred to as 'safety climate'[1]. Following this line of reasoning, even more specific strategic-related outcomes such as psychological health and safety are studied by looking at the 'psychosocial safety climate'[2] (Dollard & Bakker, 2010).

Depending on the chapter's research question or the strategic outcome of interest, this study uses the molar (organizational) climate construct and several different focused

1 In the health care sector, the term 'safety climate' is often used to refer to the patient safety climate (i.e. the perceptions of *patient* safety within the organization, not *employee* safety). In this study, the term 'safety climate' always refers to the perceptions of employee safety, unless stated otherwise.

2 Psychosocial safety climate is related to psychological safety climate as defined by Edmondson (1999), but both terms represent different concepts (Idris et al., 2011). Psychological safety climate refers to a climate where employees believe that they can safely express their own opinions and ideas without being rejected or punished (Baer & Frese, 2003). The concept of psychosocial safety climate refers to employees' perceptions of the policies, practices and procedures concerning psychological health and safety within the organization. In this regard, psychological health and safety is viewed as freedom from serious psychological injuries that could arise from psychologically damaging working conditions (for instance high work pressure, emotional demands) or from damaging actions of others (for instance bullying, aggression and violence).

climates, including safety climate, physical safety climate, and psychosocial safety climate. Figure 1.1 shows the various climate concepts that will be used throughout the study. Because the safety climate concept is used in the majority of the chapters, and for consistency, we chose to refer to 'safety climate' in the research questions (see section 1.5). We define safety climate as employees' perceptions of the policies, procedures, and practices as it relates to the value and importance of physical and psychological health and safety within the organization. This definition is based on the work by Zohar (1980; 2008; 2010), who first introduced the concept of safety climate in his research on physical safety in industrial organizations, where he described it as employees' perceptions of policies, procedures and practices as it relates to the value and importance of safety within the organization. Although our definition is similar to the description of the safety climate concept by Zohar, our conceptualization is broader. First of all, since employee health and safety are very closely related (see for instance Mearns et al., 2010), we focus on both employee *safety* and employee *health*. Second, we are interested in the *physical* and *psychological* domain and therefore extended the definition to encompass both physical and psychological health and safety (with the exception of Chapters 5 and 6 where we disentangled the safety climate concept in a physical safety climate and a psychosocial safety climate concept.

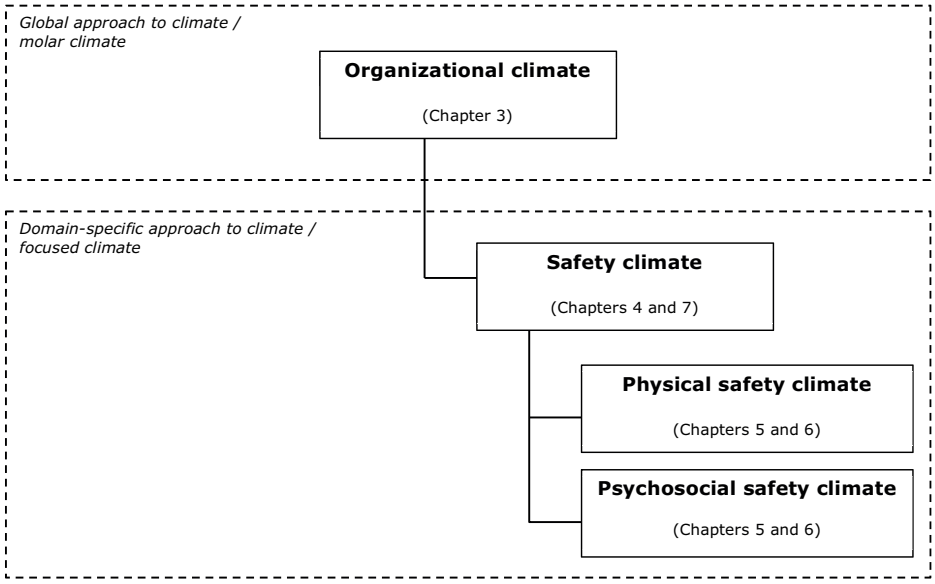


Figure 1.1 Overview of various climate concepts used throughout the study

1.5 MAIN RESEARCH QUESTIONS AND STUDY OUTLINE

The study aims to gain a better understanding of the relationship between safety climate and health and safety outcomes of health care employees and organizations. The main research question addressed in this study is formulated as follows:

What role does safety climate play in the health and safety of health care employees and organizations?

To answer the main research question, a combination of inductive, abductive and deductive reasoning was taken. Inductive reasoning may be defined as arguing from the particular to the general (for instance by moving from individual observations to patterns) (Teddlie & Tashakkori, 2009). Abductive reasoning is the process of developing explanations for inductive findings (Spector, 2017). A third type of reasoning, deductive reasoning, starts with arguing from the general to the particular (for instance by empirically testing hypotheses) (Teddlie & Tashakkori, 2009). In the first part of the study observations about employee health and safety in health care organizations are made to discern patterns and infer a possible explanation for differences in health outcomes and the role that safety climate might play in this. In the second part of the study, hypotheses about the relationship between safety climate and health and safety outcomes are tested. The main research question breaks down into the following four research questions, of which the first two research questions follow a more inductive or abductive line of reasoning, and the last two research questions are more deductive. All research questions will be further elaborated on below.

1. How does employee health and safety –as indicated by health care utilization– differ between health care organizations?
2. How do the differences in employee health outcomes relate to the safety climate in health care organizations?
3. What are the effects of the safety climate on health and safety outcomes of health care employees and organizations?
4. What are the effects of a safety climate intervention on health and safety outcomes of health care employees?

To answer the first research question, this study takes the exploration of the variation in health care utilization across health care organizations as a starting point. Chapter 2 investigates the variation in employee health and safety between health care organizations by looking at the employee physical therapy and mental health care utilization rates. The findings in this chapter show there is still a lot of variation between organizations not accounted for by differences in health care industry,

organizational size, urbanization rate and employee characteristics such as age and gender. Apparently, other factors play a role in this. With that in mind, the following research question explores the association between the climate concept and employee health and safety.

The second research question is answered in Chapters 3 and 4, where we zoom in on the concept of climate and examine its potential for explaining organizational differences in employee health and safety. Chapter 3 shows the results of a systematic review of the literature on the relationship between organizational climate and mental health outcomes in health care organizations. To further investigate the relationship between the climate concept and employee health and safety, we examined the safety climate perceptions of employees working in two hospitals with high health care utilization rates and in two hospitals with low health care utilization rates. Chapter 4 describes the results of this qualitative case study.

To answer the third research question, we test a variety of mechanisms through which safety climate relates to employee health and safety outcomes. In Chapter 5, we make a distinction between physical and psychosocial safety climate and quantitatively examine three different pathways through which safety climate influences organizational health and safety performance outcomes such as absenteeism, presenteeism and health care utilization by using a large sample of health care workers. Using a selection of this same sample in Chapter 6, we furthermore test how these two types of safety climate affect the relationship between job demands and –resources and safety behavior.

Given the amount of empirical evidence regarding the significance of safety climate for employee health and safety outcomes, the lack of intervention studies is surprising. Moreover, the few intervention studies that have been published are mostly located in the industrial sector, which forms a significantly different setting from the health care sector. Hence, in Chapter 7, we present a multifaceted safety climate intervention and test its effects on safety climate perceptions and safety behavior in a field experiment including five health care organizations. The goal of this Chapter is to answer the fourth research question.

This study thus investigates the relationship between safety climate and various health and safety outcomes, such as employee health, employee safety behavior and organizational health and safety performance. Some chapters focus on direct relationships, whereas other chapters also include indirect relationships. All main concepts and relationships examined in the study and their corresponding chapters are presented

in the graphical outline of the study in Figure 1.2. Table 1.1 shows how the chapters are related to the research questions and the articles submitted to and published in academic journals.

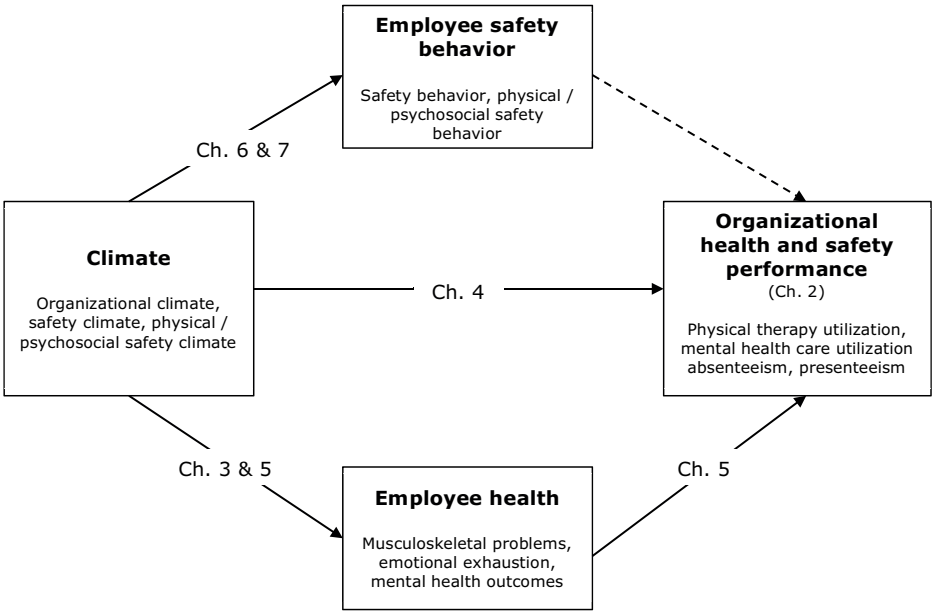


Figure 1.2 Graphical outline of the study

1.6 THEORETICAL VALUE

As the subject of safety climate is linked to several scientific disciplines, this study follows insights from different bodies of research. There are three main bodies of research that we draw on when examining its relation to employee health outcomes: safety science, organizational behavior and occupational health psychology. Of course, these literatures are connected in various ways. For example, the safety science and organizational behavior literatures are linked as the safety climate concept is conceptualized as an aspect of the organization and has its origin in organizational climate theories (Ajslev et al., 2017). Moreover, theories on the relationship between safety climate and employee health and safety outcomes often draw on frameworks from the occupational health psychology literature, such as the job demands and –resources theory (Nahrgang et al., 2011). In this way, our study provides insights for different literatures and bodies of research.

More specifically, we add to the literature in three ways. First, our study is set in the health care context and focuses on the health and safety of employees. The majority of the safety climate research in health care involves the health and safety of patients, not employees (see for instance Katz-Navon et al., 2005; Flin et al., 2006; Singer et al., 2009; Goedhart et al., 2017). At the same time, the studies that examine employee safety climate are often conducted in the industrial sector (for instance construction or manufacturing). As the uniqueness of the health care sector with its specific organizational structures, dual focus on employee and patient health and safety, and the high prevalence of both physical and psychological hazards causes shortcomings in the existing safety climate concepts and models (Flin et al., 2006; McCaughey et al., 2013b), our study contributes to the literature by addressing these shortcomings and testing new approaches that fit the health care context. For example, in Chapters 3 and 4, the importance of group norms and -behavior and the distinction between perceptions of management versus perceptions of supervisors becomes clear. In Chapters 5-7 we incorporated these findings in our measurement of safety climate to better fit the health care context.

The second contribution concerns the extension of the knowledge on the outcomes of safety climate. In general, the literature examining the outcomes of safety climate can be divided in several categories based on the focus of the outcome (safety-related or health-related outcomes), the domain of the outcome (physical or psychological health and safety outcomes), and the level of the outcome (individual or organizational level outcomes). The contribution of our study lies in the fact that we examine outcomes from multiple outcome categories, and add new outcomes to these categories.

For example, we investigate safety climate's association with both safety-related and health-related outcomes. Safety-related outcomes are slightly different from health-related outcomes as they concern the *likelihood* of (often acute and severe) harm to individual employees during work (Beus et al., 2016), whereas health-related outcomes concern the *actual* harm individual employees experience (which can also be invisible and develop gradually). Although the safety climate concept was originally developed to explain differences in safety-related outcomes (for instance, safety accidents, safety behavior, see also Zohar, 1980), we expect safety climate to be important for differences in employee health as well. In Chapters 3, 4 and 5 we examine several health-related outcomes and in Chapters 6 and 7 we focus on safety-related outcomes.

In addition, we include outcomes in both the physical and psychosocial health and safety domain. At the moment, both domains have their own specific bodies of re-

search that mainly exist separately (Zadow et al., 2017). With the exception of some recent research (see for instance Bailey et al., 2015b; Zadow et al., 2017), safety climate studies either investigate the physical domain or the psychosocial domain. From its introduction in the 1980s the main focus of the safety climate literature has been on physical health and safety. More recently, the psychosocial safety climate concept emerged, which highlights the value and importance of psychological health and safety (Dollard & Bakker, 2010) and examines its effects on psychological health outcomes such as burnout, psychological distress and depression (Idris et al., 2012; 2014). Our study combines insights from both domains and includes two types of safety climate and behavior. In Chapter 5 for instance, we test three pathways to organizational health and safety performance outcomes, including both types of safety climate. Chapter 6 incorporates both physical and psychosocial climate in the job demands and -resources model (Bakker & Demerouti, 2007; 2017) and extends it to include two types of safety behavior: physical and psychosocial safety behavior. The link with psychosocial safety behavior is particularly innovative, since no other study has investigated this specific type of safety behavior.

Moreover, our study relates safety climate to outcomes at both the individual and organizational level. At the organizational level, the majority of the safety climate research focuses on physical safety outcomes such as accident and injury rates (Huang et al., 2016). By investigating its relationship with other health and safety outcomes at the organizational level such as absenteeism, presenteeism and employee health care utilization, we examine whether safety climate is associated with employee outcomes beyond the 'traditional' safety outcomes (Chapter 5). In this regard the relationship with employee health care utilization, which is also included in Chapters 2 and 4, is especially innovative given the very limited number of studies that connect employee health care utilization to organizational factors such as safety climate.

The third contribution is that our study adds to the current safety climate literature by presenting and testing a safety climate intervention. More specifically, in Chapter 7 we develop and test a multifaceted intervention approach to improve safety climate and behavior. Intervention studies are important to create a better understanding of the concept in theory and practice (Kristensen, 2005). Over the years, research has examined the multifaceted nature of the safety climate concept and proved that it references multiple levels in the organizational hierarchy (Zohar & Luria, 2005), including senior managers and coworkers (Yule et al., 2006; Brondino et al., 2012). However, most of the current safety climate interventions solely focus on supervisors as leverage points for safety climate improvement (see for instance Zohar, 2002; Zohar & Polachek, 2014; Kines et al., 2010). The added value of our safety climate

intervention therefore lies in its multifaceted nature. By incorporating safety agents operating at various organizational layers in our intervention, our research adds to what is already known about safety climate improvement. Next to the insights it provides on the content of a safety climate intervention, this study also adds to the knowledge on the intervention implementation process (Pedersen et al., 2012; Nielsen & Randall, 2013) by addressing the conditions under which our safety climate intervention is most effective.

1.7 METHODOLOGICAL VALUE

From a methodological perspective, an important contribution of this work lies in the multiple research methods and analyses techniques used. Research in the field of employee health and safety as well as the broader organizational sciences field has been dominated by quantitative, deductive research methods (Spector & Pindek, 2016; Spector, 2017). Although part of our study follows this methodology, we also use a qualitative research method and inductive and abductive reasoning. To answer the main research question, both qualitative and quantitative methods are conducted in a sequential form, with one form building on the other (a sequential mixed methods design, see Creswell, 2009). Starting with the analyses of health care utilization data (quantitative, inductive), we move on to a systematic review and a case study (qualitative, abductive), followed by a large-scale survey and a field experiment (quantitative, deductive). Our use of inductive, abductive and deductive approaches to research thus adheres to the recent call made by Spector (2017) for a broader range of methodologies in occupational health science and the broader organizational sciences.

Another methodological contribution of this study lies in the use of a field experiment to study safety climate and employee health and safety. Our field experiment is one of the few intervention studies in the safety climate literature. Several scholars (Zohar, 2014; Leitão & Greiner, 2016; Griffin & Curcuruto, 2016) have called for an increase in studies testing an intervention that attempts to improve safety climate. Hence, we developed and experimentally tested a multifaceted safety climate intervention based on the insights provided by the research described in Chapters 3 to 6.

Next to the use of multiple research methodologies, this study also applies various techniques to analyze quantitative data. In general, there are main two perspectives on the analysis of the climate concept: an individual level perspective and a group level perspective (Ehrhart et al., 2014). Currently, most climate researchers consider safety climate an emerging, group level construct representing shared climate percep-

tions among organizational members (Zohar et al., 2014). Safety climate scores are, therefore, often derived by aggregation of employee's individual perceptions. Within the individual level perspective, safety climate is operationalized at the individual level of analysis and labeled as psychological climate. Both perspectives are used in this study, with Chapters 5 and 6 analyzing safety climate at the (organizational) group level and Chapter 7 analyzing individual safety climate perceptions. As the effects of safety climate in Chapters 5 and 6 are situated at the individual level, multi-level analyses are performed. In Chapter 6, a particular form of multilevel analysis is used, namely a 2-1-2 multilevel mediation analysis (Preacher et al., 2010) in which the dependent variable is situated at the highest level. One of the strengths of this technique is that it makes it possible to test both top-down and bottom-up processes. This is particularly interesting in the safety climate field, as one of its assumptions is that the way safety climate ultimately affects organizational outcomes is through individual employee level variables (Griffin & Curcuruto, 2016).

1.8 PRACTICAL AND SOCIETAL VALUE

The findings of this study have practical and societal relevance as well. As this study resulted from an academic-practitioner collaboration, the research questions were developed to meet both academic and practitioner interests. With regard to the practitioner interests, insights into the role of safety climate in employee health and safety are highly relevant for an number of stakeholders including health care organizations, governmental bodies, social partners and trade organizations. Especially given the labor market trends and challenges the health care sector is expected to face in the near future.

Health care sectors, such as those of The Netherlands, are faced with a constantly changing environment that requires a healthy and safe workforce. Labor market trends show that after many years of downsizing and budget cuts across the sector, labor shortages are expected to arrive. In addition, the ageing population increases the demand for care while simultaneously the labor force as a percentage of the population is shrinking (ZIP, 2009; AZW, 2016). Providing a healthy and safe workplace to all health care employees is necessary in order to maintain an effective health care system. Not least because sufficient health care staff is needed to meet future care demands, but also for the reason that employees who work in a healthy and safe care environment provide a higher quality of care (Aiken et al., 2002; 2008). Furthermore, healthy and safe workplaces are expected to result in lower sickness absence and health care

costs. Thus, the insights that our study provides are beneficial to employees, employers and society as a whole.

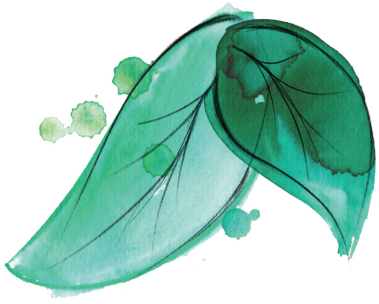
More specifically, by examining the role that safety climate plays in health and safety outcomes, our study informs organizations about the factors they should focus on if they wish to improve employee physical and psychological health, behavior and organizational health and safety performance outcomes such as absenteeism, presenteeism and health care utilization. Moreover, this study shows whether differences between physical and psychological health should be taken into account when attempting to improve employee health and safety in the workplace. As the Dutch Labor Inspectorate concluded in their report, many health care organizations struggle to find and implement the right measures to address the most significant risks, in particular in the psychosocial health and safety domain (Inspectie SZW, 2016). Our insights into the role of safety climate in this regard are valuable for organizations looking for ways to address these risks.

Finally, by presenting and testing a multifaceted safety climate intervention, we provide practitioners with an evidence-based approach to improve safety climate and behavior in the workplace. We extensively describe the activities that comprise the intervention in Appendix III. To further close the gap between research and practice, specific resources where developed in the collaborative research project, including a toolkit, instructions, and a video on the experiences of senior managers from two organizations that tested the intervention. Furthermore, Appendix IV includes an infographic with information on the practical application of the multifaceted safety climate intervention made for practitioners, which is named the 'Aanpak Organisatieklimaat' in the Dutch health care sector. All these resources can be downloaded for free online through www.izz.nl/organisatieklimaat (in Dutch). This way, our study provides actionable ways to improve employee health and safety and help reduce the variations in employee health and safety between health care organizations.

Chapter 2

How 'healthy' are health care organizations?

Exploring employee health care utilization rates among Dutch health care organizations



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ABSTRACT

Occupational health and safety research rarely makes use of data on employee health care utilization to gain insight into the physical and mental health of health care staff. This chapter aims to fill this gap by examining the prevalence of two relevant types of health care utilization among staff working in health care organizations: physical therapy and mental health care utilization. The chapter furthermore explores what role employee and organizational characteristics play in explaining differences in health care utilization between organizations. A Dutch health care insurance company provided health care utilization records for a sample of 417 organizations employing 136,804 health care workers in The Netherlands. The results showed that there are large differences between and within health care industries when it comes to employee health care utilization. Multivariate regression analyses revealed that employee characteristics such as age and gender distributions, and health care industry, explain some of the variance between health care organizations. Nevertheless, the results of the analyses showed that for all health care utilization indicators there is still a large amount of unexplained variance. Further research into the subject of organizational differences in employee health care utilization is needed, as finding possibilities to influence employee health and subsequent health care utilization is beneficial to employees, employers and society as a whole.

2.1 INTRODUCTION

Health care workers are exposed to a complex variety of physical and psychosocial risks everyday. The current research on occupational health and safety includes many different outcomes to examine the extent to which the health care work environment impacts employee physical and mental health. In most cases, studies rely on self-reports to collect data regarding employee health status (Short et al., 2009). Given the susceptibility to measurement errors associated with subjective measures (i.e. self-report bias, Spector, 1994), it is often suggested to use self-reports in conjunction with more objective measures based on archival data. Examples of archival data used as a proxy for employee health include sickness absence data, performance measures, accidents, injuries and death records (Fisher & Barnes-Farrell, 2013). One source of archival data that is widely used in economic and epidemiological research (Longobardi et al., 2011), but is rarely included in the field of occupational health and safety research is health care utilization. Health care utilization data can be understood and interpreted as a set of proxies that indirectly describe the health status of an individual, because individuals in better health would be expected to consume less health care services than those in worse health (Butler et al., 2009).

In current research, health care utilization data are mostly examined by looking at specific groups such as ethnic minorities, age groups or people with certain diseases such as diabetes or cancer. There is very little research examining utilization of health services by looking at specific occupational groups or organizations and there are, as far as we know, no studies examining health care utilization among employees working in health care organizations. This is surprising, because according to an U.S. health care industry study conducted by the Health care business of Thomas Reuters, hospital workers consume more medical services and accrue higher health care costs than the workforce at large (Thomson Reuters, 2011). This study also found that health risks for hospital employees were 8.6 percent higher than the general employee population. A hospital or health system with 16,000 employees would be able to save an estimated 1.5 million annually in medical costs for each 1 percent reduction in health risk. As the rise of health care costs is becoming an important issue to combat all around the world, more research into the patterns of health care utilization among specific groups, such as health care workers, is therefore needed.

With this study, we aim to shed more light on the health care utilization of employees working in health care organizations. Given the variation in type of care delivery and subsequent work demands within the health care sector (Davis & Kotowski, 2015), we furthermore distinguish between different health care industries. The study makes use

of specific insurance claim data from The Netherlands. We specifically focus on the utilization of two types of health care services: physical therapy and mental health care, which serve as proxies for musculoskeletal disorders and mental health problems. We made this choice because according to the EU-OSHA, the most common health threats posed by the work environment in European countries are musculoskeletal and mental health problems (EU-OSHA, 2009). In The UK for instance, around 80% of the new work-related conditions in 2015 were musculoskeletal disorders or stress, depression or anxiety (Health and Safety Executive, 2015a). Moreover, a study by Goetzel et al. (2004) showed that health problems such as musculoskeletal disorders, depression and anxiety are among the top-20 list of health conditions requiring attention due to their high costs faced by employers and society. Research from the Netherlands for instance shows that musculoskeletal disorders and psychosocial disease are responsible for 83% of the cost of work-related ill health (Eurofound, 2004).

By examining physical therapy utilization and mental health care utilization we provide insight into the prevalence of two of the most common health threats in health care organizations. Moreover, we are interested in examining what role employee and organizational characteristics play in employee health care utilization, as this could provide us with possible explanations of utilization patterns among health care organizations. These findings can subsequently serve as input in the formation of policies to improve health care worker health and reduce employee health care costs. The main goal of the study is thus twofold: (1) to describe the physical therapy and mental health care utilization of employees working in Dutch health care organizations, and (2) to examine what role employee and organizational characteristics play in explaining differences in health care utilization between health care organizations.

2.2 METHODS

2.2.1 Data collection and sample

The study population comprises health care organizations in the four biggest health care industries in The Netherlands: the hospital sector, nursing homes and home care, mental health care, and disability care. The Dutch health care system is primarily public and funded by means of taxes. Employers pay a fixed percentage of their employee's income to the tax administration. In addition, employees also pay a fixed percentage of their income to the government. The remaining part of the health care funding is the monthly premium that each person pays to his or her health care insurance provider. In The Netherlands it is mandatory to take out standard health insurance.

For this research, we used health care utilization records from the year 2015 to examine differences in physical therapy and mental health care utilization among employees working in health care organizations. These data were made available by a national health care insurance provider (IZZ), which is focused on providing health care insurance specifically for Dutch health care workers. We selected the health care utilization data from health care organizations with an IZZ insurance participation rate of 10 percent, meaning that at least 10 percent of the employees working within the organization have this specific IZZ health care insurance. This cut-off point generated an acceptable number of health care organizations included in the sample to perform multiple linear regression analyses and is representative of the population of health care organizations in The Netherlands.

Our selection resulted in a sample of 417 organizations (employing 136,804 IZZ insured workers) from a total population of 2,285 registered health care organizations (our sample thus represents 18,2% of the Dutch population). The average IZZ insurance participation rate in these organizations was 24.6% and ranged between 10.1% per organization to 69.2% per organization. This corresponds with a mean of 328 IZZ insured employees per organization (25 employees per organization for the smallest organization to 2,798 employees for the largest organization). Table 2.1 presents the distribution of organizations in our sample compared to the distribution in the population.

Table 2.1 Health care organizations included in the study compared to the population of health care organizations in The Netherlands

	Included in study sample	Population in The Netherlands	Sample percentage of population
Health care industry			
Hospitals*	100	139	71.9%
Nursing homes and home care	155	1,900	8.2%
Mental health care	79	89	88.8%
Disability care	83	157	52.9%
Total	417	2,285	18.2%

*Including specialized hospitals and rehabilitation clinics
N = 417 organizations

The results show that hospitals and mental health care facilities are overrepresented in our sample and nursing homes are underrepresented. There are several reasons for this. First, the distribution of IZZ insured employees is traditionally higher among hospitals and mental health care facilities. Second, in general, nursing homes and home care organizations are smaller in size. Many very small organizations (<25 employees) do not have an agreement with insurance companies to provide an employer contribu-

tion to the insurance premium of their employees. This makes the participation rate of IZZ insured employees relatively low in this sector.

2.2.2 Measures

Health care utilization – In view of the privacy of individual employees, the 2015 health care utilization data were provided by IZZ at the aggregated organizational level. We used three different indicators of health care utilization for each type of health care service: user rate, treatments per user and costs per 100 employees. The user rate is the percentage of employees within the organization that visited a physical therapist (for physical therapy utilization) or a mental health care provider such as a psychologist, therapist or psychiatrist (for mental health care utilization) during the past year. The treatment per user indicator represents the average number of physical therapy or mental health care treatments per user within the organization. The health care costs indicator describes the average costs of health care utilization in euros per 100 employees within the organization.

As health care utilization varies with age and gender (Bernstein et al., 2003; Koopmans & Lamers, 2007), the following employee characteristics were included in the analyses:

Employee age – The average employee age in years within the organization.
Employee gender – The percentage of female employees working within the organization.

The following organizational characteristics were available and included in the analyses:

Health care industry – The specific health care industry the organization belongs to (based on the type of patients and the type of health care provided). As the amount of physical and mental strain accompanying the work in these industries differs considerably (Simon et al., 2008), we expect the health care industry to be important for employee health care utilization. We included three dummy variables with the hospital industry as the reference category: nursing homes and home care, mental health care, and disability care.
Organizational size – The total number of employees working within the organization.
Urbanization – The urbanization rate of the geographical area the organization is located in.
IZZ participation rate – The percentage of employees within the organization that have an IZZ health care insurance (our sample within the organization).

2.3 RESULTS

Tables 2.2 and 2.3 include means, standard deviations, ranges and correlations for the variables in this study. The results show that almost one third (32.8%) of the employees working in a health care organization visited a physical therapist in 2015. This percentage is lower for mental health care utilization: 5.7% of the employees visited a therapist, psychologist or psychiatrist. When we look at the treatments per user and costs indicators, we see that the average number of treatments per user and the costs per 100 employees are also lower for mental health care utilization (mean treatments = 3.4 and mean costs = €13,429) than for physical therapy utilization (mean treatments = 13.4 and mean costs = €5,106). Finally, the range statistics show that there are large differences between organizations when it comes to health care utilization, both in utilization of services (users and treatments) and costs.

Table 2.2 Descriptive statistics of study variables

	Mean	**S.D.**	**Range (min. – max.)**
Health care utilization			
Physical therapy utilization (user rate)	32.83%	6.94%	15.38% – 65.52%
Physical therapy utilization (treatments per user)	13.38	3.23	3.25 – 35.75
Physical therapy costs (per 100 employees)	€13,429.68	€46,19.12	€1,647.88 - €36,435.45
Mental health care utilization (user rate)	5.68%	2.79%	0.00% – 17.86%
Mental health care utilization (treatments per user)	3.43	5.24	0.00 – 99.67
Mental health care costs (per 100 employees)	€5,106.16	€8,903.62	€0.00 – €138,923.51
Employee characteristics			
Employee age (average age within org.)	48.44	2.22	38.99 – 55.36
Employee gender (% females within org.)	.78	.10	0.32 – 1.00
Organizational characteristics			
Health care industry (hospital = ref. cat.)			
Nursing homes and home care	.37	.48	.00 – 1.00
Mental health care	.19	.39	.00 – 1.00
Disability care	.20	.40	.00 – 1.00
Organizational size (number of employees)	1,312.57	1,331.22	47 – 12.904
Urbanization rate	3.64	1.10	1.00 – 5.00
IZZ participation rate	24.58%	11.99	10.05% – 69.23%

S.D. = standard deviation
N = 417 organizations

Table 2.3 Correlations between study variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Dependent variables														
1. Physical therapy utilization (user rate)	1													
2. Physical therapy utilization (treatments per user)	.16**	1												
3. Physical therapy costs (per 100 employees)	.69**	.77**	1											
4. Mental health care utilization (user rate)	.08	-.05	.00	1										
5. Mental health care utilization (treatments per user)	.02	.09	.09	.05	1									
6. Mental health care costs (per 100 employees)	.00	.01	.01	.19**	.83**	1								
Employee characteristics														
7. Employee age (average age within org.)	.24**	.20**	.30**	-.21**	.04	-.06	1							
8. Employee gender (% females within org.)	.33**	.12*	.28**	-.01	.05	-.06	.06	1						
Organizational characteristics														
Health care industry (hospitals = ref.cat.)														
9. Nursing homes and home care industry	.38**	.17**	.37**	.09	.08	-.00	.349**	.54**	1					
10. Mental health care industry	-.17**	-.16**	-.22**	-.01	-.03	.06	-.015	-.55**	-.37**	1				
11. Disability care industry	.10*	.06	.09	.12*	-.05	.02	-.246**	-.09	-.38**	-.24**	1			
12. Organizational size (number of employees)	-.15**	-.01	-.11*	-.07	-.02	-.06	-.132**	-.06	-.15**	-.10*	.02	1		
13. Urbanization rate	-.19**	-.0	-.18**	.02	-.11*	-.02	.025	-.19**	-.17**	.12*	-.11*	.12*	1	
14. IZZ participation rate	-.17**	-.06	-.14**	-.16**	-.06	-.02	-.066	-.16**	-.42**	.31**	-.12*	.03	.06	1

*p<.05
**p<.01
N = 417 organizations

To shed some light on the large differences in health care utilization between organizations, we broke down the indicators and produced scatterplots for each health care industry (see Table 2.3 and Figure 2.1). The results show that two types of differences in health care utilization are visible in the data: differences between health care industries and differences between organizations within the same health care industry.

A one-way between-groups analysis of variance (ANOVA) was conducted to explore the impact of health care industry on the physical therapy and mental health care utilization indicators. Table 2.4 shows group means for each health care industry. The ANOVA output revealed that there was a statistically significant difference (at the $p > .05$ level) in physical therapy utilization (user rate [F (3, 413) = 40.27, $p < .05$]; treatments per user [F (3, 413) = 7.21, $p < .05$]; and costs [F (3, 413) = 33.32, $p < .05$]) and mental health care utilization (user rate [F (3, 413) = 6.58, $p < .05$]). Given the fact that significant differences were established, it was necessary to further find out which groups were significantly different from which other groups. This was done by use of a post-hoc test (Tukey HSD). The results of the post-hoc test presented in Table 2.4 show an interesting difference between hospitals and mental health care on the one hand, and nursing homes and disability care on the other hand. Nursing homes and disability care homes have a significant higher mean in physical therapy user rate and physical therapy costs compared to hospitals and mental health care

Table 2.4 Differences in health care utilization between health care industries

	Physical therapy utilization			**Mental health care utilization**		
	User rate	Treatments per user	Costs	User rate	Treatments per user	Costs
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)
Health care industry						
Hospitals	28.29%^{ab} (5.35)	12.81^{a} (3.9)	€10,995.13^{ab} (€2,977.61)	4.69^{ab} (1.53)	3.23 (1.62)	€4,032.76 (€4,569.01)
Nursing homes and home care	36.26%^{ac} (6.89)	14.11^{ab} (3.24)	€15,616.64^{ac} (€4,984.74)	6.00%^{a} (3.06)	3.97 (8.13)	€5,091.32 (€12,085.59)
Mental health care	30.35%^{cd} (5.69)	12.31^{bc} (2.00)	€11,356.64^{cd} (€2,664.78)	5.62% (2.49)	3.15 (3.00)	€6,129.65 (€8,860.13)
Disability care	34.23%^{bd} (5.89)	13.75^{c} (3.81)	€14,251.91^{bd} (€4,798.49)	6.33%^{b} (3.38)	2.89 (1.52)	€5,452.94 (€5,044.70)
Total health care sector	32.83% (6.94)	13.38 (3.23)	€13,429.68 (€4,619.12)	5.68% (2.79)	3.43 (5.24)	€5,106.16 (€8,903.62)

^{abcd} The mean difference between groups with the same letter is statistically significant at the $p<.05$ level
S.D. = standard deviation
N = 417 organizations (100 hospitals, 155 nursing homes, 79 mental health care facilities, 83 disability care organizations)

facilities. Furthermore, the mean physical therapy treatments indicator also differed significantly between the nursing homes industry on the one side and the hospitals and mental care industry on the other side. From the mental health care utilization indicators, only the user rate appeared to significantly differ between industries. Again, the nursing homes and disability care homes scored significantly higher on mean mental health care utilization rate compared to the hospital industry.

Figure 2.1 shows the scatterplots of physical therapy and mental health care utilization user rates within each of the four health care industries. The plots identify a scattered, non-linear pattern indicating there is no relationship between physical therapy utilization and mental health care utilization (see also correlations in Table 2.3). Moreover, the plots show that within each industry, there are large differences between individual health care organizations. As can be seen in the plots in Figure 2.1, the variation in health care utilization is especially large in the long-term care settings (nursing homes and disability care).

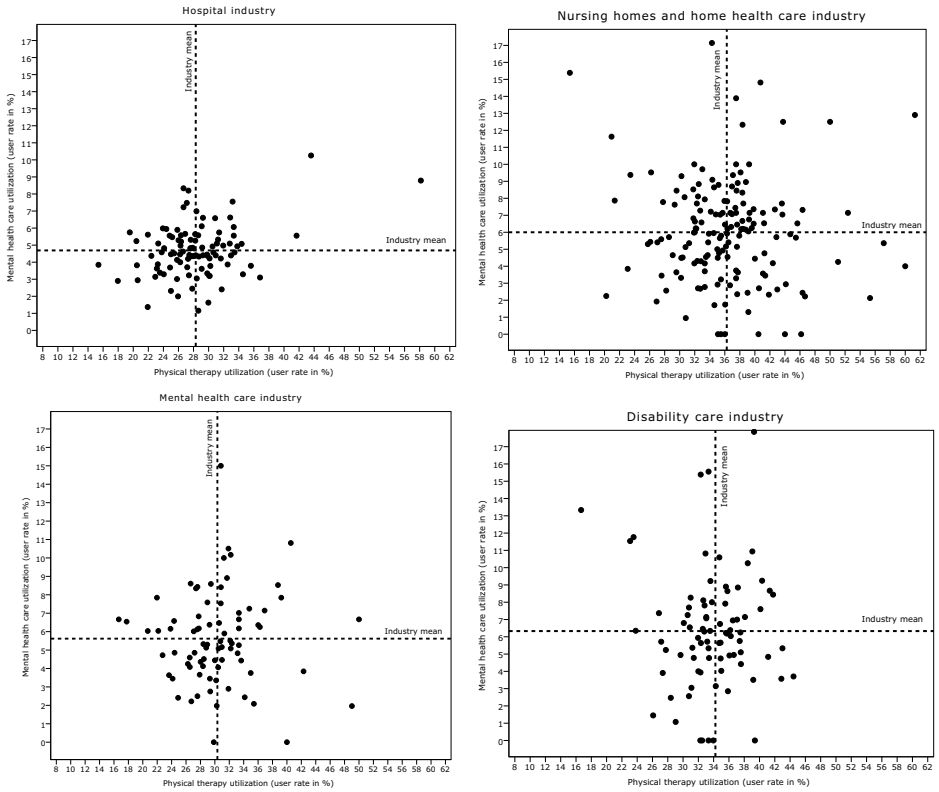

Figure 2.1 Scatterplots of differences in health care utilization between health care organizations

In order to find leverage points for reducing employee health care utilization, the second goal of this chapter was to examine what role employee and organizational characteristics play in explaining differences in health care utilization between health care organizations. We used multiple linear regression analyses to test the relationship between employee characteristics within the organization (average age and gender), organizational characteristics (industry, size and urbanization) and the three health care utilization indicators.

The results presented in Table 2.5 show that employee age and gender have a positive relationship with all three physical therapy utilization variables, indicating that organizations with a higher average employee age and a higher percentage of female employees score higher on physical therapy user rate (age: β= .17; p< .01; gender: β= .32; p< .01), treatments per user (age: β= .20; p< .01) and costs per 100 employees (age: β= .23; p< .01; gender: β= .13; p <.05). This result is consistent with generally higher use of health care services among the elderly and women (Bernstein et al., 2003; Koopmans & Lamers, 2007). The second models with the organizational characteristics show that health care industry has a significant effect on physical therapy utilization. In line with the results presented in Table 2.4 and Figure 2.1, we found that nursing homes and disability care homes have a significant higher physical therapy user rate (nursing homes: β= .39; p< .01; disability care: β= .35; p< .01) and costs (nursing homes: β= .33; p< .01; disability care: β= .29; p< .01) compared to organizations in the hospital sector. Organizations providing mental health care have a significant higher user rate than those in the hospital industry (β= .19; p< .01). Organizational size and urbanization rate were not significantly related to any of the three physical therapy utilization indicators. The second model shows that the included employee and organizational characteristics together explain 28% of the variation in physical therapy user rate, 8% in physical therapy treatments per user and, 25% in physical therapy costs. Although employee age and gender account for the largest share in explained variance, there is thus still a large part of variance unexplained.

The analyses for mental health care utilization in Table 2.6 did not show any significant relationship between employee characteristics, organizational characteristics and mental health care costs. For mental health care treatments per user we found one positive significant effect of urbanization rate (β= .11; p< .05). This means that health care organizations located in more urbanized geographical areas have a higher average number of mental health treatments per user among their employees than health care organizations located in rural areas. This is in line with the general finding that mental health problems are more prevalent in cities than on the countryside (Peen et al., 2010). For the mental health care user rate indicator the results show that employee

Table 2.5 Multiple linear regression analysis with physical therapy utilization indicators as dependent variables

	Physical therapy user rate		**Physical therapy treatments per user**		**Physical therapy costs per 100 employees**	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	β (S.E.)	*β* (S.E.)	*β* (S.E.)	*β* (S.E.)	*β* (S.E.)	*β* (S.E.)
Constant (B)	-17.58* (7.16)	-8.82 (7.99)	-3.25 (3.53)	-.88 (4.21)	-23,251.22** (4,777.81)	-13,599.43** (5,428.22)
Employee characteristics						
Employee age	.22** (0.14)	.17** (.14)	.20** (.07)	.20** (.08)	.27** (94.38)	.23** (97.15)
Employee gender	.32** (3.25)	.23** (4.05)	.11* (1.60)	.02 (2.13)	.26** (2,165.01)	.13* (2,750.39)
Organizational characteristics						
Health care industry (hospitals = ref. cat.)						
Nursing homes and home care		.39** (.88)		.12 (.46)		.33** (594.91)
Mental health care		.19** (1.01)		-.07 (.54)		.06 (689.62)
Disability care		.35** (.91)		.13* (.48)		.29** (616.82)
Organizational size		-.03 (.00)		.03 (.00)		-.01 (.16)
Urbanization rate		-.06 (.28)		-.04 (0.15)		-.08 (187.72)
R^2	.16	.28	.05	.08	.15	.25
Change in R^2		.13**		.03*		.10**
F for change in R^2		14.76**		2.61*		11.28**

*p<.05
**p<.01
S.E. = standard error
N = 417 organizations

age has a significant negative effect (β= -.28; p< .01), indicating that health care organizations with a younger workforce have a higher mental health care user rate. Finally, we found that, similar to the results for physical therapy utilization, health care industry matters. Nursing homes and disability care homes have a higher percentage of mental health care users among their employees than hospitals (nursing homes: β= .37; p< .01; disability care: β= .21; p< .01). Employee gender, organizational size and urbanization rate did not have a significant relationship with mental health care

user rate. Contrary to physical therapy user rate, we found that the explained variance between organizations for mental health care user rate is mostly accounted for by the organizational characteristics. Nevertheless, the results show there is still a large part of variance between organizations within the discerned sectors unexplained in our mental health care utilization indicators.

Table 2.6 Multiple linear regression analysis with mental health care utilization indicators as dependent variables

	Mental health care user rate		**Mental health care treatments per user**		**Mental health care costs per 100 employees**	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	β (S.E.)	*β* (S.E.)	*β* (S.E.)	*β* (S.E.)	*β* (S.E.)	*β* (S.E.)
Constant (B)	18.31 (3.06)	23.59 (3.55)	-3.09 (5.86)	2.55 (7.06)	20,814.09* (9,951.37)	28,095.51* (11,997.30)
Employee characteristics						
Employee age	-.21** (.06)	-.28** (.06)	.04 (.12)	.02 (.13)	-.06 (196.59)	-.09 (214.71)
Employee gender	.01 (1.39)	-.10 (1.80)	.05 (2.67)	.00 (3.58)	-.06 (4,509.36)	-.08 (6,078.84)
Organizational characteristics						
Health care industry (hospitals = ref. cat.)						
Nursing homes and home care		.37** (.39)		.03 (.77)		.10 (1,314.85)
Mental health care		.10 (.45)		-.01 (.90)		.05 (1,524.18)
Disability care		.21** (.40)		-.05 (.80)		.04 (1,363.29)
Organizational size		-.07 (.00)		.00 (.00)		-.05 (.34)
Urbanization rate		.09 (.12)		.11* (.24)		-.02 (414.90)
R^2	.04	.11	.01	.02	.01	.02
Change in R^2		.08**		.01		.01
F for change in R^2		7.49**		1.11		.87

*p<.05
**p<.01
S.E. = standard error
N = 417 organizations

2.4 DISCUSSION AND CONCLUSIONS

2.4.1 Discussion

The main aim of this study was to describe the physical therapy and mental health care utilization of employees working in Dutch health care organizations, and to examine what role employee and organizational characteristics play in explaining differences in health care utilization between health care organizations. The results showed that, in The Netherlands, on average 32.8% of staff employed by a health care organization visit a physical therapist and 5.7% visit a mental health care provider every year. Compared to the Dutch population average of individuals between 20 and 65 years old, physical therapy utilization is higher among staff working in health care organizations (Dutch population average is 23.6%). On the other hand, the mental health care utilization average of the Dutch population (8.9%) is slightly lower (CBS, 2015). These percentages will probably vary across countries, as health care utilization varies according to characteristics of the health care system and socio-economic status.

Our exploratory analyses also showed that there are large differences between health care industries when it comes to employee health care utilization. Especially interesting is the difference between hospitals and mental care facilities on the one side and nursing homes and disability care organizations on the other side. Both physical therapy and mental health care utilization is significantly higher among nursing homes, home health care organizations and disability care homes compared to hospitals. One explanation for this could be that the level of physical and mental workload is higher in long-term care settings (Van den Berg et al., 2006). Employees in nursing homes are, for example, exposed to a greater amount of heavy handling and work under high time pressure more often than their counterparts in hospitals (Boyer, 2008; Kurowski et al., 2015). Furthermore, employees working in hospitals generally have a higher educated population (Van den Berg et al., 2006) and a lower experience of physical load (Alexopoulos et al., 2006), which could explain the lower health care utilization within the hospital industry. The differences in qualification level of nurses between hospitals and nursing homes could also potentially play a role. A study by Simon et al. (2008) for instance showed that nursing aides are slightly more at risk of disability than registered nurses. However, there are very few studies investigating employee health in health care organizations other than hospitals. Research in mental health facilities and long-term care organizations such as nursing homes or disability care homes are relatively scarce (Davis & Kotowski, 2015). Given the increasing demands in long-term care, it is important to have a better understanding of employee health, safety and health care utilization in these types of health care industries. To shed more light on the unexplained variation in health care utilization between health care indus-

tries, it would be interesting to include information on educational level, health care profession, and work demands as these socio-economic factors differ between health care settings. Unfortunately, it was not possible to add information about profession or educational level of individual health care professionals to our health care utilization dataset due to privacy legislation. Moreover, at the moment the data are not available at the organizational level. In the future it would be interesting to study differences between health care industries by examining a smaller sample of organizations and link their health care utilization rates to information on type of profession at the organizational level.

Another relevant conclusion from our research concerns the large differences in health care utilization between similar health care organizations within the same health care industry. Multivariate regression analyses showed that for physical therapy the employee characteristics (average age and gender) explained some variance between organizations. Organizational size and urbanization rate were not significantly related to our physical therapy utilization indicators. Urbanization rate was only negatively related to mental health care treatments per user. For mental health care user rate we found that the specific health care industry makes up the largest part of the explained variance. Nevertheless, the results of the analyses showed that for all health care utilization indicators there is still a large amount of unexplained variance. This suggests there are other factors contributing to the differences between health care organizations. Future research should examine this more in-depth and consider other variables that might help explain these differences. Obviously, employee characteristics concerning lifestyle such as such as smoking, physical inactivity, and eating behaviors should be incorporated. However, other organizational characteristics such as psychosocial work factors may also play a role in this (for example see Butler et al., 2009; Azagba & Sharaf, 2011; Gershon et al., 2007; Bronkhorst et al., 2015). Factors such as leadership and organizational climate have proven to be related to worker health, and can vary significantly between organizations that provide the same type of care. A study by Aiken et al. (2008) has for instance shown that the odds of nurses being burned out were lower by 24% in hospitals with better work environments relative to hospitals with poor work environments (i.e. poor staff development, leadership and collegial relationships). Stone and Gershon (2006) found that intensive care units of hospitals with a better organizational climate had lower rates of musculoskeletal injuries than the ones with lower organizational climate scores. The results of these studies indicate that employees' perceptions of their work environment could be an interesting factor to examine in relation to health care utilization. More research on the relationship between various employee and organizational variables and health care utilization is needed to discover why similar organizations differ greatly in worker

physical and mental health. An increased understanding of the factors underlying these differences is important because it provides information to policymakers and stakeholders on how to reduce employee mental and physical ill-health and subsequent adverse outcomes for the health care industry and, in the end, society as a whole. We therefore urge researchers in the field of health care management to further examine the health care utilization rates of health care organizations in different industries, and investigate their relationship with other organizational factors.

2.4.2 Strengths and limitations of the study

The strength of this exploratory study is that few researchers have considered exploring the health care utilization patterns of employees, and few researchers have focused on these patterns within health care organizations. Our sample consisting of 417 organizations presents almost one fifth of the entire population of Dutch health care organizations. As the health care industry is continuously growing and rising health care costs are becoming an important issue all around the world, learning more about possible ways to prevent ill health and accompanying costs in this sector is crucial.

As with every research, this study also has its limitations. First, our research exclusively focuses on physical therapy and mental health care. Although these two types of health care are occupationally relevant, people with musculoskeletal disorders or mental health problems might also make use of other types of health care, such as hospital care or alternative medicine (both are not included in our measure). We should keep this in mind when interpreting the results as proxies for physical and mental health problems. A second limitation concerns the limited number of independent variables that were available for this research. To really gain insight into the employee and organizational characteristics that explain the organizational variance in employee health care utilization, more extensive explanatory analyses are needed. Finally, although our sample has a considerable size, the nursing homes industry is underrepresented compared to the other industries. Moreover, it is uncertain whether the IZZ insured employees within each organization adequately represent the entire staff. Therefore, sampling bias might have influenced the external validity of our results (Berk et al., 1983).

2.4.3 Implications for practice

Understanding the health care utilization patterns of health care employees is important because these data can serve as proxies for health care workers' mental and physical health (Butler et al., 2009). Our results show that there are large differences in the physical and mental health status of employees working in different health care

industries and between employees working in different organizations within the same industry. This implies organization- and industry-specific characteristics play a role in the health of health care employees. This opens up possibilities for health care organizations to influence employee health and subsequent health care utilization, which Is beneficial to employees, employers and society. Besides the direct economic burden of illness on society, our results are also interesting for employers as our findings about within-industry differences in employee health might also point to differences in health-related productivity losses (Goetzel et al., 2004), and eventually differences in quality of care between health care organizations. Gaining more insight into the health care utilization rates of health care organizations and monitoring these rates can therefore be an interesting way to keep tabs of employee health and subsequent outcomes.

2.4.4 Conclusions

The results of this study revealed that there are large organizational differences in health care utilization across health care industries and between organizations in the same health care industry. Differences in employee- or organizational characteristics such as age, gender, organizational size, or urbanization rate could not fully explain the variance between organizations. These findings highlight the need for research into other organizational factors that help explain the utilization differences between health care organizations and –industries. More insight into the health care utilization rates of organizations will provide new ways of monitoring health care workers' health and minimizing the costs and burden of ill health.

Chapter 3

Organizational climate and employee mental health outcomes: A systematic review of studies in health care organizations

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ABSTRACT

In recent years, the high prevalence of mental health problems among health care workers has given rise to great concern. The academic literature suggests that employees' perceptions of their work environment can play a role in explaining mental health outcomes. We conducted a systematic review of the literature in order to answer the following two research questions: (1) how does organizational climate relate to mental health outcomes among employees working in health care organizations and (2) which organizational climate dimension is most strongly related to mental health outcomes among employees working in health care organizations? Four search strategies plus inclusion and quality assessment criteria were applied to identify and select eligible studies. As a result, 21 studies were included in the review. Data were extracted from the studies to create a findings database. The contents of the studies were analyzed and categorized according to common characteristics. The results showed that perceptions of a good organizational climate were significantly associated with positive employee mental health outcomes such as lower levels of burnout, depression, and anxiety. More specifically, our findings indicate that group relationships between coworkers are very important in explaining the mental health of health care workers. There is also evidence that aspects of leadership and supervision affect mental health outcomes. Relationships between communication, or participation, and mental health outcomes were less clear. If health care organizations want to address mental health issues among their staff, our findings suggest that organizations will benefit from incorporating organizational climate factors in their health and safety policies. Stimulating a supportive atmosphere among coworkers and developing relationship-oriented leadership styles would seem to be steps in the right direction.

3.1 INTRODUCTION

In recent years there has been great concern over the work-related mental health of employees working in health care organizations. Several studies have reported a high incidence of mental distress among health care workers. Based on data from the literature, Embriaco et al. (2007) concluded that severe burnout syndrome is present in about 50 percent of critical care physicians and in one-third of critical care nurses. Letvak et al. (2012) found 18 percent of 1,171 U.S. hospital nurses surveyed reported depressive symptoms: a figure twice that in the general population.

A large number of empirical studies have focused on organizational factors that explain the mental health problems of health care workers. These often rely on theoretical frameworks, such as the effort-reward imbalance model or the job demands-control (JD-C) model, that provide insights regarding the impact of an individual's job design. The growing body of empirical research on the relationship between individual job design and employee health has given rise to several systematic reviews on the subject. For instance, Michie and Williams (2002) reviewed the literature up to the year 2000 and concluded that the empirical evidence is consistent with the JD-C model: that the most common work factors associated with psychological ill health are work demands (long hours, workload, and pressure), a lack of control over work, and poor support from managers.

Although these factors certainly influence employee mental health outcomes, the majority of research to date has examined psychological ill health from an individual job design perspective (e.g. Stansfeld & Candy, 2006). In this study, we have taken a different, less familiar, perspective that focuses on the organizational climate (OC) within an organization. Rooted in Lewinian field theory, the OC approach concentrates on those aspects of the social environment that are consciously perceived by organizational members (Denison, 1996). In this review, we explicitly view OC as *the perceptions of the social and interpersonal aspects of the work situation* (Wilson et al., 2004) such as leadership, group behavior, and communication. In taking an OC perspective, we hoped to add to what is already known from the reviews and studies that adopt an individual job design perspective. While we recognize the importance of employees' perceptions of their immediate work tasks in explaining mental health outcomes, we believe that a broad review of studies that include mental health predictors related to the social and interpersonal aspects of the work situation will contribute to our knowledge about occupational mental health in health care organizations. Our focus on OC will moreover provide new directions to those interested in managing the health of health care workers.

Although there have been several systematic reviews on the subject of OC, these have focused either on outcomes other than employees' mental health, such as work attitudes, motivation, and performance (Parker et al., 2003), or on a specific aspect of climate such as safety climate (Clarke, 2006) or ethical climate (Schluter, 2008). We were able to identify two literature reviews that had examined the impact of OC on health outcomes among health care employees. First, MacDavitt et al. (2007) conducted a review on the effects of OC on patient and employee outcomes. However, their search strategy only included burnout as a mental health outcome, and they only reviewed studies conducted in hospitals. The second review, by Gershon et al. (2007), addressed the role of OC in three health outcomes: musculoskeletal disorders, needlestick injuries, and burnout. However, as in the other review, burnout was the only indicator of employee mental health used. Further, the review only included empirical studies within US hospitals. These reviews both concluded that OC is related to employee mental health. More specifically, Gershon et al. (2007) concluded that leadership variables are associated with burnout among health care employees. The current chapter contributes to the field by extending the existing literature reviews of MacDavitt et al. (2007) and Gershon et al. (2007) in four ways. First, by employing a time period covering the period from 2000 and 2012, we include more recent work published in the five years since the earlier reviews. Second, we did not limit ourselves to studies in hospitals or about nurses, but examined a wide variety of health care organizations and occupations. Third, we included a wide range of mental health problems (i.e. burnout, anxiety, depression, psychological distress). Finally, we also searched for evidence of an OC–mental health relationship in studies conducted in countries other than the United States.

There is a lack of uniformity in both the terminology and the measurement of the OC concept (Kuenzi & Schminke, 2009). We decided, therefore, to not only look at the impact of OC as a distinct construct, but also include research on the mental health consequences of dimensions that are generally seen as part of this climate construct. In this respect, we distinguished three dimensions of OC based on the work of Wilson et al. (2004) and Gershon et al. (2004): (1) leadership and supervision, (2) group behavior and relationships, and (3) communication and participation. As such, the purpose of this chapter is to give a comprehensive overview of the published evidence on the relationship between OC (and three of its dimensions) and mental health outcomes. To this end, a systematic review was conducted guided by the following two research questions:

RQ 1: *How does organizational climate relate to the mental health of employees working in health care organizations?*

RQ 2: *Which dimension of organizational climate is most strongly related to the mental health of employees working in health care organizations?*

3.2 THEORETICAL FRAMEWORK

3.2.1 The organizational climate concept

The OC concept has been defined in many different ways (Schneider, 2013) and previous research has highlighted the lack of consensus in terminology and measurement (e.g. Fink & Chen, 1995; Kuenzi & Schminke, 2009). Most OC scholars tend to agree on the following two aspects of the climate concept.

First, there is considerable agreement on the distinction between organizational climate and culture. Although the concepts have some conceptual overlap, they are distinctly identifiable within organizations (Moran & Volkwein, 1992; Schneider et al., 2013). Culture refers to the implicit underlying values, beliefs, and assumptions that guide employees' behavior (Schneider et al., 2013). Climate, in contrast, concerns the meaning employees attach to the tangible policies, practices, and procedures they experience in their work situation (Schneider et al., 2013). In this review, we explicitly focus on employee perceptions of the social and interpersonal practices of the work situation (Wilson et al., 2004). Wallace et al. (1999) studied the relationship between culture and climate and concluded that both concepts are related, but that a causal direction between the two should not be presumed.

Second, OC can be described either in terms of organizational features that can be applied to any number of contexts and industries, or in terms of specific features that are tied to the subject of interest. The first approach is referred to as a global approach to climate (Patterson et al., 2005) or as molar climates (Schneider et al., 2013). The latter approach is described as a domain-specific approach (Patterson et al., 2005), or as focused climates (Schneider et al., 2013), and addresses certain types of climate such as service climate, safety climate, or ethical climate. However, there is little research on the relationship between specific climates and general OC (Schneider et al., 2013). One notable exception is the study by Neal et al. (2000) that found that general OC has a significant impact on the safety climate within the Australian hospital sector.

Several studies have found that climate perceptions are related to a number of important performance outcomes in health care, such as quality of care (Aiken et al., 2002), innovative behavior (West & Anderson, 1996), and patient satisfaction (Ancarani et al., 2009). Other health care worker-related outcomes that have been related to OC

include job satisfaction, commitment, and intention to leave (Aarons & Sawitzky, 2006; Stordeur et al., 2007). As such, it is important that health care organizations understand how the OC they generate affects their employees and performance.

3.2.2 Organizational climate dimensions

To further clarify the description of OC used in this study, we adopt a characterization of the concept used by Gershon et al. (2004). These authors conducted a review of the biomedical literature to start a process of standardizing the terminology. To this end, they reviewed measurement instruments for OC and identified four major dimensions of the concept: (1) leadership characteristics, (2) group behaviors and relationships, (3) communication, and (4) structural attributes of the quality of work life. The first three dimensions clearly refer to social and interpersonal aspects of the work situation. However, the structural attributes dimension better fits the work domain that Wilson et al. (2004) described as 'job design'. The clear separation between aspects belonging to the job design domain and those aspects that are classified as OC (see also the conceptual model by Stordeur et al., 2007) led us to exclude Gershon et al.'s (2004) structural attributes dimension from this review. Further, since participation and involvement are also frequently included as climate dimensions in the literature (Patterson et al., 2005), the communication dimension was extended to cover 'communication and participation'. This left us with the following three dimensions (see also Gershon et al., 2004):

1. *Leadership and supervision*. This refers to an employees' perception of leadership and supervision, and comprises aspects such as: leadership style, type of supervision, degree of management support, leadership trust, and type of leadership hierarchy.

2. *Group behaviors and relationships*. This dimension describes characteristics of interpersonal interactions, group behaviors, co-worker trust, group supportiveness, and group cohesion.

3. *Communication and participation*. The final dimension refers to the formal and informal mechanisms used to transfer information. The degree of participation or involvement in decision-making is also included.

3.2.3 Employee mental health

For our study, we chose to interpret the term health in line with the argument of Danna and Griffin (1999). They proposed that the term 'health' should be used in organizational research that investigates physiological or psychological symptomology within an essentially medical context (i.e. reported symptomology or diagnosis of illness or

disease). 'Well-being', on the other hand, tends to be a broader concept that takes the whole person into consideration (e.g. job or life satisfaction, commitment). Since we are interested in employees' mental health, we have examined outcomes that are either listed as a psychological disease (burnout, depression, and anxiety) or are more general measures of mental health (psychological distress and general mental health). We chose this rather broad range of mental health outcomes to boost the number of studies included in our review.

3.2.4 Organizational climate and employee mental health

Theorists and researchers have proposed a variety of mechanisms linking OC to mental health. Generally, the research can be divided based on which of two sets of models was employed.

One set of models describes OC as a job stressor that directly influences employees' mental health. For example, in their model of a healthy workplace, Kelloway and Day (2005) show that organizational factors (e.g. interpersonal relationships at work, employee involvement, and a culture of support, respect, and fairness) influence mental health. In this model, both job demands and broader organizational characteristics, such as climate, act as occupational stress factors that affect mental health outcomes.

The other set of models proposes an indirect relationship between OC and employee mental health. For example, in their model of the healthy work organization, Wilson et al. (2004) showed that OC is related to mental health through its effects on job design, job future, and psychological work adjustment. Based on these findings, it was argued that employees' perceptions of their work environment influence the way they relate to their job and their future in the organization. Positive perceptions decrease job stress and therefore result in better mental health. Our review includes studies from both groups of models.

3.3 METHODS

3.3.1 Literature search

Four complementary searching strategies were used to find relevant studies for our systematic review. First, a computerized search was initiated using three electronic databases: PsychINFO, Medline, and Scopus. Searches included several keywords and synonyms to locate studies published between 2000 and 2012 that covered relevant (sub-) concepts. We attempted to find studies that addressed OC by using keywords such as social context, work, or practice environment. We chose this approach because

authors in different disciplines use many different terms to describe features that refer to OC (Sleutel, 2000). The OC measure column in Table 3.1 provides an overview of the terminology used in the reviewed studies. In addition, we did three searches using keywords for the three dimensions of OC (e.g. leadership style, supervision, management, group cohesion, cooperation, group supportiveness, communication, participation, involvement) with the constraint that these dimensions had to be part of an overall climate or work environment study.

The second search strategy included a search in the online archives of five scientific journals: *Occupational and Environmental Medicine*, *Journal of Occupational and Environmental Medicine*, *Health Care Management Review*, *Journal of Occupational Health Psychology* and *Social Science & Medicine*. We chose these journals because they are the major journals on this subject.

Thirdly, we examined the references in previous literature reviews and key studies in this field.

Finally, we asked several key health care researchers working in the field of OC whether they knew of additional studies that met our criteria for inclusion as outlined below.

3.3.2 Inclusion criteria

Titles, abstracts and manuscripts were included if they met all of the following inclusion criteria:

Type of study – Studies should primarily deal with the relationship between OC (or dimensions thereof) and employee mental health outcomes. Studies were included if the OC concept was examined using a composite scale or if at least two of the three climate dimensions were tested.

Type of participants – Either the entire sample of the study had to be employees working in a health care organization, or results should be presented for health care workers as a subgroup.

Study design – Studies had to contain empirical research. Moreover, we were interested in studies that quantitatively examined correlations between variables (i.e. use bi- or multivariate analyses in presenting the results). This excluded studies using a qualitative research design.

Language – Only studies in English were considered.

Publication status – Only studies published in peer-reviewed journals were included. The main advantage of this control is that it serves as an extra quality check. As a result of the review process, published studies are likely to be of a higher quality than non-published studies. At the same time, we acknowledge this could potentially lead to a publication bias also known as the file-drawer problem (Rosenthal, 1979).

Year of publication – Only studies that were published in the period from 2000-2012 were retrieved.

3.3.3 Quality assessment

In the final part of the assessment, we reviewed each study for methodological quality using a quality assessment tool. This is comprised of 12 criteria that can be used to assess four study aspects: design, sampling, measurement, and statistical analysis. The tool was adapted from an instrument developed by Cummings et al. (2010) and has been used in previously published systematic reviews (e.g. Wong & Cummings, 2007; Cummings et al., 2010). The tool was slightly adapted so that we could use it to assess the studies identified (i.e. changes made to the concepts addressed, see Table 3.2).

3.3.4 Data extraction and analysis

Given that the studies varied greatly in their measurement of the relevant concepts, analysis techniques, and effect sizes reported, it was unfortunately not possible to perform a meta-analysis. Therefore, we decided to analyze the contents using a conventional vote-counting procedure (Bushman & Wang, 1994). We categorized the studies according to their shared characteristics and defined three possible outcomes for each tested relationship: significantly positive, significantly negative, or non-significant. The number of relationships falling into each of these three categories was summed and if a majority of the relationships fell into one of these categories, that modal category was declared 'the winner' (Light & Smith, 1971).

Table 3.1 Studies included in systematic review

	Study	Design	Sample setting and participants	Organizational climate measure
1	Jenkins & Elliot (2004)	Cross-sectional	93 nurses and nurse assistants in 4 English hospitals (39% response rate)	- Organizational structure and processes (MHPSS) - Conflicts with other professionals (MHPSS) - Support from supervisors (House & Wells, 1978) - Support from co-workers (House & Wells, 1978)
2	Vahey et al. (2004)	Cross-sectional	820 nurses in 20 U.S. hospitals (86% response rate)	Nurse work environment (NWI-R): - Staffing adequacy - Administrative support - Nurse-physician relationship
3	Friese (2005)	Cross-sectional	1,956 nurses in 22 U.S. hospitals (56% response rate)	Nurse work environment (PES-NWI): - Nurse participation in hospital affairs - Nurse manager ability, leadership and support for nurses - Collegial nurse-physician relation
4	Ylipaavalniemi et al. (2005)	Longitudinal	3,651 doctors, nurses, laboratory/x-ray staff, administrative staff, maintenance/cleaning staff in 12 Finnish hospitals (74% response rate (t1), 82% (t2))	Team climate (TCI): - Participation safety - Team support - Vision - Task orientation - Fairness of leadership
5	Akerboom & Maes (2006)	Cross-sectional	706 care staff, care assistants, managers and patient care coordinators in 3 Dutch nursing homes (43% response rate)	Organizational characteristics (ORFQ): - Communication - Social hindrance - Supervisor support - Co-worker support
6	Eriksen et al. (2006)	Longitudinal	4,076 assistant nurses from different health care organizations in Norway (62.3% response rate (t1), 80.3% (t2))	Organisational work factors (QPSNordic) - Participation in important decisions - Supervisor support - Fairness of leadership - Feedback about quality of work - Social climate - Support and encouragement
7	Arnetz & Blomkvist (2007)	Longitudinal	6,157 (t1) and 9,685 (t2) physicians, nurses, nurse assistants in 4 Swedish hospitals (58% response rate)	Organizational climate (QWC) - Work climate - Performance feedback - Participatory management
8	Poncet et al. (2007)	Cross-sectional	2,392 nurses in 165 French hospital IC units (58% response rate)	- Relationship with head nurses - Relationship with physicians
9	Stone, Du & Gershon (2007)	Cross-sectional	2,047 nurses in 13 U.S. hospitals (50% response rate)	Organizational climate (PNWE): - Nursing management - Nurse/physician collaboration - Unit decision-making
10	Williams et al. (2007) Linzer et al. (2009)	Cross-sectional	426 physicians in 101 U.S. ambulatory clinics	Organizational culture (Kraleweski, 1996): - Leadership alignment - Informational emphasis - Cohesion

Mental health outcome measure	Results (statistically significant associations)
- Emotional exhaustion (MBI)	- Organizational structure and processes → emotional exhaustion (r= 0.46; p<0.001) - Conflicts with other professionals → emotional exhaustion (r= 0.46; p<0.001) - Support from co-workers → emotional exhaustion (r= -0.32; p<0.01)
- Emotional exhaustion (MBI)	Composite scale tested: - Positive nurse work environment → emotional exhaustion (OR= 0.59; p<0.05).
- Emotional exhaustion (MBI)	- Manager ability → emotional exhaustion (B= -0.24; p<0.01) - Collegial nurse-physician relation → emotional exhaustion (B= -0.21; p<0.01)
- Doctor diagnosed depression (Vahtera et al., 1997)	Composite scale tested: - Poor team climate → depression (OR= 1.75; p<0.05) - Perceived unfairness of leadership → depression (OR= 1.24; p<0.05)
- Psychological distress (SCL-90) - Emotional exhaustion (MBI-NL)	- Social hindrance → psychological distress (B= .19; p<0.05) - Social hindrance → emotional exhaustion (B= .24; p<0.01) - Supervisor support → psychological distress (B= -.17; p<0.05)
- Psychological distress (SCL-5)	- Less support and encouragement → psychological distress (B= 0.14; p<0.05)
- Mental health (Warr, 1990)	- Work climate → mental health (B= 0.35; p<0.05)
- Burnout syndrome (MBI) - Depression (CES-D)	- Poor relationship with head nurses --> burnout syndrome (OR= 0.92; p< 0.05) - Poor relationship with physicians --> burnout syndrome (OR= 0.81; p<0.01)
- Emotional exhaustion (MBI)	- Nurse/physician collaboration → emotional exhaustion (B= -0.28; p<0.01) - Good nurse management → emotional exhaustion (B= -0.46; p<0.05)
- Burnout (Bachman & Freeborn, 1999)	- Leadership alignment → burnout (direct effect OR= -0.49; p<0.05; also indirect effect via stress) - Information emphasis → burnout (OR= -0.33; p<0.05) - Cohesion → burnout (OR= -0.33; p<0.05)

Table 3.1 Studies included in systematic review (*continued*)

	Study	Design	Sample setting and participants	Organizational climate measure
11	Aiken et al. (2008)	Cross-sectional	10,184 nurses in 160 U.S. hospitals (52% response rate)	Care environment (PES of NWI-R): - Nursing foundations for quality of care - Nurse manager ability, leadership, and support - Collegial nurse/physician relations
12	Kawano (2008)	Cross-sectional	1,551 nurses in 4 Japanese hospitals (92% response rate)	Work environment (Shimomitsu et al., 2000): - Workplace environment - Interpersonal relationships - Support from supervisor - Support from co-workers
13	Flynn, Thomas-Hawkins & Clarke (2009)	Cross-sectional	422 nephrology nurses in U.S. private practices and hospitals (52% response rate)	Supportive practice environment (PES of NWI-R): - Nurse participation in hospital affairs - Nursing foundations for quality of care - Nurse manager ability, leadership, and support - Collegial nurse-physician relation - Staffing and resource adequacy
14	Gunnarsdottir et al. (2009)	Cross-sectional	695 nurses in 98 Icelandic hospital wards (75% response rate)	Nurse work environment (NWI-R): - Nurse-physician relations - Unit-level support - Hospital-level support
15	Van Bogaert et al. (2009)	Cross-sectional	401 nurses in 2 Belgian hospitals (58% response rate)	Practice environment (NWI-RVL): - Nurse-physician relation - Nurse management at the unit level - Hospital management
16	Hanrahan et al. (2010)	Cross-sectional	353 psychiatric nurses in 67 U.S. hospitals (52% response rate)	Nurse work environment (PES-NWI): - Nurse participation in hospital affairs - Foundations for quality of care - Manager skill at leadership - Nurse-physician relationship
17	Jolivet et al. (2010)	Cross-sectional	3,316 nurses and nurse assistants in 7 French hospitals (91% response rate)	Organizational work environment (NWI-EO): - Communication in the work unit - Support from the senior nurse - Relationship between workers - Respect of planned days off and vacations
18	Patrician, Shang & Lake (2010)	Cross-sectional	812 civilian and military nurses in 23 U.S. hospitals (53% response rate)	Practice environment (PES-NWI): - Nurse participation in hospital affairs -Nursing foundations for quality of care - Nurse manager ability, leadership and support - Staffing and resources adequacy - Collegial nurse-physician relation
19	Arnetz, Lucas & Arnetz (2011)	Cross-sectional	5,316 physicians, nurses and nurse assistants in 4 Swedish hospitals (45% response rate)	Organizational climate (QWC): - Social Climate - Participation - Performance Feedback
20	Meeusen et al. (2011)	Cross-sectional	882 nurse anesthetists in various Dutch hospitals and private clinics (46% response rate)	- Social environment (Van Orden & Gaillard, 1994) - Relation with supervisor (Van Orden & Gaillard, 1994) - Work climate (Buckingham & Coffman, 2006)

Mental health outcome measure	Results (statistically significant associations)
- Emotional exhaustion (MBI)	Composite scale tested: - Care environment → emotional exhaustion (OR= 0.76; p<0.05)
- Anxiety (Shimomitsu et al., 2000) - Depression (Shimomitsu et al., 2000)	- Interpersonal relationships → anxiety (B= -0.13; p<0.001) - Interpersonal relationships → depression (B= -0.30;p<0.001) - Workplace environment → depression (B= -0.11 p<0.001) - Supervisor support → anxiety (B= -0.13; p< .001) - Supervisor support → depression (B= -0.26; p<0.001) - Coworker support → anxiety (B= -0.12; p<0.001) - Coworker support → depression (B= -0.21; p<0.001)
- Emotional exhaustion (MBI)	Composite scale tested: - Poor practice environment → emotional exhaustion (OR= 4.60; p<0.01)
- Emotional exhaustion (MBI)	none
- Emotional exhaustion (MBI)	- Nurse-physician relation → emotional exhaustion (B= -0.19; p<0.05) - Hospital management → emotional exhaustion (B= -0.26; p<0.05)
- Emotional exhaustion (MBI)	Composite scale tested: - Positive work environment → emotional exhaustion (B= -10.34; p<0.001) Subscales tested: - Nurse-physician relationship → emotional exhaustion (B= -6.10; p<0.001) - Management leadership → emotional exhaustion (B= -4.46; p<0.001)
- Depressive symptoms (CES-D)	- Relationship between workers → depressive symptoms (B= -0.26; p<0.01) - Communication in the work unit → depressive symptoms (indirect via perceptions of effort-reward imbalance)
- Emotional exhaustion (MBI)	Composite scale tested: - Poor practice environment → emotional exhaustion (OR= 12.70; p<0.01)
- Mental health (Warr, 1990)	- Social climate → mental health (B= .16; p< 0.01) - Participation → mental health (B= .09; p< 0.01) - Performance feedback → mental health (indirect via organizational efficacy)
- Burnout (MBI)	- Social environment → burnout (B= -.18; p<001) - Work climate → burnout (B= -.36; p<0.001)

Table 3.1 Studies included in systematic review (*continued*)

	Study	Design	Sample setting and participants	Organizational climate measure
21	Bobbio, Bellan & Manganelli (2012)	Cross-sectional	273 nurses in an Italian hospital (57% response rate)	Empowering leadership (ELQ): - Leading by example - Participative decision-making - Coaching - Informing - Showing concern/interaction with team Trust (OTI): - Trust in the leader

Table 3.2 Summary of quality assessment of included studies

	Design	NO	YES
1.	Was the study prospective?	18	3
2.	Was probability sampling used?	16	5
	Sample		
3.	Was sample size appropriate?	0	21
4.	Was sample drawn from more than one site?	2	19
5.	Was anonymity protected?	3	18
6.	Response rate more than 60%?	13	8
	Measurement		
7.	Was organizational climate measured reliably?	5	16
8.	Was organizational climate measured using a valid instrument?	2	19
9.	Was employee mental health observed rather than self-reported? (0 scored for self-report, 1 for observed, 2 for both)	21	0
10.	If a scale was used to measure variables, is internal consistency at least 0.70?	5	16
11.	Was a theoretical model/framework used for guidance?	10	11
	Statistical Analysis		
12.	Were correlations analyzed?	0	21
13.	Were outliers managed?	19	2
	Total quality rating:	TOTAL QUALITY SCORE:	
	Low quality (0-4) Medium quality (5-9) High quality (10-14)	Medium: Score of 6 (2 studies) Score of 7 (7 studies) Score of 8 (7 studies) Score of 9 (3 studies) High: Score of 10 (2 studies)	

Mental health outcome measure	Results (statistically significant associations)
- Emotional exhaustion (MBI-GS)	- Trust in leader → emotional exhaustion (B= -.32; p<0.05) - Informing leadership → emotional exhaustion (indirect via trust in organization) - Leading by example → emotional exhaustion (indirect via trust in leader) - Leader showing concern/interaction with team → emotional exhaustion (indirect via trust in leader)

3.4.1 Search Results

Using the four search strategies outlined above, we identified more than 4,000 potentially relevant studies published between 2000 and 2012 (see Figure 3.1). After removing the duplicates, 2,308 studies remained. A further 2,214 studies were excluded based on a reading of their abstracts, leaving 94 studies. The full-text assessment of these excluded a further 70 studies seen as irrelevant and 3 low quality studies. This selection process thus resulted in 21 studies for the review. Of these 21 studies, 13 had been initially identified through database searching, four through journal archives, three from reference lists, and one study had been suggested by the key researchers. The search had identified all the relevant studies included in the previous reviews by Gershon et al. (2007) and MacDavitt et al. (2007).

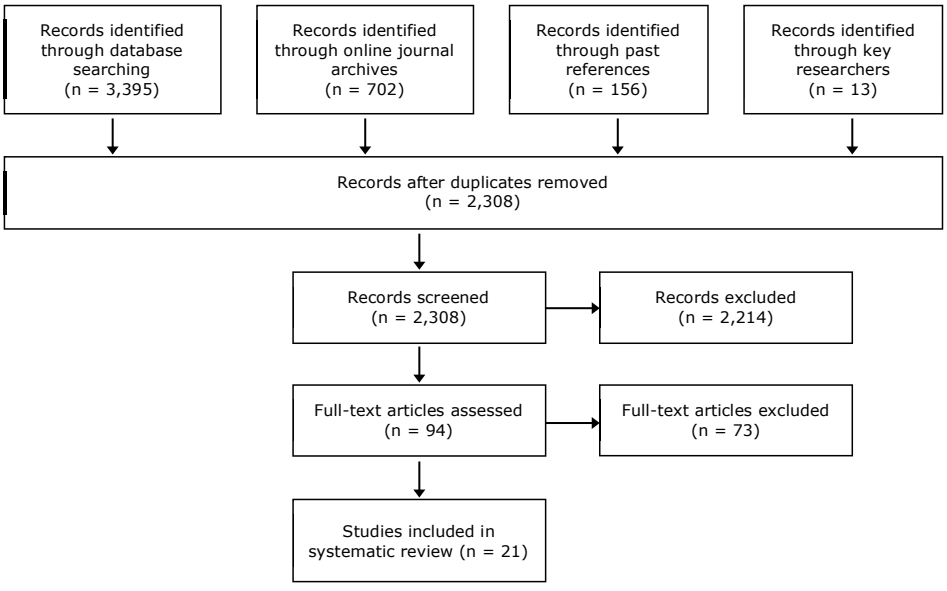


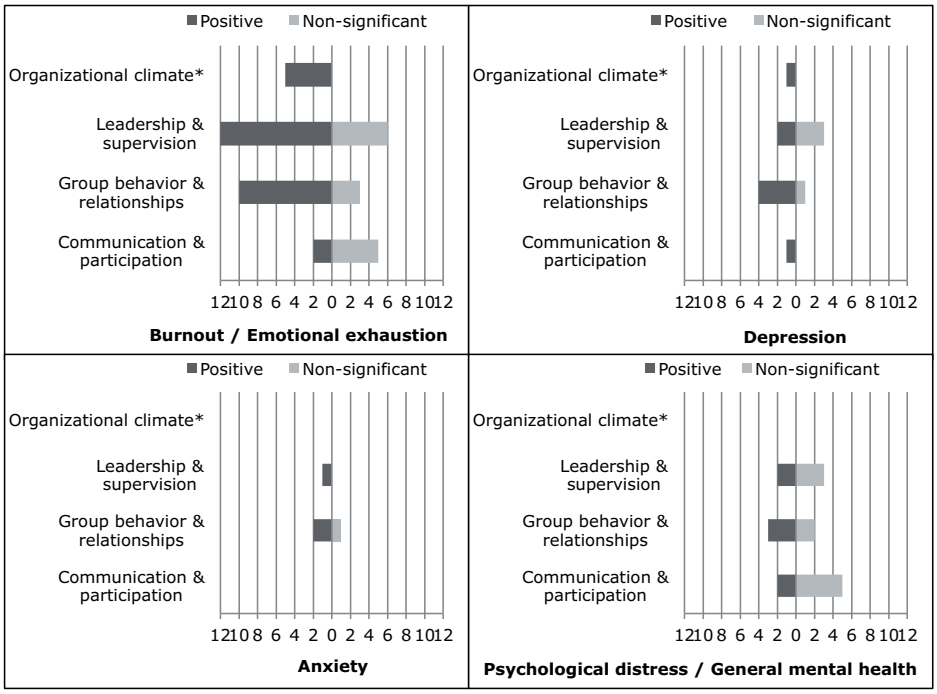
Figure 3.1 Flow diagram of study selection

Given our search approach and that we initially started with over 2,000 different articles, the final total of 21 studies was less than we had expected. The most common reason for exclusion was the use of a sample including non-health care employees. Much of the research on the relationship between OC and mental health outcomes uses a mixed sample of occupations, or a population-based survey. Moreover, the majority of the OC research does not focus on mental health outcomes, but on work attitudes and behavior (e.g. job satisfaction, commitment, turnover). The results of the quality assessment are presented in Table 3.2 and Table 3.3.

The results of the studies included in our systematic review are shown in Table 3.1. Figure 3.2 presents the results of our data analysis.

Table 3.3 Summary of total quality scores of included studies

Study	Total quality score (scale 0-14)
Jenkins & Elliot (2004)	9
Vahey et al. (2004)	8
Friese (2005)	7
Ylipaavalniemi et al. (2005)	10
Akerboom & Maes (2006)	7
Eriksen et al. (2006)	10
Arnetz & Blomkvist (2007)	8
Poncet et al. (2007)	6
Stone, Du & Gershon (2007)	7
Williams et al. (2007) & Linzer et al. (2009)	6
Aiken et al. (2008)	8
Kawano (2008)	8
Flynn, Thomas-Hawkins & Clarke (2009)	9
Gunnarsdottir et al. (2009)	7
Van Bogaert et al. (2009)	8
Hanrahan et al. (2010)	9
Jolivet et al. (2010)	7
Patrician, Shang & Lake (2010)	8
Arnetz, Lucas & Arnetz (2011)	7
Meeusen et al. (2011)	8
Bobbio, Bellan & Manganelli (2012)	7
Mean Total Quality Score	7.8



Note: Each analysis of a mental health outcome casts one 'vote' for every organizational climate dimension it includes. The sign of the vote reflects whether the association of the organizational climate dimension and mental outcome is positive or non-significant

*Organization climate refers to a composite climate scale

Figure 3.2 Results of data analysis

3.4 RESULTS

3.4.2 The organizational climate concept and mental health outcomes

Of the 21 studies included in the review, only six studies examined OC by looking at the *combined* effect of multiple dimensions. Aiken et al. (2008), for instance, tested the effect of the care environment, including both leadership and group behavior dimensions, among a large group of nurses (N= 10,184) working in 160 US hospitals. Their findings revealed that the likelihood of nurses experiencing burnout were 24 percent lower in hospitals with good working environments than in hospitals with mixed environments, and lower in hospitals with mixed environments than in hospitals with poor environments. The sample of 820 nurses used by Vahey et al. (2004) provided similar results with a nurse work environment construct, consisting of leadership and group behavior dimensions, having a statistically significant negative effect on the emotional exhaustion of nurses.

Two cross-sectional US-based studies, by Patrician et al. (2010) and by Flynn et al. (2009), examined the effect of a work environment construct that encompassed all three OC dimensions. Each study surveyed a specific group of nurses and measured the nurse practice environment. Both studies found that respondents who rated their practice environments as unfavorable were more likely to suffer burnout than nurses who rated their practice environment as favorable. While the findings of Patrician et al. (2010) showed an odds ratio of 4.60, the study by Flynn et al. (2009) reported odds ratios up to 12.70. That is, according to the latter study, nurses who experience an unfavorable work environment are nearly 13 times more likely to experience emotional exhaustion than those in a favorable environment.

Although the previously mentioned studies suggest a positive impact of a favorable OC on employee mental health outcomes, we should keep in mind that they are cross-sectional in nature. However, we found one longitudinal study that did assess the impact of the climate on health care workers' mental health over time. Ylipaavalniemi et al. (2005) conducted a prospective cohort study on the relationship between team climate and doctor-diagnosed depression among various hospital employees (N= 3,651). The authors measured team climate, which included aspects of two OC dimensions (group behaviors and communication), and tested whether this could predict the two-year incidence of depression. Their results revealed an association between poor team climate and the risk of depression that was independent of lifestyle factors and psychological distress at a baseline. Thus, a favorable OC appears to positively influence the mental health of health care employees. Another interesting finding was that job control, work demands, and job strain were not predictors of the two-year incidence of depression. The authors concluded that the job strain model and the team climate model must therefore reflect different aspects of the work environment (Ylipaavalniemi et al., 2005: 120), which is consistent with our initial assumption that studies focusing on job design are examining something different than studies that focus on OC.

Another cross-sectional study, by Hanrahan et al. (2010), focused on the effect of work environment on burnout using a sample of 353 hospital psychiatric nurses. This study tested the impact of a composite work environment scale encompassing all three OC dimensions *and* the impact of the individual subscales. Their analyses showed that the nurse-physician collaboration and the leadership subscales were both significantly associated with nurse emotional exhaustion, whereas the participation subscale was not. The composite scale was also revealed to be significantly associated with emotional exhaustion. Notably, the effect of the composite scale appeared to be stronger than the effects of the individual subscales.

Overall, the studies that tested a composite scale of OC dimensions showed that there is a statistically significant and positive association between OC and mental health outcomes.

3.4.3 Leadership and mental health outcomes

Of the three OC dimensions, the leadership and supervision dimension has been the one most often used to predict employee mental health outcomes with nearly 40 percent of the relationships reported in the included studies testing at least one aspect of the leadership and supervision dimension (e.g. supervisory support, trust in the leader, and fairness of leadership).

Within the leadership and supervision dimension, the impact of supervisor support was the aspect most often tested. Some studies reported that poor mental health outcomes were significantly lower with strong supervisor or higher management support (Akerboom & Maes, 2006; Kawano, 2008; Van Bogaert, 2009). Here, Akerboom and Maes (2006) showed that supervisor support had a negative impact on reported psychological distress among their sample of Dutch nursing home employees. Kawano (2008) reported a significant negative impact of direct supervisor support on emotional exhaustion and depression in Japan, while Van Bogaert et al. (2009) found that support from top management can lower emotional exhaustion. However, overall, the findings appear to be inconsistent with several other studies in failing to find a significant relationship between management support and mental health outcomes (Jolivet et al., 2010; Jenkins & Elliot, 2004; Gunnarsdottir et al., 2009; Eriksen et al., 2006; Meeusen et al., 2011).

Other predictors categorized within the leadership dimension were somewhat heterogeneous. Four studies tested the impact of a more general measure of nurse management (variously labelled 'nurse manager skills', 'nurse manager ability, leadership and support', 'relationship with head nurses,' or 'nurse management') and reported significantly lower emotional exhaustion (Friese, 2005; Hanrahan, 2010; Stone et al., 2007) and burnout (Poncet et al., 2007) in situations of highly rated nurse management. According to Williams et al. (2007) and Linzer et al. (2009), leadership alignment is also negatively associated with burnout among physicians. Ylipaavalniemi et al. (2005) and Eriksen et al. (2006) both used a longitudinal design and looked at the impact of the way an employee perceives fairness of leadership on mental health outcomes. The research team of Ylipaavalniemi (2005) found that perceptions of unfair leadership positively predicted employee depression. In contrast, Eriksen et al. (2006) failed to find a significant relationship between this predictor and employee psychological distress. A recent study by Bobbio et al. (2012) examined five types of

leadership behavior and found that three of them, namely leading by example, informing, and showing concern/interaction, were significantly related to nurses reporting less emotional exhaustion, whereas the other two types (participative decision-making and coaching) were not. Moreover, their results showed that having trust in the leader was negatively associated with emotional exhaustion.

In our overall review, 17 of the 29 relationships (59%) categorized as falling within the leadership and supervision dimension were reported as statistically significant and 12 relationships (41%) as non-significant. None of the significant relationships suggested that leadership led to an increase in poor mental health among employees.

3.4.4 Group relationships and mental health outcomes

A total of 26 relationships had been tested in the group relationships and behavior dimension of OC. In contrast to the inconsistent findings related to social support in the leadership dimension, the studies included in the group relationships and behavior dimension consistently revealed that co-worker social support has a significant effect on employee mental health. Three cross-sectional studies provided support for a negative effect of co-worker social support on emotional exhaustion (Jenkins & Elliot, 2004), anxiety and depression (Kawano, 2008), and burnout (Meeusen et al., 2011). Moreover, Eriksen et al.'s (2006) longitudinal study showed that changes in the work situation that resulted in less support and less encouragement were positively associated with a higher level of psychological distress. Despite the consistent evidence these studies provide on the importance of co-worker social support in explaining employees' mental health, there was one study that failed to find such a relationship (Akerboom and Maes, 2006).

Given that the majority of the reviewed studies focused on nurses, a considerable amount of evidence was collected on the impact of the nurse-physician relationship on nurse mental health outcomes. Friese (2005) for example reported a significant, negative association between collegial nurse-physician relationships and nurse emotional exhaustion. The results described in Stone et al. (2007), Poncet et al. (2007), Van Bogaert et al. (2009), and Hanrahan et al. (2010) agree with this finding. Notably, Gunnarsdottir et al. (2009) tested this relationship but found no significant association.

The other relationships tested within the group relationships dimension included more general predictors of the relationship between workers, such as 'social climate', 'cohesion', or 'interpersonal relationship'. Arnetz et al. (2011), in a cross-sectional design, tested the impact of social climate on the general mental health of employees using a sample of nurses working in four Swedish hospitals. Results showed that employees'

positive perceptions of social support and cohesion among colleagues positively influenced their mental health. Arnetz and Blomkvist's (2007) longitudinal study found a similar result. One of the most significant predictors of good mental health was a positive work climate, which refers to a positive, supportive atmosphere at work and cohesion among co-workers. Having said this, Eriksen et al.'s (2006) longitudinal study did not support this finding.

Both Jolivet el al. (2010) and Kawano (2008) found evidence that a good interpersonal relationship between workers had a negative effect on employee symptoms of depression. Kawano et al. (2008) reported a similar result for employee anxiety.

On aggregating these results, it becomes clear that a majority of the relationships tested in the second dimension, namely group behaviors and relationships, point to a statistically significant association between group relationships and mental health outcomes: 19 of the relationships tested (73%) were statistically significant, whereas only seven relationships were not (27%). All of the relationships showed that positive group behavior is positively related to mental health among employees.

3.4.5 Communication and mental health outcomes

The third OC dimension, referring to communication and perceived participation within the organization, was the least often examined. Only 15 such relationships (20% of the total relationships tested) were tested by the 11 studies reviewed here. The study by Arnetz et al. (2011) reported a direct, positive relationship between perceived participation and employees' mental health. Further, they found evidence of an indirect effect of performance feedback on their mental health outcome measure. However, neither form of relationship had been supported by an earlier longitudinal study of Arnetz and Blomkvist (2007). These earlier findings, regarding the lack of an impact of employees' perceived organizational participation on mental health outcomes, were supported by other cross-sectional studies (Friese, 2005; Stone et al., 2007; Hanrahan et al., 2010) and one longitudinal study (Eriksen et al., 2006).

The research into other aspects of the communication dimension has also yielded inconsistent findings. Jolivet et al. (2010) reported a significant indirect effect of low communication in the work unit on the prevalence of depressive symptoms in nurses, whereas Akerboom and Maes (2006) failed to find any significant relationship between communication and psychological distress or emotional exhaustion. Similar inconsistencies can be seen in the findings when investigating information transfer as a potential predictor of mental health outcomes. Linzer et al. (2009) examined the relationship between informational emphasis and physician burnout and found

a statistically significant association. However, Williams et al. (2007) reporting on a different sample, albeit from the same study, found this relationship to be non-significant.

Overall, in contrast to the other two dimensions, there is little empirical support for the communication and participation dimension having an influence on the mental health outcomes of employees working in health care organizations. Although five of the fifteen relationships reported in the studies included in this review were statistically significant, the majority of the tested relationships (67%) were non-significant.

3.5 CONCLUSIONS AND DISCUSSION

3.5.1 Conclusions

The aim of this chapter has been to provide a comprehensive overview of the published evidence on relationships between OC and mental health outcomes among employees working in health care organizations. In taking a global approach to OC (Patterson, 2005), we distinguished three OC dimensions: (1) leadership and supervision, (2) group relationships and behavior, and (3) communication and participation. These dimensions guided our systematic review of empirical studies published in the period 2000-2012 that had examined the OC concept. Overall, our findings support claims that a 'good' OC contributes positively to the mental health of employees. In the reviewed studies, a 'good' organizational climate is seen in terms of employee perceptions, including perceptions of co-worker support, nurse-physician collaboration, leadership alignment, and trust in leader.

Although somewhat similar to the now dated reviews by MacDavitt et al. (2007) and by Gershon et al. (2007), our review adds additional detailed analyses assessing the significance of individual OC dimensions for health care organizations.

The studies that examined a composite OC scale showed that OC relates positively to the mental health of employees working in health care organizations. Both cross-sectional and longitudinal studies offered support for this positive relationship. Further, the majority of the empirical research on the influence of individual OC dimensions also pointed in this direction.

From our review, it was clear that most OC research focuses on aspects belonging to the leadership or group relationships dimensions, with only a small part of the research including aspects related to the communication or participation dimension.

The group relationships and behavior dimension proved to be the dimension most strongly related to mental health outcomes, followed by the leadership and supervision dimension. In terms of group relationships, co-worker support and nurse-physician relationships were important influences on employee mental health. This last aspect is in line with Schmalenberg and Kramer's (2009) observation that high-quality nurse-physician relationships not only lead to positive patient outcomes, but also to positive outcomes among nurses and physicians. Regarding relationships with leadership and supervision, we particularly found evidence that relationship-focused management (using predictors such as 'good relationship with manager' and 'leadership alignment') had positive effects on emotional exhaustion, indicating that relationship-focused managers are crucial in protecting health care employees from burnout (see also Schreuder et al., 2011).

There was relatively little evidence, and what there was, was inconsistent of a relationship between communication and mental health outcomes. This could be due to the use of different concepts and measures for aspects categorized under this dimension. Compared to the research addressing the other two dimensions, there was little consistent use of concepts across studies (such as with supervisor support within the leadership dimension and the nurse-physician relationship in the group relationships dimension). Further research employing consistent concepts and measures of information-sharing mechanisms is needed.

3.5.2 Conceptual model

Based on our systematic review, we have developed a conceptual model that reflects the established pathways from the OC dimensions to mental health outcomes (see Figure 3.3).

Figure 3.2 shows that most empirical research has focused on the effects of OC on burnout or emotional exhaustion. One explanation for this focus could be that burnout is a job-related mental health outcome, whereas other mental health outcomes are more generic in nature. Based on the results of their meta-analysis, De Boer et al. (2011) highlighted the importance of OC in preventing anxiety and depression among health care professionals caused by critical incidents. As such, it would be valuable to obtain additional knowledge on the relationship between OC and outcomes such as depression and anxiety.

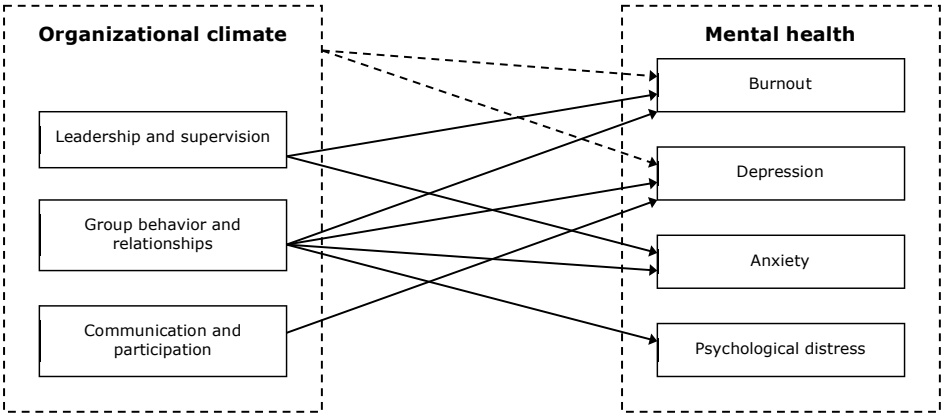


Figure 3.3 Theoretical model resulting from systematic review

Following the theoretical model proposed by Wilson et al. (2004), it might be helpful to include mediators when examining the relationship between OC and somewhat general mental health outcomes. Several studies in our review had indeed tested the effect of mediators such as stress (Williams et al., 2007), perceptions of effort-reward imbalance (Jolivet et al., 2010), and organizational efficacy (Arnetz et al., 2011). The use of a range of mediating mechanisms might help to better explain the effect of OC on various mental health outcomes. It would be particularly relevant to investigate the role that health care specific job demands (e.g. high emotional labour, interdisciplinary tensions, long working hours) play in the established pathways.

3.5.3 Future research agenda

Our findings have several implications for OC research. First, most of the studies included in this review did not examine the *collective* perceptions and interpretations of an organization's attributes, but measured the employees' *individual* perceptions. By adopting an individual unit of analysis, these studies examine psychological climate rather than focus on the effects of OC. It struck us, when reviewing the studies that most studies fail to address this distinction or mention and explain their choices regarding their level of analysis. Notwithstanding the contribution of the individual approach to OC, we believe researchers should be more explicit in explaining and justifying their approach. To remove the confusion produced by the use of multiple terms and measures, the field of OC research would benefit by clearly defining its levels of theory, measurement, and analysis (Parker et al., 2003). The study by Patrician et al. (2010) provides a good example by clearly specifying their conceptual and empirical reasons for choosing a purely individual-level approach when testing the effect of OC on nurses' work outcomes.

Second, only a few studies have investigated the relationship between OC and employee mental health outcomes over time, with most studies having used a cross-sectional research design. Since one cannot rule out the possibility of reverse causation when using cross-sectional data, our review indicates a need for increased longitudinal research. This may be particularly salient for this field since employees suffering from poor mental health conditions (e.g. depressive employees) may over-report an unfavourable working environment.

Additionally, the studies in this review exclusively used employee self-reports of mental health outcomes. Studies that rely on self-reporting may be prone to many kinds of response bias, and correlations may be inflated by common method variance (Panari et al., 2012). However, relying solely on 'objective' data, such as health care costs or health care utilization, may not fully capture the mental health status of employees. Combining both self-reporting and other mental health measures may overcome these concerns.

Finally, the majority of the reviewed studies only examined the individual effects of OC subscales on employee mental health. Despite the significant positive results reported in these studies, our review shows that stronger effects were found in studies employing a composite OC scale (Hanrahan et al., 2010, Patrician et al., 2010; Flynn et al., 2009). Moreover, the study by Hanrahan et al. (2010), which tested the impacts of both a composite scale as well as the individual subscales, found that the composite scale had a stronger effect than the separate subscales. Although the inclusion of a composite scale did not result in an effect greater than the sum of its individual parts in this specific study, it would be interesting to investigate whether a combination of OC aspects could have a positive synergistic effect on mental health outcomes. Future research should therefore not only focus on the influence of a composite OC scale or the influence of individual subscales, but should include the combined effects of both. This would enable more light to be shed on the role that different climate perceptions play in explaining employee mental health.

3.5.4 Implications for practice

Understanding how OC is associated with mental health outcomes is important because it provides information on how to prevent mental health problems occurring among health care staff. Our results have several implications.

First, our results indicate that there is a need to give attention to group relationships and group behavior within health care organizations. Empirical evidence indicates that aspects such as co-worker support and cohesion among colleagues are crucial

in preventing mental illnesses among health care employees. Various means such as decreasing competition among co-workers and creating a strong set of standards that encourages co-workers' positive interactions could help achieve this (Chiaburu & Harrison, 2008). With the increased focus on team-based work and interactions among health care workers, the relationships between employees become increasingly important.

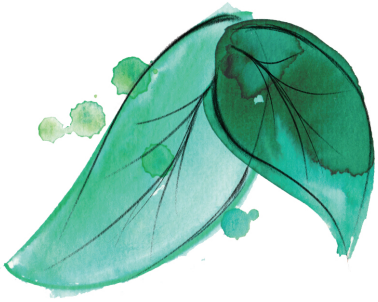
Further, our results indicate that leadership and supervision should not be ignored when seeking to support employees' mental health. Relationship-oriented leadership styles and behaviors play an important role in maintaining mentally healthy employees. Including competences such as showing concern and support in management development training can stimulate the development of relationship-focused leadership styles (Schreuder, 2011).

Another practical implication is that health care organizations that actively try to align their attempts to stimulate good leadership, group relationships, and communication, rather than merely invest in one of these OC dimensions, will probably see a stronger effect on the mental health of their employees.

To conclude, we see a need to expand occupational health and safety policies to include the social and interpersonal environment. If health care organizations want to successfully address mental health issues among their staff, our findings suggest that they will benefit from incorporating OC into their health and safety policies.

Chapter 4

Comparing ‘healthy’ and ‘unhealthy’ hospitals: Do safety climate perceptions play a role?



This chapter is submitted to an international peer-reviewed journal.

ABSTRACT

Health care utilization records show that employees working in different hospitals vary greatly in physical therapy and mental health care utilization. These differences suggest some hospitals might offer a more 'healthy' work environment than other hospitals. The purpose of this article is to explore how the differences in employee health care utilization across hospitals relate to differences in safety climate perceptions. To this end, a qualitative comparative case study was conducted in the Dutch hospital sector. Safety climate perceptions of employees working in two hospitals with a low score on health care utilization were compared to employees employed by two hospitals with a high score on health care utilization. The interview data revealed that employees working in 'healthy hospitals' have more positive safety climate perceptions than hospital workers employed by 'unhealthy' hospitals. Overall, their perceptions about management, group norms and –behavior, and communication regarding workplace health and safety were more favorable. This study provides information on factors that could play a role in improving employee health and subsequent health care utilization. The findings suggest that if 'unhealthy' hospitals invest in improving safety climate in the organization, they may be able to decrease employee health care utilization and -costs. This study is the first to use employee health care utilization data as an indicator of employee health and connect it to the safety climate literature. Moreover, a qualitative methodology was applied to explore perceptions, which provides a rich description of safety climate in a hospital context.

4.1 INTRODUCTION

Workplace-related injuries and illnesses such as musculoskeletal disorders or burnout cause great human suffering and incur high costs, both for those affected, employers and for society as a whole. The European Commission identified the hospital sector as a high-risk sector, because of the high incidence of work-related injuries and diseases. Data from the U.S. Bureau of Labor Statistics revealed that hospitals experienced injuries at nearly three times the rate of professional and business services and have a higher rate of 'illnesses and injuries resulting in days away from work' cases than construction, manufacturing, or private industry as a whole (Bureau of Labor, 2014). However, employee health does not only vary across different industries, but also between organizations within industries. Health care utilization data in the Netherlands for instance shows that the percentage of hospital workers that visit a physical therapist or a mental care provider can be twice as high in one hospital compared to another (Bronkhorst, 2017; Stichting IZZ, 2013; 2014). Since health care utilization data can be understood and interpreted as a set of proxies that indirectly describe the health status of an individual (Butler et al., 2009), it seems that some hospitals are 'healthier' than other hospitals. This makes research into factors that could help to explain the organizational differences in employee health particularly interesting.

Although the health of employees and subsequent health care utilization may not be uniquely caused by work, organizational characteristics could play a role in this. Organizational policies, practices and procedures concerning aspects such as leadership, communication, and group processes have proven to be related to worker health (Gershon et al., 2007; Bronkhorst et al., 2015) and can vary significantly between organizations. Employees' perceptions regarding these social and interpersonal aspects within the organization are reflected by the organizational climate (Wilson et al., 2004). When the aspects are focused on employee health and safety as a strategic performance-related outcome, the organizational climate is referred to as safety climate (Schneider et al., 2013; Zohar, 1980). The extent to which safety climate perceptions differ across organizations has been examined meticulously for the past 30 years (Zohar, 2010). However, the relationship with employee health as measured by health care utilization rates has not been subject of any research to date. An increased understanding of this relationship is important because it provides information to policymakers and stakeholders on how to reduce employee ill health and subsequent health care utilization. The central aim of this chapter is therefore to explore how differences in employee health care utilization across hospitals relate to differences in safety climate perceptions. We draw on qualitative case study evidence to discern whether there is a pattern in the safety climate perceptions across 'healthy'

and 'unhealthy' hospitals in terms of employee physical therapy and mental health care utilization rates. Data were collected from two Dutch hospitals with low health care utilization rates among their employees and two hospitals with high health care utilization rates.

4.2 ORGANIZATIONAL CLIMATE AND SAFETY CLIMATE

4.2.1 Organizational climate

There has been considerable debate regarding the definition of the organizational climate concept (Schneider et al., 2013) and previous research has highlighted the lack of consensus in terminology and measurement (e.g. Fink and Chen, 1995; Kuenzi and Schminke, 2009). However, the majority of the organizational climate scholars tend to agree on the following three aspects of the climate concept.

First, the majority of the work on climate mentions its subjective nature. Organizational climate is reflected in employees' subjective interpretations of the policies, practices and ways of goal attainment within an organization. Or put otherwise, climate is a perceptually based abstraction (Ashforth, 1985).

Second, there is a distinction between organizational climate and organizational culture. Although some have noted that the concepts have some conceptual overlap (Glick, 1985), there is considerable agreement that they are distinctly identifiable within organizations (Moran and Volkwein, 1992; Schneider et al., 2013). Culture refers to the implicit underlying values, beliefs, and assumptions that guide employees' behavior. Climate, on the other hand, concerns the meaning employees attach to the tangible policies, practices, and procedures they experience in their work situation (Schneider et al., 2013). In this study, we explicitly focus on employee perceptions of the social and interpersonal practices and procedures within the workplace (Wilson et al., 2004). We therefore refer to climate as a momentary representation of a more enduring culture concerning social and interpersonal aspects of the work environment.

Third, there are two approaches to define and measure organizational climate. The first approach was introduced by James and James (1989) and describes climate in terms of organizational features that can be applied to any number of contexts and industries. This approach is referred to as a global approach to climate (Patterson et al., 2005) or as molar climates (Schneider et al., 2013). Most empirical research investigating the impact of climate on organizational outcomes, however, has adopted the approach forwarded by Schneider (1990). In this approach, climate is described in

terms of specific features that are tied to the subject of interest. This domain-specific approach (Patterson et al., 2005) or focused climates (Schneider et al., 2013) addresses certain types of climate such as service climate or ethical climate. In the present study, we are interested in the relationship between climate and employee health and safety as a specific, important aspect of organizational functioning. We therefore use the domain-specific approach of the well-developed safety climate concept instead of the global approach to the organizational climate concept.

4.2.2 Safety climate

From the introduction of the concept in the 1980s, safety climate research has almost exclusively focused on the perceptions of physical health and safety in the workplace. This is not surprising as the concept was originally developed based on empirical research in industrial and manufacturing organizations where physical safety is the primary safety issue. However, more recently another stream of safety climate literature has emerged which focuses on the value of psychological health and safety. Psychosocial safety climate highlights the importance of psychological safety in the workplace and relates to freedom from psychological and social risk or harm (Dollard and Bakker, 2010), such as aggression and violence, bullying, or high work pressure. Considering the type of work and accompanying risks that health care workers face on a daily basis, the importance of both physical and psychological health and safety is evident. For this study, we therefore refer to safety climate as the perceptions employees have of the policies, practices and procedures regarding employee physical and psychological health and safety in the workplace.

4.2.3 Safety climate dimensions

Although most safety climate scholars agree on the definition of the concept, there is not much consensus on its dimensionality (Zohar and Luria, 2005). A great variety of multidimensional measurement instruments have been proposed and used to empirically examine the safety climate concept. Several reviews have been conducted to identify the common themes in these instruments (Flin et al., 2000; Seo et al., 2004). They conclude that the majority of the research includes some type of 'management commitment and priority to safety' dimension, which is not surprising as this is said to constitute the core meaning of safety climate (Zohar, 2014; Kuenzi and Schmincke, 2009). Attitudes and behaviors of managers are seen as crucial for setting the organizational atmosphere, establishing priorities and allocating resources in relation to workplace health and safety (Flin et al., 2000).

A second theme that has been emphasized more recently is the importance of coworkers and group attitudes and –behavior regarding health and safety (Brondino et

al., 2012; Fugas et al., 2011; Kines et al., 2011). This is especially critical when the majority of the work is done while in a group setting, such as health care delivery (McFadden, 2015). Fugas, da Silva and Melia (2009: 244) define safety group norms as "internalized informal safety rules that work groups adopt to regulate and regularize group member's behavior".

Another frequently mentioned safety climate theme is safety communication and participation. Openly communicating about safety and empowering employees to participate in safety related decision-making and activities are important aspects of a positive safety climate (Kines et al., 2011). In this regard, both top-down communications aimed at informing employees about health and safety rules and regulations, and bottom-up communications from employees to management about the needs, values and opinions of staff are included.

Following the common themes outlined above, this study will focus on three main safety climate dimensions (see also Bronkhorst et al, 2015):

1. *Leadership and management.* This refers to the perceptions employees have of management commitment to health and safety within the organization as well as the priority managers give to the subject.
2. *Group norms and –behaviors.* This dimension describes perceptions of co-worker behavior, group norms and attitudes concerning health and safety.
3. *Communication and participation.* The final dimension refers to the formal and informal mechanisms used to transfer information regarding health and safety in the workplace. The degree of participation or involvement in health and safety-related decision-making is also included.

4.3 SAFETY CLIMATE AND EMPLOYEE HEALTH

Several studies have found that safety climate perceptions are related to a number of important employee health and safety related outcomes in health care, such as physical injuries (Hofmann and Mark, 2006; McCaughey et al., 2013a), psychological injuries (Zarei et al., 2016), and sick days (McCaughey et al., 2013a). The safety climate literature has proposed a variety of mechanisms linking safety climate to employee health and safety outcomes. Generally, the research can be divided based on two types of models. One set of empirical models describes safety climate as a work characteristic that directly relates to employee health and safety outcomes (see the meta-analyses by Nahrgang et al., 2010 or Clarke, 2010). The majority of models, however, belong to the other set of models that proposes an indirect relationship

between safety climate and health and safety outcomes, for instance through safety knowledge, -skills, –motivation, and -behavior (e.g. Griffin and Neal, 2000; mostly focused on physical safety) or through job demands and –resources (e.g. Law et al., 2011; Idris et al., 2014, mostly focused on psychological safety).

Ample evidence clearly shows that the perceptions that employees have of the importance of health and safety in the workplace matter for their physical and psychological health. However, most of this research is based on self-reported health and focuses on the differences between individuals. In most cases, the archival data that is used at the organizational level is data on reported accidents and injuries. However, organizations often record data on accidents and injuries that meet OSHA criteria (Beus et al., 2010a), which include only those injuries that result in comparatively severe health issues (e.g. death, loss of consciousness or medical treatment beyond first aid). Less severe or acute physical health problems such as musculoskeletal disorders or mental health problems such as burnout of depression are thus not included in these types of injury data. In this respect, health care utilization data are relevant as they can be interpreted as a set of proxies that describes the physical and/or psychological health status of an individual (Butler et al., 2009), or when aggregated, the health status of an organization's workforce. Research on the association between safety climate perceptions and health care utilization rates has not been developed yet. We aim to fill this gap by examining how differences in health care utilization rates across hospitals relate to differences in employee safety climate perceptions.

4.4 METHODS

To explore how the patterns in safety climate perceptions and health care utilization rates are related, we conducted a comparative case study in the Dutch hospital sector. We compared safety climate perceptions among employees working in two hospitals with a low score on health care utilization to employees employed by two hospitals with a high score on health care utilization (see Table 4.1). The health care utilization rates were made available by a Dutch national health care insurance provider, which provides health care insurance specifically for health care workers in The Netherlands (for more information on the health care utilization data used in this study, see Bronkhorst, 2017). We exclusively focused on the utilization of two types of health care services: physical therapy and mental health care utilization, as according to the EU-OSHA, the most common threats posed by the work environment in European countries are musculoskeletal disorders and mental health problems (EU-OSHA, 2009). The health care utilization data provided for this research were aggregated to the hospital level in

order to comply with Dutch privacy rules and regulations. The health care utilization rate for each hospital represents the percentage of employees within the hospital that visited a physical therapist for treatment (for physical therapy utilization) or a mental health care provider such as a psychologist, therapist or psychiatrist (for mental health care utilization) during one year. From all the Dutch hospitals, the selection of the four hospitals explored in the case studies was made using two criteria.

First, we used purposeful sampling (Patton, 2002) of 'healthy' and 'unhealthy' hospitals

Table 4.1 Comparative case study design

	Large teaching hospital	**Small regional hospital**
Low health care utilization (physical therapy and mental health care utilization rates)	Hospital A	Hospital B
High health care utilization (physical therapy and mental health care utilization rates)	Hospital C	Hospital D

by looking at the health care utilization rates of these hospitals. As physical therapy and mental health care treatments are often not indicated as preventative care (Deb & Trivedi, 2006; Ozkan, 2014), the top 25 percent hospitals with the lowest health care utilization rates were indicated as 'healthy' hospitals and the top 25 percent hospitals with the highest health care utilization rates were indicated as 'unhealthy' hospitals. We selected two hospitals in the 'healthy' category to compare to two hospitals in the 'unhealthy' category. This approach is a more efficient sampling strategy when comparing hospitals than selecting a random sample of organizations, because hospitals at the end of the spectrum are more likely to offer sharper contrasts and may therefore provide more valuable information than hospitals with average health care utilization rates (Mannion et al., 2005).

Second, we decided to select two large teaching hospitals and two small regional hospitals in both categories. This choice was made because teaching hospitals provide more specialized care and generally attract a higher proportion of severely ill patients who are in need of more complex procedures in comparison to regional hospitals (Iezzioni et al., 1990). This way, a fair comparison can be made across categories. The characteristics of the hospitals included in the case study are presented in Table 4.2.

Table 4.2 Characteristics hospitals in comparative case study

	'Healthy' hospitals		**'Unhealthy' hospitals**	
	Hospital A	Hospital B	Hospital C	Hospital D
Physical therapy utilization rate (hospital sector mean = 32.1%)	27.5%	28.9%	34.3%	36.6%
Mental health care utilization rate (hospital sector mean = 6.2%)	5.9%	5.9%	7.2%	8.4%
Type of hospital	Teaching hospital	Regional hospital	Teaching hospital	Regional hospital

We conducted semi-structured interviews at each hospital with occupational health advisors and employees to gather data and compare cases. We first interviewed the occupational health advisors and then asked them to randomly choose three employees (including one employee with supervising tasks) that we could interview about health and safety in the workplace. In total, we conducted 17 interviews that were recorded and transcribed (see Table 4.3 for an overview of respondents). The transcripts were subsequently analyzed using thematic analysis. The main themes were theoretically driven and resembled the three main dimensions of safety climate: (1) leadership and management, (2) group norms and –behavior, and (3) communication and participation. One researcher who had conducted the interviews coded and analyzed all data to ensure consistency and rigor (Green et al., 2007). The semi-structured interviews focused on the way employees working in 'healthy' and 'unhealthy' hospitals perceived safety climate themes, and the role these perceptions played in their physical and mental health. Quotes from the interviewees were used to highlight the main findings.

Table 4.3 Respondents

Hospital A	- Occupational health advisor and HR manager (duo interview) - Nurse - Facility services employee (team manager) - Nurse
Hospital B	- Occupational health advisor - Operating room assistant - Nutrition assistant - Nurse (team manager)
Hospital C	- Occupational health advisor - Nurse (team manager) - Dialysis technician - Nurse
Hospital D	- Occupational health advisor - HR Manager - CSSD technician - CSSD technician - Facility services employee (team manager)

4.5 FINDINGS

Findings from the interviews on the perceptions of the three main safety climate dimensions in the two 'healthy' and two 'unhealthy' hospitals are presented below. Table 4.4 shows a summary of the findings.

Table 4.4 Summary of interview findings

	'Healthy' hospitals (Hospitals A and B)	**'Unhealthy' hospitals** (Hospitals C and D)
Safety climate perceptions		
Perceptions of leadership and management	- Senior managers have different reasons to commit to workplace health and safety, but their main driver is the well-being of their employees - Senior management shows commitment by investing in extensive health and safety networks - Direct supervisors are very involved with health and safety issues and behave in a pro-active manner to solve health and safety issues	- Negative stereotyping of senior managers' concern of health and safety issues - Senior managers give no or very limited priority to investments in employee health and safety issues beyond the compulsory risk assessments - Direct supervisors are concerned with employee health and safety, but behave in a reactive manner to solve health and safety issues
Perceptions of group norms and –behavior	- Workplace health and safety is as important as finishing work in time - Group behavior is characterized by co-workers helping each other to perform their jobs in a healthy and safe manner and addressing unsafe behaviors or unhealthy circumstances	- Workplace health and safety is in the way of finishing work in time - Addressing unsafe behaviors or unhealthy circumstances is difficult because most employees do not feel it is important or they are not willing to change their ingrained routines.
Perceptions of communication and participation	- Roles and responsibilities regarding workplace health and safety are clearly communicated throughout the organization - A range of internal communication channels are present to actively encourage staff to engage in health and safety matters - Employees are willing to use opportunities offered to become involved in health and safety issues	- There is no or limited communication about roles and responsibilities regarding health and safety - Opportunities to become engaged in health and safety matters are limited - Employees are reluctant to become involved in health and safety issues because they believe management will not use their input in decision-making

4.5.1 Perceptions of leadership and management

From the interviews it immediately became clear that hospital workers make a clear distinction between different managerial levels within the organization. Perceptions of management commitment to safety differed substantially between senior management and direct supervisors. Generally, employees were more skeptical and even cynical about senior management's priority for health and safety related issues. The negative stereotyping of senior managers' safety concerns (Clarke, 1999) was espe-

cially apparent in 'unhealthy' hospitals C and D, where employees stated that senior management is only extrinsically motivated to pay attention to employee health and safety in the workplace. Our data revealed that employees feel that the main reason why the board of directors and senior managers decide to invest in health and safety policies and procedures is because the national law and sector-wide trade agreements require them to do so. Or, as one interviewed employee stated, to cut costs by decreasing sickness absence:

"Well, they [senior management, BB] have to invest in employee health. I mean, creating a network of ergo coaches who are schooled and trained for instance. These kinds of agreements were made in the hospital sector and they are obligated to carry out these agreements. And of course they want a reduction in sickness absence, because that will make money. Their actions and decisions are not purely focused on increasing our health and safety" (Respondent hospital C).

In these hospitals, the attributions about the purpose of the investments made by senior management in policies and procedures regarding workplace health and safety were thus very skeptical. Moreover, interviewees from hospital D claimed senior management gives very limited priority to health and safety in the workplace, as they were not aware of any policies or projects on this subject other than the compulsory risk assessments. Employees from hospitals A and B also mentioned they believed legal and financial reasons played a role in senior management commitment to health and safety, but they also stated the top of the organization is genuinely concerned with the health and safety of employees. Moreover, the 'healthy' hospitals had a more developed network of health and safety specialists (e.g. ergo coaches) working within the organization and offer their employees activities to maintain healthy (e.g. health promotion programs). As one nurse put it:

"The top of our organization considers working conditions a priority. When I see the investments made in the set up of our entire occupational health and safety network, I have faith that they really want what is best for their employees" (Respondent hospital A).

Although the perceptions of direct supervisors were overall more positive in comparison to those of senior management, we found some differences in perceptions of direct supervisors commitment to safety between the 'healthy' and 'unhealthy' hospitals. All employees stated that their supervisors were committed to workplace health and safety, but employees from the two low health care utilization hospitals characterized their supervisors as being proactive and prevention-focused whereas their counter-

parts working at the hospitals with high health care utilization rates described their supervisors to often behave in reactive and curative manner (attending to health and safety problems once the have occurred). Proactive management practices thus seem to differentiate the 'healthy' hospitals from the 'unhealthy' hospitals (Vredenburgh, 2002). One nurse from hospital B also explains how this influences her behavior:

"Our supervisor clearly states what she expects from us when it comes to dealing with workload. Together with the ergo coach, she will initiate activities like courses on how to use lifting equipment and such. She will always tell us when she sees us moving a patient in an unsafe manner. Therefore, health and safety is always in the back of our minds and we will think twice about acting unsafe" (Respondent hospital B).

On the other hand, employees from the 'unhealthy' hospitals described they perceived their supervisor as passive and reactive:

"He will always react, of course. If there are serious [health and safety, BB] problems that severely burden our jobs, he will try to fix them. But only when it is absolutely necessary and we need to explicitly ask for his help" (Respondent hospital C).

4.5.2 Perceptions of group norms and group behavior

Besides senior managers and supervisors, the safety literature stresses the importance of co-workers' influence (Brondino et al., 2012; Fugas et al., 2011). All interviewees emphasized the role of co-workers when it comes to health and safety in the workplace, but we found some differences in group norms and group behavior between 'healthy' and 'unhealthy' hospitals. A recurring theme that all respondents referred to during the interviews was high time pressure and how they would deal with this as a team. Employees from hospitals A and B characterized their teams as "taking their own health as serious as finishing work on time" (respondent hospital A). They for instance stated co-workers are always willing to help others and support each other when a team member is not feeling well. Another important aspect of group norms regarding workplace health and safety is that co-workers feel safe enough to address unsafe behaviors:

"We are always very busy, but we try to deal with that as a team. That means that we help each other out, but sometimes we also need to address certain behaviors and say, "Hey, that's not how we agreed to do that, right?" If you're not able to address those things in your team, you will never really manage health and safety risks" (Respondent hospital B).

In contrast, the employees from hospitals C and D generally described health and safety group norms as being overshadowed by time pressure concerns. There are strong beliefs that behaving healthy and safe in the workplace takes too much time. As a consequence, they for instance do not choose to use patient-lifting equipment. Moreover, a number of respondents stressed that it is hard to convince co-workers to change their unsafe or unhealthy routines, especially older co-workers who have worked at the hospital for many years.

"Some of our co-workers feel that everything needs to be done 'quick quick quick'. In their eyes, it takes too much time to lift a patient in a safe manner. It actually doesn't if you do it right, but that's just the way these people think" (Respondent hospital D).

4.5.3 Perceptions of communication and participation

Finally, our data showed that the perceptions of health and safety communication and employee participation in the two 'healthy' hospitals differed from the perceptions in the two 'unhealthy' hospitals. These differences did not so much appear in the information being send to employees about occupational health and safety risks, but in the communication about responsibilities and roles in managing occupational risks. The International Labour Organization described a successful occupational safety and health system as having clear and defined responsibilities in running it. A major principle is the establishment of line management (International Labour Office, 2011). However, with the upswing of self-managing teams in health care, many responsibilities are being devolved to teams. In hospitals C and D employees said they felt that roles and responsibilities were not clearly communicated and, therefore, they did not know what the hospital wanted from them in this regard. As one nurse put it:

"Frameworks and structures on how we are supposed to deal with health and safety issues have not been communicated to employees. Therefore, it is unclear who is responsible for what in this hospital and how we should deal with physical or psychological strain in the workplace" (Respondent hospital C).

As a consequence, the participation of employees in health and safety issues is very limited. Respondents stated that there are not many possibilities to become involved in health and safety matters. Moreover, the opportunities offered to engage in health and safety matters are not being used to their full extent, because employees expect management will not use their input in the decision-making process. They feel there is no point in participating when management is insincere about their willingness to listen to them.

In contrast, respondents from hospitals A and B stated that information on roles and responsibilities were brought to their attention regularly through newsletters, trainings and introduction days. Furthermore, from the interviews it became clear that employees appreciate and use the different arrangements and methods for employee involvement, in particular in hospital A:

"Our hospital offers many different ways to express your concerns or make suggestions to improve working conditions. Possibilities vary from your own supervisor or health and safety expert to special safety committees. Eventually the best ideas always originate at the shop floor, so it is all properly organized" (Respondent hospital A).

4.6 CONCLUSIONS AND DISCUSSION

4.6.1 Conclusions

The main goal of this chapter was to explore how differences in employee health care utilization across hospitals relate to differences in safety climate perceptions. The evidence gathered among hospital employees showed that employees working in 'healthy hospitals' (with low physical and mental health care utilization rates) have more positive safety climate perceptions than hospital workers employed by 'unhealthy' hospitals. Overall, their perceptions about management, group norms and –behavior, and communication and participation regarding workplace health and safety were more favorable compared to the perceptions of their counterparts working in hospitals with high health care utilization rates. This finding seems to be in line with the general idea that a positive safety climate is a prerequisite for an effective safety and health management system (Kim et al., 2016). Our research shows that hospitals that do not succeed in creating positive safety climate perceptions among their employees have higher employee health care utilization rates. Although this study does not provide evidence on the underlying mechanisms that connect safety climate to health care utilization, the interview data have shown that employee behavior might play an important role. Current safety climate theories are mostly focused on the relationship between climate and injuries, but could benefit from applying a wider range of outcomes including employee health care utilization.

By connecting health care utilization data to safety climate perceptions within organizations, this study has combined insights from both epidemiological and organizational literatures. Moreover, it is one of the first studies to use health care utilization data as an objective indicator of employee health. Our findings suggest that health care utilization data may provide a new way to measure organizational (health and safety)

performance. These data could for instance be used alongside other archival data such as absenteeism records, accident data or subjective and perceptual indicators of employee health and well-being.

The finding that employees from the two hospitals with low health care utilizations rates have more positive safety climate perceptions also has implications for practice. First and foremost, this study provides information on factors that could play a role in improving employee health and subsequent outcomes at the organizational and societal level. 'unhealthy' hospitals with a high health care utilization rate face high costs in terms of worker compensation claims, overtime and temporary staff. Our findings suggest that if they invest in improving their employees' safety climate perceptions, they might also be able to improve their employees' mental and physical health and subsequent health care utilization. These improvements should take place at different places in the organization, from top management priority to direct supervisor commitment and group norms and behavior at the team level. In the end, lower health care utilization rates do not only benefit individual employees and hospitals, but the entire health care industry and society too. Therefore, future research into the relationship between safety climate and health care utilization is desirable.

One of the strengths of our study is its use of qualitative research methods. Most of the research on safety climate is based on quantitative survey instruments to measure safety climate and its dimensions. In order to advance safety climate theory and concepts, repeated calls have been made to apply qualitative research techniques such as semi-structured interviews (e.g. Colley and Neal, 2012; Frone and Barling, 2004). This study has qualitatively explored the safety climate and organizational outcomes relationship and thereby uncovered that the perceptions of employees working in 'healthy' and 'unhealthy' hospitals differed considerably. In particular, our case-study data revealed how hospital employees perceived safety leadership, group norms and communication "within its real-life context" (Yin, 2003: 13). For example, one interesting finding based on the interview data concerns the differences in attributions made by employees about top management commitment to safety. In hospitals, a certain form of safety cynicism appears to be related to safety climate perceptions. Another example of a finding we uncovered using qualitative methods is that the content of safety communication is an important factor when it comes to the difference between 'healthy' and 'unhealthy' hospitals. These findings provide a rich description of safety climate perceptions in a hospital context. The specific and context-dependent findings are much harder to find using a quantitative research design. Nevertheless, we believe it is still important for future research to subject these qualitative findings to quantitative testing. In order to generalize our main finding that employees working

in 'healthy' hospitals have more positive safety climate perceptions, research should be conducted among a larger sample of health care organizations.

4.6.2 Limitations

Several limitations of this study need to be highlighted. First, we used a general and broad operationalization of safety climate that focuses on both physical and psychological health and safety. This choice did not allow us to examine perceptions of policies, procedures and practices aimed at specific physical or psychological risks in the workplace (e.g. aggression and violence, patient lifting, bullying, VDU tasks, work-life balance). There might be differences in how employees perceive priority for physical health and safety within the organization and how they perceive priority for psychological health and safety (see for instance Idris et al., 2012; Dollard and Bakker, 2010).

Second, the respondents we interviewed were from a small number of hospital teams, which might not be representative of other teams in the hospital. Research shows that safety climate perceptions vary across teams within the same organization (Zohar and Luria, 2005). We might not have captured all different kinds of safety climate perceptions. However, a random selection of respondents by the hospitals' occupational health advisors resulted in variation in occupations and type of teams included in our study.

Finally, the number of cases we studied does not enable us to make quantitative generalizations. Nevertheless, the main objective of the study was not to obtain a representative sample of hospitals to generalize our findings, but to in-depth explore the safety climate dimensions in hospital contexts in order to discover differences or similarities between 'healthy' and 'unhealthy' hospitals.

Chapter 5

Safety climate, worker health and organizational health performance:

Testing a physical, psychosocial and combined pathway

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ABSTRACT

The purpose of this chapter is to investigate the relationship between organizational safety climate and organizational health performance outcomes (i.e. absenteeism, presenteeism, health care utilization) mediated by individual worker health. Three pathways were used to examine this relationship: a physical pathway starting with physical safety climate and mediated by musculoskeletal disorders (MSDs), a psychosocial pathway starting with psychosocial safety climate and mediated by emotional exhaustion, and a combined pathway starting with psychosocial safety climate and mediated by both MSDs and emotional exhaustion. Three mediational multilevel analyses were conducted using a sample of 8,761 employees working in 177 health care organizations. Although the findings did not support the hypothesized physical pathway, they showed that the psychosocial pathway worked satisfactorily for two of the three health performance outcomes (absenteeism and presenteeism). The combined physical and psychosocial pathway explained differences in the third outcome: health care utilization. This is one of the few studies to include both physical and psychosocial pathways that lead to employee health and organizational performance. The results underscore the importance of paying attention to psychological health and safety in the health care workplace. Not only for the psychological health of employees, but also to improve their physical health and subsequent organizational health performance.

5.1 INTRODUCTION

Over the last thirty years considerable theoretical and empirical evidence has been found that an organization's safety climate is associated with safety-related outcomes such as workplace accidents and injuries (Zohar, 2010). However, the relationship between safety climate and workers' physical and mental health problems has received far less attention. This is surprising since reports worldwide show that musculoskeletal problems and stress are the most common threats posed by the working environment (EU-OSHA, 2009; Safe Work Australia, 2013). Increased attention to workplace physical and mental health is essential to improve worker health and organizational health performance indicators such as sickness absence, presenteeism and health care utilization (Dickson-Swift et al., 2014). However, the topic of workplace health and safety in organizations may have suffered in recent years as a result of the global economic crisis leading to restructuring and downsizing. This is especially true for the health care sector where system reforms and budget cuts have resulted in a focus on productivity leading to a distraction on physical and psychosocial health and safety in the workplace (International Labour Office, 2013). This makes it interesting to study whether health care organizations that do give a high priority to health and safety (i.e. that score high on safety climate) perform better when it comes to individual worker health and subsequent absenteeism, presenteeism and health care utilization rates at the organizational level.

In this chapter we examine the relationship between organizational safety climate and organizational health performance mediated by individual worker health among a large sample of 8,761 employees working in 177 health care organizations. With this study we add to the literature in several ways. First, we expand the current knowledge on outcomes of organizational safety climate by examining the association with organizational health performance indicators. More specifically, we integrate absenteeism, presenteeism and health care utilization as outcomes of organizational safety climate. Second, we differentiate between two types of safety climate (i.e. physical and psychosocial safety climate) and test the proposed relationships in both the physical and the psychosocial domain. Most safety climate research focuses either on physical safety (e.g. Arcury et al., 2012; Sinclair et al., 2010) or psychosocial safety (e.g. Bond et al., 2010; Law et al., 2011; Idris et al., 2014) in relation to worker health and safety. Third, we conduct our research on multiple levels using multilevel structural equation modeling (Preacher et al., 2010) in which the lower-level variables are clearly separated into within- and between-group components. This technique makes it possible to test both top-down and bottom-up processes. In this respect, this

chapter addresses one of the biggest challenges in management research: bridging micro and macro domains (Aguinis et al., 2011).

5.2 THEORETICAL FRAMEWORK

Organizational safety climate is traditionally defined as employees' shared perceptions of the policies, practices, and procedures concerning safety within the organization (Zohar, 1980). An important assumption in safety climate theory is that safety always operates in the context of other competing task domains (e.g. productivity or efficiency). The organizational safety climate concept therefore reflects workers shared perceptions of the priority of employee health and safety compared to other competing priorities within the organization (Zohar, 2008).

5.2.1 The physical pathway: musculoskeletal disorders and physical safety climate

From its introduction in the 1980s the main focus of the safety climate literature has been on physical health and safety. As stated earlier, most studies focus on the association with safety-related outcomes such as safety behavior, accidents and injuries (Nahrgang et al., 2011). Nevertheless, research has demonstrated the relevance of physical safety climate for various other health-related outcomes such as physical complaints, sleeping complaints and general health (Hayes et al., 1998; Oliver et al., 2002).

In the health care sector, musculoskeletal disorders (MSDs) are among the most prevalent physical health issues (Davis & Kotowski, 2015). Few studies have examined the relationship between safety climate and MSDs (e.g. Hofmann & Mark, 2006; Arcury et al., 2012). The theoretical framework for these studies is based on expectancy-valence theory (Vroom, 1964). This theory suggests that workers will be motivated to comply with physical safety rules and regulations if they believe that these behaviors will lead to valued outcomes. Working in an organization with a high physical safety climate will inform workers on the value and importance of physical safety (Zohar, 2008) and as a result they will comply with health and safety procedures because they believe this behavior will be rewarded and supported. In a health care context, this could for instance mean that employees with high safety climate perceptions will use patient-lifting equipment or adhere to regulations for lifting heavy objects, as they believe these behaviors are expected and rewarded (Bronkhorst, 2015). Closer adherence to these rules and regulations should be associated with a decrease in MSDs. We therefore hypothesize:

H1: Physical safety climate is negatively related to worker MSDs

MSDs are not merely an outcome of physical safety climate perceptions, but also serve as a critical link to achieving organizational health performance outcomes. Following healthy workplace models presented by Grawitch et al. (2006) and Danna and Griffin (1999), we expect the improvement of organizational health performance to happen indirectly through the improvement of workers' MSDs. In this study, we focus on three organizational health performance outcomes associated with worker health: sickness absenteeism, presenteeism and health care utilization.

Sickness absenteeism is our first performance outcome and is most often associated with MSDs. A study by Andersen et al. (2012) for instance showed that MSDs are a risk factor for long-term sickness absence among health care workers. But previous research has also linked organizational climate perceptions via MSDs to absenteeism. Piirainen et al. (2003) found that if the workplace organizational climate is considered to be poor, there is a clear increase in musculoskeletal symptoms and sickness absence, whereby the increase in sickness absence was mediated through an increase in musculoskeletal symptoms.

More research is starting to emerge on a topic beyond sickness absenteeism: sickness presenteeism. Presenteeism can be defined as 'going to work when one is ill' and is often claimed to go hand in hand with productivity loss (Johns, 2010). As with absenteeism, studies have found presenteeism to be correlated with MSDs and work factors (Caverley et al. 2007; Campo & Darragh, 2012). In our study, we therefore assume that the relationship between physical safety climate and presenteeism is also mediated by MSDs. Our argument for this proposition draws on the claim that the nature and severity of health events that lead to absenteeism and presenteeism are similar. Caverley et al. (2007) describe this phenomenon as 'the substitution hypothesis': employees who feel ill may substitute sickness presence for sickness absence. Thus, the same work-related factors that have been found to lead to absenteeism with changes in health as the underlying mechanism may likewise lead to presenteeism (Pohling et al., 2015: 3).

Finally, we are interested in worker health care utilization as an organizational health performance outcome. Much of the existing research on worker health care utilization is limited to the relationship with job stress and the individual job design (e.g. Manning et al., 1996b; Azagba & Sharaf, 2011). Based on the argument presented above on the relationship between physical safety climate and MSDs, and the research findings showing that MSDs are associated with increased health care use among health care

workers (Koehoorn et al., 2006), we expect a mediation of MSDs in the relationship between physical safety climate and health care utilization similar to the mechanisms described above. This brings us to our second hypothesis:

H2: Physical safety climate is negatively related to a) absenteeism, b) presenteeism and c) health care utilization rates via worker MSDs

5.2.2 The psychosocial pathway: emotional exhaustion and psychosocial safety climate

More recently, another domain-specific safety climate concept emerged which does not focus on physical health and safety, but highlights the value and importance of psychological health and safety. Dollard and Bakker (2010: 580) define psychosocial safety climate as the shared perceptions among employees regarding policies, practices, and procedures for the protection of worker psychological health and safety.

As with physical safety climate, empirical evidence has shown that psychosocial safety climate is related to various mental health and well-being outcomes such as psychological distress (Law et al., 2011), posttraumatic stress symptoms (Bond et al., 2010) and depression (Idris et al., 2014). However, the underlying theoretical framework for the effect of safety climate on worker health outcomes is different when it comes to psychological health. The literature on psychosocial safety climate often describes the concept as a 'cause of the causes' (Dollard & McTernan, 2011) and relies heavily on the job demands-resources framework (Bakker & Demerouti, 2007). Based on the theoretical underpinnings of this framework, it is argued that psychosocial safety climate acts as an organizational resource and will influence worker psychological health by its effect on job demands and job resources (Dollard & Bakker, 2010). Thus, organizations with a high psychosocial safety climate will organize the work in such a way that employees are not exposed to high levels of job demands, and are provided with more resources (Idris et al., 2014). In a health care context this could for instance mean that when the importance of psychological well-being is recognized by the organization, workers are offered procedures and practices (e.g. a support group) when faced with patient aggression. Employees then react emotionally to their perceptions of being valued and supported by their organization (Arnold & Dupré, 2012), which will be associated with less emotional exhaustion as the organization provides workers with opportunities to cope with stressful situations. Therefore, we hypothesize:

H3: Psychosocial safety climate is negatively related to worker emotional exhaustion

Following our second hypothesis, we expect psychosocial safety climate to be not only important in relation to individual worker health, but also in relation to our three organizational health performance outcomes. More specifically, we expect the relationship between psychosocial safety climate and absenteeism, presenteeism and health care utilization to be mediated by emotional exhaustion.

The literature on psychosocial safety climate is still growing and evidence on its association with organizational level health performance outcomes is scarce. Although not examining the indirect effect via worker psychological health, previous research showed there is a negative correlation between psychosocial safety climate and sickness absence data (Dollard & Bakker, 2010), and overall compensation costs measured at the organizational level (Winwood et al, 2013). Moreover, there is evidence that supports the idea of an indirect effect of an organizational level resource on worker health and organizational health performance. A study by Van Scheppingen et al. (2013) showed that a concept very similar to psychosocial safety climate (i.e. bonding social capital) was associated with absenteeism and presenteeism indirectly through emotional exhaustion. The mechanism behind these findings is that psychosocial safety climate acts as an organizational resource that helps employees feel less emotionally exhausted (see hypothesis 3), which in turn contributes to their ability to work more optimally without the work being hampered by absence or being less often at work while sick (Van Scheppingen et al., 2013). Moreover, decreased emotional exhaustion may also motivate workers less to seek health care services (DePasquale et al., 2015). This leads to our fourth hypothesis:

H4: Psychosocial safety climate is negatively related to a) absenteeism, b) presenteeism and c) health care utilization rates via worker emotional exhaustion

5.2.3 The combined physical and psychosocial pathway

In the past decade, the assumption that work factors and health consequence lie within the same qualitative domain has been challenged. A meta-analysis based on previous empirical research by Lang et al. (2012) for instance shows that the impact of *psychosocial* risk factors such as job demands, job resources, and social support predict the *physical* outcome MSDs. More recently, researchers have started to examine the effect of safety climate (as a psychosocial risk factor) on physical health outcomes mediated by psychological health outcomes. Golubovich et al. (2014) for instance found that low safety climate acts as a stressor that elicits emotional strain among workers. As a consequence, physiological mechanisms (e.g. increased muscle tension), behavioral mechanisms (e.g. risk-taking), and psychosomatic mechanisms (e.g. lower pain threshold) occur that explain the effect of emotional strain on MSDs.

Eatough et al. (2012) tested a similar model, examining the impact of safety-specific leadership on strain responses and MSDs, and found that strain fully mediated the relationship between safety-specific leadership and lower back and shoulder symptoms.

Clearly, psychosocial factors and worker psychological health can have important implications for worker physical health. The former two studies focused on physical safety climate and -leadership as psychosocial work factors that impact physical health. Yulita et al. (2014) were the first to discover that the psychosocial variant of organizational safety climate affects physical health problems as well, via challenge- and hindrance demands, and in turn emotional exhaustion. Bailey et al. (2015) recently replicated these findings when they found that psychosocial safety climate relates to emotional exhaustion and MSDs. Their study furthermore showed that the model could be extended to predict workers' compensation claims. In our study, we follow the integrated psychosocial-physical process proposed by Bailey et al. (2015) and expand the array of outcomes associated with psychosocial safety climate by adding absenteeism, presenteeism, and health care utilization at the organizational level. This leads to our final hypothesis:

H5: Psychosocial safety climate is negatively related to a) absenteeism, b) presenteeism and c) health care utilization rates via worker emotional exhaustion and MSDs

5.3 METHODS

5.3.1 Design and participants

The data for this study were obtained from a large national research project on the health and safety of health care workers in The Netherlands ('Gezond werken in de zorg'). In the Netherlands, employers are obliged by law to pay at least 70% of the employee's most recent gross base salary for sickness absence during the first two years of absenteeism. After that, an employee can be granted a work disability pension, which is paid by the national Social Insurance Institute. The cost of workplace absenteeism in The Netherlands is therefore mostly distributed between the state and the employer.

The participants in the research project completed a web-based survey. They were employed by various health care organizations such as hospitals, nursing homes, mental care facilities, and organizations providing care to clients with physical or mental disabilities. Several different approaches to ask employees to fill in the online survey were used, including both direct and indirect approaches. Some employers

agreed to send their employees an email with an invitation to participate (direct), while others were only able to mention the study on the organization's intranet and social media pages (indirect). Furthermore the largest health care unions and all four Dutch employer's associations in the health care industry invited their members to fill in the survey through a message and link on their website. As a consequence, it is unfortunately not possible to derive a response rate for our sample. From the total of 10,581 participants who completely filled in the survey, we took a sample of 8,761 participants working in 177 health care organizations. This selection was made to ensure the sample is line with the 100/10 rule for multilevel analysis set by Hox et al. (2010; at least 100 groups with at least 10 individuals per group). The average number of participants per organization was 50 and varied between 10 and 593.

82% of the participants is female, with an average age of 47 years old. This is broadly representative of the Dutch health care worker population in a direct comparison with data from the Arbeidsmarktinformatie Zorg en Welzijn (2015). The majority of the participants works with patients or clients on a daily basis (87%) and 13% has a management job.

5.3.2 Measures

Physical and psychosocial safety climate - To measure the physical and psychosocial safety organizational climate we used the four factor PSC-12 scale developed by Hall et al. (2010) and added an extra fifth factor. Although the PSC-12 scale is originally developed to measure psychosocial safety climate, we used the same fifteen items to measure physical safety climate. We substituted the words or phrases that referred to psychological health and safety with words or phrases that refer to physical health and safety (e.g. 'psychological well-being' is replaced with 'physical well-being' and 'the prevention of stress' is replaced with 'the prevention of physical injury'). Two previous studies by Hall et al. (2010) and Idris et al. (2012) have used the same substitution procedure to measure physical safety climate and showed good internal validity and reliability.

The PSC-12 four factors each comprise three items and cover four dimensions of safety climate: (1) management priority given to health and safety, (2) management commitment to health and safety, (3) organizational communication about health and safety, and (4) organizational participation and involvement in relation to health and safety. Since working together in teams is an essential part of health care work, we added a fifth dimension consisting of three items from the 'Co-workers' Safety Climate (CSC) scale' developed by Brondino et al. (2012) to address co-worker influences and group norms concerning health and safety. To examine whether the assumed

underlying five-factor structure of the two safety climate measures was justified, we conducted exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) in a random split-sample approach. We performed EFA on the first randomly split half sample. The results of both safety climate constructs were compatible with the assumed multidimensional structure: the four original factors of the PSC-12 can be extended with one 'group norms' factor. The Cronbach's alphas for the five factors were high and ranged between .84 for physical safety communication to .94 for direct management commitment. With the second half of the sample, we performed CFA. The results of the physical safety climate CFA revealed that the data were adequately represented by the hierarchical factorial structure (CFI= .97, TLI= 0.96, RMSEA= .07, SRMR= .04). Regarding the psychosocial safety climate construct, the results of the CFA showed that the five-factor structure fitted the data adequately as well (CFI= .97, TLI= 0.97, RMSEA= .06, SRMR= .04).

Finally, we examined whether the individual level responses on the safety climate constructs are suitable for aggregation to the organizational level by calculating three inter-rater agreement and reliability measures (LeBreton & Senter, 2008). First, we assessed within-group inter-rater agreement using the mean rWG(J) (James et al., 1993). The results showed that strong agreement exists among employees within organizations for both physical safety climate (mean rWG(J)=0.95, S.D.=0.2) and psychosocial safety climate (mean rWG(J)=0.95, S.D.=0.2). Next, we assessed the between-group variance using ICC(1). For physical safety climate, the ICC(1) was .11, indicating that 11% of the variance in physical safety climate could be explained by differences between organizations. The percentage of the variance due to organization was 9% for psychosocial safety climate (ICC(1) = .09). We furthermore calculated the ICC(2) to check the inter-rater reliability. For physical safety climate, the ICC(2) was .86 and for psychosocial safety climate it was .84. In their article, LeBreton and Senter (2008) use an example cut point of 0.80 for climate ratings. Taken together, the mean rWG(J), ICC(1) and ICC(2) provide good justification to aggregate physical and psychosocial safety climate to the organizational level.

Musculoskeletal disorders - We used the standardized Nordic Musculoskeletal Questionnaire to measure participants' MSDs (Kuorinka et al., 1987). Participants indicated (1) whether they have had trouble with a particular area in their body (shoulders/neck, arms/elbows/wrists, back, hips/thighs, knees/ankles/feet) in the past 12 months (yes or no), (2) whether the pain or discomfort resulting from the trouble they experienced has prevented them from engaging in work activities (yes or no), and (3) whether the participant was still having discomfort or pain in the last seven days resulting from the trouble they experienced (yes or no). The answers to these three questions were used

to score each participant on an index ranging from 0 (they had no trouble with this body part in the last 12 months) to 5 (they had trouble with a body part in the last 12 months, this trouble prevented them from engaging in their work and is still continuing to give them discomfort or pain).

Emotional exhaustion - This was measured using five items from the corresponding subscale of the Utrecht Burnout Scale (UBOS; Schaufeli & Dierendonck, 2001). Items were measured on a seven-point Likert scale, ranging from a low score of 1 (never) to a high score of 7 (always). Cronbach's alpha for the emotional exhaustion measure was .89.

To measure the organizational health performance, we used three individual health performance indicators and aggregated these to the organizational level to get organizational rates.

Absenteeism - We first measured individual absenteeism by asking one single item: "During the past 12 months, have you been absent from work due to physical or mental health problems?" (yes or no). As we expected a stronger association between organizational safety climate and work-related sickness absence as opposed to general (non-work-related) sickness absence, we used another question to distinguish which participants have been absent due to work-related health problems: "Were these physical and mental health problems that resulted in your absence work-related?" (yes or no). Based on the answers to these two questions we scored all participants 0 (no (work-related) absence) or 1 (work-related absence).

Presenteeism - We used a similar method for our presenteeism measure. Based on the single-item measure by Aronsson and Gustafsson (2005) we asked participants the following question: "During the past 12 months, have you gone to work despite feeling that you really should have taken sick leave because of your state of health?" (yes or no).

Health care utilization - With respect to our measure of health care utilization, we decided to focus on the utilization of health services for the two most prevalent and often work-related types of health problems among employees: musculoskeletal problems and stress or psychological health problems. Participants were asked to respond to the follow two questions: "In the past 12 months, have you visited a health care provider for musculoskeletal problems (e.g. physical therapist, general practitioner)?" and "In the past 12 months, have you visited a health care provider for psychological health problems (e.g. psychologist, psychiatrist, general practitioner)?" Based on the

answers to these two questions (yes or no) we scored all participants 0 (did not visit a health care provider) or 1 (visited a health care provider).

In testing our hypotheses, we included several control variables at the individual and organizational level.

To control for factors at the individual level, we included two background variables, three work variables, and two lifestyle variables. The background variables are gender and age in years. The work controls included tenure in years, supervisory position, and patient/client contact. The two lifestyle controls were smoking and exercise.

At the organizational level we expected the specific health care industry to be important. We included three dummy variables with the hospital industry as the reference category: nursing homes, mental health care, and disability care.

5.3.3 Convergent and discriminant validity

We used CFA to test for convergent and discriminant validity of our three latent constructs: physical safety climate, psychosocial safety climate, and emotional exhaustion. According to Hair et al. (1998), convergent validity is established under three conditions: (1) all individual items loaded significantly on their constructs, (2) composite reliability (CR) is greater than .7, and (3) the average variances extracted (AVE) is greater than .5. Our CFA results revealed that all loadings were statistically significant ($p < .01$) and varied between .66 and .97, indicating acceptable individual item reliability. Composite reliability is an indicator of the internal consistency of a construct. In the present study, CR for the constructs ranged from .89 to .91, indicating good overall internal consistency of the scales. Finally, AVE represents the percentage of variances in a latent construct that can be explained by its individual items. In the present study, AVE for physical safety climate was 0.69, for psychosocial safety it was .66 and for emotional exhaustion it was 0.60. Overall, the three latent constructs in our study had acceptable convergent validity.

Discriminant validity is established when correlations between different constructs are weaker than those within each construct. One method to assess discriminant validity is to compare the AVE to the squared correlation between two constructs. The AVE should be greater than the squared correlations involving the constructs (Hair et al., 1998). The AVE of .69 for physical safety climate was greater than the squared correlation between physical safety climate and the other constructs in our study (greatest squared correlation was 0.13). This was also true for the AVE of psychosocial safety climate (greatest squared correlation was 0.19) and emotional exhaustion (greatest

squared correlation was 0.19). Overall, the discriminant validity was acceptable for all three latent constructs in the present study.

5.3.4 STATISTICAL ANALYSES

The assumption that individual worker health outcomes mediate the relationship between physical and psychosocial safety climate and organizational health performance outcomes implies the need to take variables on various levels into account. In this study, physical and psychosocial safety climate and organizational health performance outcomes are calculated on the higher (organizational) level, while individual worker health outcomes (i.e. musculoskeletal problems and emotional exhaustion) are measured on the individual level. Taking the multilevel structure of our data into account, we applied multilevel structural equation modeling (MSEM) to test our hypotheses, using Mplus software.

To date, upward and mixed models have received relatively little attention in the literature on multilevel mediation (Preacher et al., 2010). Nevertheless, in organizational safety climate and performance outcomes research, one is often confronted with a situation in which at least part of the hypothesized mediation process operates at the higher (organizational) level and another part at the lower (employee) level. In previous research, data from such a design have often been analyzed by aggregating the lower level (employee) data into the higher (organizational) level of analysis by computing group means and conducting the analysis at the higher level (e.g. Ljungblad et al., 2014). However, aggregating individual data in this way may yield misleading results, as the variances and covariances computed at the group level not only represent between-group variation but also within-group variation (Croon & Van Veldhoven, 2007). In our study, we therefore perform multilevel structural equation modeling, in which the lower-level variables (i.e. musculoskeletal problems and emotional exhaustion) are clearly separated into within- and between-group components so that the entire relationship can be formulated as a two-level SEM model (Preacher et al., 2010). Thus, in this analysis, the between-group estimations are no longer clouded by within-group variations.

5.4 RESULTS

Table 5.1 shows the mean, standard deviation and the correlations between variables used in the study. To test the proposed relationships, a causal structure was posited, resulting in three separate structural equation models (a physical pathway, a psychosocial pathway and a combined pathway). For the individual level variables (i.e. musculoskeletal problems and emotional exhaustion), there is a corresponding latent variable on the organizational level. Given that variance in the independent and dependent variables exists only on the organizational level, the interpretation of the estimated effects is at the organizational level. The numeric values on the lines are the standardized regression coefficients (beta), and the values in brackets indicate explained variance.

5.4.1 The physical pathway

This study has tested two hypotheses for the physical pathway. The model results are presented in Figure 5.1.

We first tested hypothesis 1: physical safety climate is negatively related to worker MSDs. The results show no statistically significant relationship between physical safety climate and worker MSDs. Based on this result our first hypothesis has to be rejected.

Hypothesis 2 proposes that physical safety climate is negatively related to a) absenteeism, b) presenteeism and c) health care utilization rates via worker MSDs. The previous analysis (hypothesis 1) has already shown that the relationship between physical safety climate and worker MSDs is not statistically significant. Although the analysis shows statistically significant relationships between MSDs and absenteeism (β= .411, p< .01), presenteeism (β= .569, p< .01) and health care utilization rates (β= .772, p< .01) all three indirect effects are not statistically significant. Therefore, our second hypothesis has to be rejected.

The analysis of the control variables on the individual level shows a negative relationship between supervisory position and MSDs (β= -.037, p< .01) and between exercise and MSDs (β= -.031, p< .05). Moreover, the analysis shows a positive relationship between patient/client contact and MSDs (β= .050, p< .01). On the organizational level the relationship between disability care industry and presenteeism (β= .127, p< .01), nursing homes industry and health care utilization (β= .242, p< .05) and disability care industry and health care utilization (β= .206, p< .01) are statistically significant.

Table 5.1 Means, standard deviations, and correlations

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Main variables																			
1. Physical safety climate	3.16	.25	1																
2. Psychosocial safety climate	3.12	.19	.759**	1															
3. MSDs	3.12	1.36	-.021	-.055**	1														
4. Emotional exhaustion	2.50	1.00	-.122**	-.110**	.260**	1													
5. Absenteeism	.14	.34	-.054**	-.061**	.230**	.272**	1												
6. Presenteeism	.60	.49	-.025*	-.029**	.273**	.299**	.205**	1											
7. Health care utilization	.59	.49	.023*	-.008	.438**	.196**	.259**	.241**	1										
Control variables																			
8. Gender (1=female)	.82	.39	.130**	.050**	.089**	-.022*	.006	.057**	.091**	1									
9. Age	47.17	11.40	-.014	-.094**	.009	-.003	.027*	-.078**	.053**	-.116**	1								
10. Tenure	4.43	1.83	-.016	-.102**	.027*	-.003	.009	-.034**	.037**	-.049**	.589**	1							
11. Supervisory position (1=yes)	.13	.34	.017	.027*	-.044**	-.021	-.037**	-.044**	-.039**	-.103**	.074**	.030**	1						
12. Patient/clientcontact (1=yes)	.87	.33	.019	.010	.057**	.069**	.060**	.087**	.053**	.100**	-.064**	-.018	-.152**	1					
13. Smoking (1=yes)	.16	.37	-.016	.029**	.017	.044**	.043**	.103**	.013	-.010	-.033**	-.035**	.004	.048**	1				
14. Exercise	2.31	.58	.008	.016	-.030**	-.024*	.001	-.018	-.018	-.008	.052**	.044**	-.021*	.036**	-.026*	1			
Industry (ref.= hospital industry)																			
15. Nursing homes industry	.20	.40	.552**	.259**	-.015	-.037**	.007	-.015	.025*	.120**	.103**	-.030**	.040**	.058**	.010	.006	1		
16. Mental health care industry	.25	.43	-.545**	-.079**	-.061**	.069**	.019	-.019	-.036**	-.149**	.018	-.076**	-.001	-.016	.055**	-.006	-.289**	1	
17. Disability care industry	.20	.40	.258**	.368**	.024*	.015	-.003	.048**	.035**	.019	-.143**	-.057**	.018	.028**	.048**	-.002	-.253**	-.285**	1

*$p<.05$
**$p<.01$
S.D. = standard deviation
Variables at the organizational level: physical safety climate, psychosocial safety climate, absenteeism, presenteeism, health care utilization, nursing homes industry, mental health care industry, and disability care industry. All other variables are at the individual level.

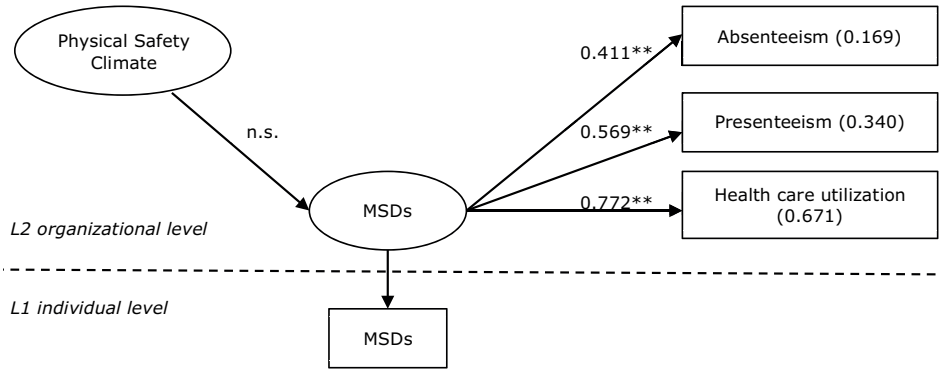
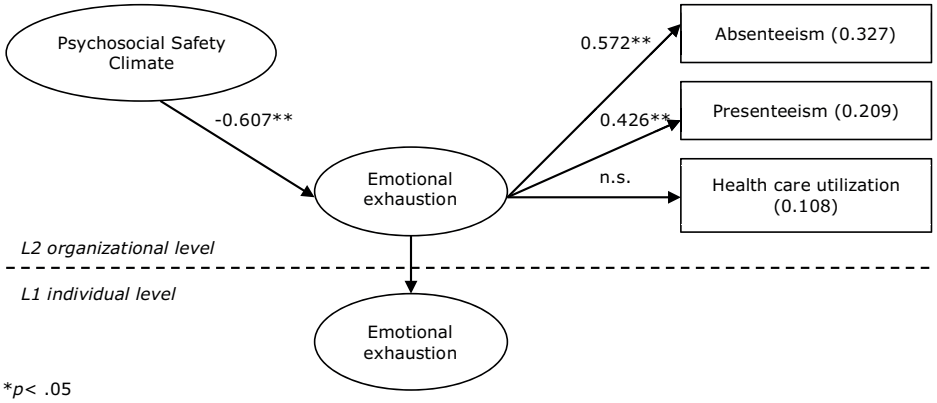


Figure 5.1 The physical pathway

The overall model fit is assessed using several fit indices. The model fit values were CFI= 0.74, TLI= 0.70, RMSEA= 0.02, SRMR (within)= 0.00, and SRMR (between)= 0.13. These values indicate that the structural model did not fit the data.

5.4.2 The psychosocial pathway

This study has tested two hypotheses for the psychosocial pathway as well. The model results are presented in Figure 5.2.



*p< .05
**p< .01
n.s. = non-significant

Figure 5.2 The psychosocial pathway

We first tested Hypothesis 3 that the psychosocial safety climate is negatively related to worker emotional exhaustion. The analysis shows a statistically significant negative relationship between psychosocial safety climate and emotional exhaustion (β= -.607, p< .01), supporting Hypothesis 3. Hypothesis 4 proposes that psychosocial safety climate is negatively related to a) absenteeism, b) presenteeism and c) health care

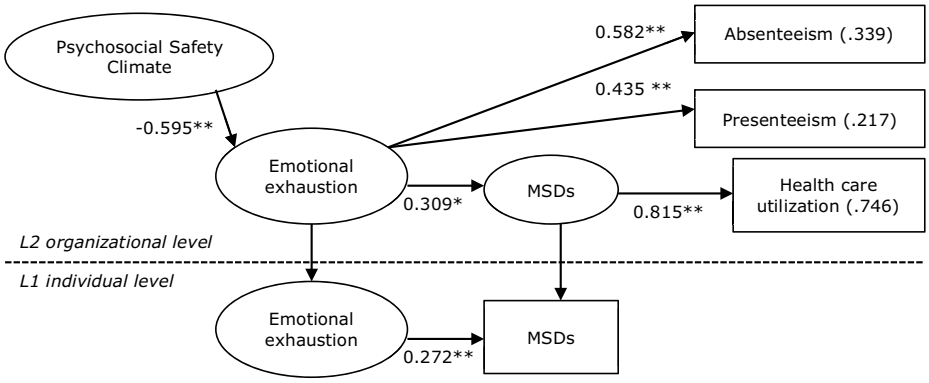
utilization rates via worker emotional exhaustion. The indirect effect of psychosocial safety climate on absenteeism is statistically significant (β= -.347, p< .01) supporting Hypothesis 4a. The indirect effect of psychosocial safety climate on presenteeism is statistically significant (β= -.259, p< .01) as well supporting Hypothesis 4b. However, the indirect effect of psychosocial safety climate on health care utilization (β= -.109, ns) is not statistically significant. Therefore, Hypothesis 4c has to be rejected.

The analysis of the control variables on the individual level shows a positive relationship between patient/client contact and emotional exhaustion (β= .050, p< .01) and between smoking and emotional exhaustion (β= .044, p< .01). Moreover, the analysis shows a negative relationship between exercise and emotional exhaustion (β= -.030, p< .05). On the organizational level the relationship between disability care industry and presenteeism (β= .166, p< .01), nursing homes industry and health care utilization (β= .201, p< .05) and disability care industry and health care utilization (β= .247, p< .01) are statistically significant.

The model fit values were CFI =0.95, TLI= 0.94, RMSEA= 0.02, SRMR(within)= 0.01, SRMR(between)= 0.10. These values indicate that the model provides a good explanation of the relationships between the variables.

5.4.3 The combined physical and psychosocial pathway

Finally, we combined the physical and psychosocial pathway. The model results are presented in Figure 5.3.



*p< .05
**p< .01
n.s. = non-significant

Figure 5.3 The combined physical and psychosocial pathway

We tested the hypothesis that psychosocial safety climate is negatively related to a) absenteeism, b) presenteeism and c) health care utilization rates via worker emotional exhaustion and MSDs. Results showed that the relationship between psychosocial safety climate and absenteeism is mediated by emotional exhaustion, not by emotional exhaustion and MSDs. The indirect effect is statistically significant (β= -.346, p< .01), partly supporting Hypothesis 5a. The same results were found for the association between psychosocial safety climate and presenteeism: the relationship is only mediated by emotional exhaustion. The indirect effect is statistically significant (β= -.259, p< .01), partly supporting Hypothesis 5b. Finally, the relationship between psychosocial safety climate and health care utilization is mediated by both emotional exhaustion and MSDs (indirect effect β= -.150, p< .01), supporting Hypothesis 5c.

The analysis of the control variables on the individual level shows a positive relationship between patient/client control and emotional exhaustion (β= .065, p< .01) and between smoking and emotional exhaustion (β= .044, p< .01). Moreover, the analysis shows a negative relationship between exercise and emotional exhaustion (β= -.031, p< .01). With respect to MSDs, the relationship between gender and MSDs (β = .082, p< .01), between patient/client and MSDs (β= .027, p< .01) and between supervisory position and MSDs (β= -.024, p< .01) are statistically significant. On the organizational level the relationship between disability care industry and presenteeism (β= .166, p< .01), nursing homes industry and health care utilization (β= .255, p< .01) and disability care industry and health care utilization (β= .212, p< .01) are statistically significant.

The model fit values were CFI= 0.94, TLI= 0.94, RMSEA= 0.02, SRMR (within)= 0.01, SRMR (between)= 0.10. This shows that the structural model fits the data. Finally, we tested whether the third model with a combined pathway had a significantly better fit compared to the second model with a psychosocial pathway. A Satorra-Bentler chi-square difference test indicated a significant improvement in fit ($\Delta\chi 2(40)$= 240.75, p< .01).

5.5 DISCUSSION

5.5.1 Conclusions

The main goal of this chapter was to examine the relationship between organizational safety climate and organizational health performance mediated by individual worker health. We constructed three pathways through which we hypothesized this can happen: a physical pathway (via physical safety climate and MSDs), a psychosocial

pathway (via psychosocial safety climate and emotional exhaustion) and a combined physical and psychosocial pathway (via psychosocial safety climate, MSDs, and emotional exhaustion). These pathways were tested in a large sample of 8,761 Dutch employees working in 177 health care organizations.

Although we did not find evidence for the physical pathway, our study provided support for the psychosocial pathway for two of the three health performance outcomes (i.e. absenteeism and presenteeism). Psychosocial safety climate indirectly affects absenteeism and presenteeism through its negative association with emotional exhaustion. The results furthermore demonstrated that the combined physical and psychosocial pathway explained differences in our third health performance outcome (i.e. health care utilization). This finding is in line with the results presented by Bailey et al. (2015) and Yulita et al. (2014) who found that psychosocial safety climate is related to both physical and mental health outcomes. Our study thus underscores the importance of the psychosocial safety climate for worker health, and extends its range of outcomes to include absenteeism, presenteeism and health care utilization.

When we compare the results of the psychosocial and combined pathways, it becomes clear that emotional exhaustion is not related to health care utilization directly, but only through its effect on MSDs. This finding is particularly interesting because it suggests that employees may not start using health care services until their psychological complaints have physical consequences. One possible reason for this could be the reluctance of employees to discuss stress and mental health problems compared to physical problems (Wynne-Jones et al., 2011). Moreover, in a health care context, workers may believe feeling emotionally exhausted is 'not enough' reason to visit a health care provider, as they often consider emotional demands as part of the job (De Castro, 2004).

Despite the previous research linking physical safety climate to MSDs (e.g. Hofmann & Mark, 2006), we did not find evidence for the first part of the physical pathway from physical safety climate to MSDs. To our knowledge, no previous study has examined both safety climate constructs in relation to worker health and health performance outcomes. One of our contributions therefore lies in the insights provided by comparing the outcomes of both constructs. Considering the extensive amount of evidence on the effect of physical safety climate on safety performance outcomes such as accidents and injuries (Zohar, 2010), our findings imply that physical safety climate may be more important in relation to *safety* outcomes, whereas psychosocial safety climate might be more useful in relation to *health* outcomes. One explanation for this could be that safety outcomes such as accidents (e.g. falls) are often comparatively severe

and short-term in nature (Beus et al., 2010a), and therefore more dependent upon the priority given to physical aspects of the work environment (e.g. the presence of patient-lifting equipment or proper safety training). Health outcomes such as MSDs are, compared to safety outcomes, more often a consequence of a long-term process that takes time to develop (i.e. accumulation of physical strain). Attention paid to psychosocial risks factors in the work environment such as work pressure or work-life conflict is possibly more important in this respect. The results in our study point to the priority for psychological safety in the organization as an important starting point to prevent MSDs and indirectly increase organizational health performance. Future research including both safety climate constructs, safety outcomes and health outcomes should shed more light on this.

5.5.2 Limitations of the study

Despite the contributions of this study, the results should be interpreted with some caution, given several limitations that also suggest lines of further research.

First of all, our data are based on a cross-sectional survey with employees rating all variables. We must acknowledge this design is liable to common method variance. Given this possibility, we conducted a Harman one-factor test (Podsakoff & Organ, 1986) to see if the majority of the variance could be explained by a single factor. A factor analysis was conducted on all 49 items. The factors together accounted for 67.1% of the total variance and the largest factor did not explain the majority of the variance. We furthermore used a common latent factor approach to capture the common variance among all observed variables in the model (Podsakoff, et al., 2003). The results showed that the common factor accounted for only 4% of the variance, which is less than the average amount of method variance in organizational research. While these results do not preclude the possibility of common method bias, they do indicate that such a bias is unlikely to have confounded the interpretation of the results. Another consequence of this cross-sectional design is that it is not possible to draw conclusions about causality or rule out reverse causality. We cannot rule out that worker health or organizational health performance outcomes influenced the perception of safety climate. This concern highlights the need for a longitudinal or experimental research design to increase internal validity.

Second, we used self-reported perceptual data. This is an adequate way to measure physical and psychosocial safety climate, as these concepts are by definition perceptual (Zohar, 2010). For the measurement of worker health problems, absenteeism, presenteeism, and health care utilization, however, our measures might be influenced by factors such as cognitive processes, mood, attitudes and individual personality

(Spector, 1992). Respondents might have encountered difficulties recalling health problems, days absent or visits to a health care provider. When it comes to self-report absenteeism, research has shown that the agreement between self-reported data and administrative data is relatively good and the associations with health are equivalent for both measures (Ferrie et al., 2005). Despite this, we suggest future research examining the relationship between safety climate, worker health and organizational health performance to combine self-reports with other types of measures (e.g. archival data, insurance claim data).

With respect to our third organizational health performance outcome, we need to point out that it is very likely that other variables outside the work context influence health care utilization. In this study, we chose to focus on the effect of organizational safety climate, but other factors such as type of health care insurance, income or place of residence could play a role as well. Future research should include these factors to give insight into the relative importance of the work context versus socioeconomic background.

Finally, our study is limited to employees working in health care organizations. Further research is needed to find out whether it is possible to generalize the findings to organizations in other industries. It may be possible that our finding that psychological health and safety is more important than physical health and safety when it comes to organizational health outcomes is dependent upon the specific health care context. Nevertheless, we believe our large sample of employees and organizations makes it possible to generalize findings to a broad range of health care industries.

5.5.3 Practical implications

Understanding how the organizational safety climate is associated with worker health and health performance is important because it provides information on how to maintain a healthy workforce. Our results have practical implications at the individual level and the organizational level.

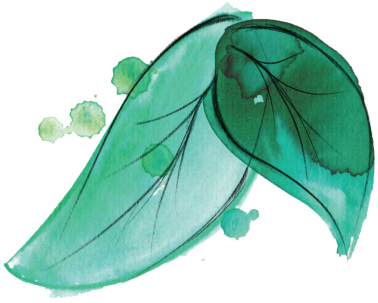
First, the results showed that health care organizations with a good psychosocial safety climate might be better able to maintain their employees' mental and physical health. Surprisingly, our study also indicates that if health care organizations wish to successfully address MSDs among their staff, they benefit more from increased attention to workers' mental health than from increased attention to worker physical health. Our combined physical and psychosocial pathway showed that employees working in organizations with a good psychosocial safety climate are less emotionally exhausted which, in turn, has positive effects on their MSDs.

Second, our findings indicate that the positive potential of psychosocial safety climate is not limited to individual health outcomes, but includes bottom-line organizational outcomes as well. Strengthening the psychosocial safety climate within the organization may decrease absenteeism, presenteeism and health care utilization rates. This is not only important in terms of costs, but also in terms of productivity and the ability to deliver high quality of care to patients or clients. The psychosocial safety climate is thus an optimal target of intervention to prevent negative health outcomes (Dollard & McTernan, 2011), and improve organizational health performance. Nevertheless, many organizations have not yet paid enough attention to this topic (Sivris & Leka, 2015). We therefore conclude by stressing the urgency to put this topic higher on the organizational agenda. As our study shows, it might be well worth the effort.

Chapter 6

Behaving safely under pressure:

The effects of job demands, resources, and safety climate on employee physical and psychosocial safety behavior



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ABSTRACT

Previous research has shown that employees who experience high job demands are more inclined to show unsafe behaviors in the workplace. In this chapter, we examine why some employees behave safely when faced with these demands while others do not. We add to the literature by incorporating both physical and psychosocial safety climate in the job demands and resources (JD-R) model and extending it to include physical and psychosocial variants of safety behavior. Using a sample of 6230 health care employees nested within 52 organizations, we examined the relationship between job demands and (a) resources, (b) safety climate, and (c) safety behavior. We conducted multilevel analyses to test our hypotheses. The results showed that job demands (i.e. work pressure), job resources (i.e. job autonomy, supervisor support, and co-worker support) and safety climate (both physical and psychosocial safety climate) are directly associated with, respectively, lower and higher physical and psychosocial safety behavior. We also found some evidence that safety climate buffers the negative impact of job demands (i.e. work–family conflict and job insecurity) on safety behavior and strengthens the positive impact of job resources (i.e. co-worker support) on safety behavior. Regardless of whether the focus is physical or psychological safety, our results thus show that improving the safety climate within an organization can increase employees' safety behavior. This makes the organization's safety climate an optimal target of intervention to prevent and ameliorate negative physical and psychological health and safety outcomes, especially in times of uncertainty and change.

6.1 INTRODUCTION

The health care sector has recently been subject to a lot of changes. Governmental measures, system reforms and budget cuts have had a huge impact on the day-to-day work of health care employees. Exposure to job demands such as work pressure, job insecurity and work-family conflict have increased considerably (Eurofound, 2014). Although not necessarily negative, these demands can invoke unsafe behaviors (Hansez & Chmiel, 2010), which in turn pose a serious threat to both employee and patient health (Christian et al., 2009). According to the European Federation of Nurses Associations (2012) over a third of the nurses across Europe report concerns about quality of care and patient safety due to budget cuts and rising unemployment for nurses. This makes it relevant to investigate why some individuals behave safely under pressure, whereas others do not. In this chapter we use a large sample of 6,230 health care employees to examine the relationship between job demands, job resources, safety climate and safety behavior.

Our study adds to the literature in the following two ways. First, we extend the job demands and resources (JD-R) model (Bakker & Demerouti, 2007) to assess its relation to employee safety behavior. Although several authors have investigated the JD-R model in the context of safety (as shown by the meta-analysis of Nahrgang et al., 2011), to our knowledge none of them have linked job demands and resources to both physical and psychosocial safety behavior. The link with psychosocial safety behavior is particularly innovative in our study, since no other study has investigated this type of safety behavior. To explain differences in this specific type of safety behavior, we also include the recently developed concept of psychosocial safety climate (Dollard & Bakker, 2010) in our research. Second, our extension of the JD-R model covers multiple levels as we include the effect of organizational level safety climate on individual level safety behavior. In an overview of the JD-R model, Demerouti and Bakker (2011) encourage researchers to integrate multiple levels in their research to better understand phenomena unfold within organizations and help guide the development of more effective interventions. From both a theoretical and practical point of view, we aim to provide new insights in how to promote physical and psychosocial safety behavior among health care employees in times of uncertainty and change.

6.2 THEORETICAL FRAMEWORK

6.2.1 Physical and psychosocial safety climate and -behavior

Safety climate refers to employees' shared perception of their organization's policies, procedures, and practices as they relate to the value and importance of safety within the organization (Griffin & Neal, 2000; Zohar, 2011). In the original paper on safety climate, Zohar (1980) points to the informative function of the concept regarding the relative importance or priority of safety versus productivity at the workplace. The majority of the safety climate literature focuses on its relation to health and safety behaviors that maintain *physical* health and safety in the workplace. In the health care industry these physical safety behaviors for instance include using lifting equipment or adhering to regulations for pushing and pulling.

Following a recent literature stream on safety climate (e.g. Dollard & Bakker, 2010; Law et al., 2011; Idris et al., 2012; Dollard et al., 2012; Garrick et al., 2014), we chose to not only examine physical safety climate and behavior, but also include psychosocial safety in our research. Psychosocial safety climate highlights the value and importance of *psychosocial* health and safety within the organization (Dollard & Bakker, 2010). Psychosocial safety relates to freedom from psychological and social risk or harm, such as aggression and violence, bullying or high work pressure. Previous research has proved its conceptual distinctiveness from related concepts such as (physical) safety climate and perceived organizational support (Idris et al., 2012). Despite its long and important history in relation to worker physical health, the safety climate construct has not been used extensively to assess or promote psychosocial safety (Dollard & Karasek, 2010). Furthermore, there are only few studies to date that include both physical and psychosocial safety climate (e.g. Idris et al., 2012) and there is no research that investigates psychosocial safety behavior. In line with the concept of physical safety behavior (Neal & Griffin, 2000), psychosocial safety behavior refers to activities that are carried out by employees to maintain their own workplace psychological safety or help to develop an environment that support psychosocial safety. This could for instance include starting an incident reporting procedure, visiting a counselor or support group, and organizing or planning work in a different way to reduce work stress. In the following sections we will elaborate on the proposed relationships between demands and resources, safety climate and safety behavior for both the physical and psychosocial domain.

6.2.2 Job demands, job resources and safety behavior

In their model of safety behavior, Neal and Griffin (2000, 2006) make a distinction between two types of individual behavior: safety compliance and safety participa-

tion. Safety compliance describes the core activities that need to be carried out by employees to maintain workplace safety (e.g. using patient lifting devises or adhering to incident reporting procedures). Safety participation refers to behaviors that do not directly contribute to an individual's personal safety, but which do help to develop an environment that supports safety (e.g. addressing physically dangerous behavior or offering a listening ear to co-workers). Job demands and resources influence the occurrence of these safety behaviors through two processes.

First, the JD-R model states that a health-impairment process takes place wherein job demands lead to exhaustion of mental and physical resources (Bakker & Demerouti, 2007). In these situations, employees use performance-protection strategies to maintain performance (Hockey, 1997). They for instance look for less effortful ways to deal with goals they accord lower priority, such as those related to safety (Hansez & Chmiel, 2010). Employees subject to high work pressure will for instance be less inclined to use safety equipment (physical safety) or start an incident reporting procedure for aggression or violence (psychological safety). Mullen (2004) for instance found that performance pressure was an important factor that influences safety behavior at work, because pressured individuals tend to value performance over safety. Other previous research supports the negative relationship between job demands and safety behavior as well (Hansez & Chmiel, 2010; Nahrgang et al, 2010). Thus, we argue that job demands will lead to less physical and psychosocial safety behavior among employees.

H1a: Job demands are negatively related to physical safety behavior

H1b: Job demands are negatively related to psychosocial safety behavior

The second process is a motivational process whereby job resources are instrumental in achieving work goals. Job resources offer energy that fosters the willingness to dedicate one's effort and abilities to work tasks (Bakker & Demerouti, 2007). This means that in the context of safety, job resources give employees the power to focus their efforts toward working safely and maintaining safety in the workplace. Employees with high job resources will for instance be motivated to regularly check if they do not exceed the physical workload limits (physical safety) or adjust their work schedule when they feel stressed (psychological safety). We therefore hypothesize the following:

H2a: Job resources are positively related to physical safety behavior

H2b: Job resources are positively related to psychosocial safety behavior

6.2.3 Safety climate and safety behavior

One of the key features of safety climate is that it informs employees about the real priority of safety (Zohar, 2014). The relative importance of safety versus other organizational goals (most often productivity) shows the extent to which safety compliant or enhancing behavior is supported and rewarded at the workplace (Zohar, 2000). A positive safety climate will therefore increase the frequency of safety behavior among employees exposed to physical or psychosocial strain. In a health care context, this could for instance occur when top management shows safety is a priority within the organization by investing in new height adjustable desks for polyclinic workers. Investment in employee health and safety foster shared perceptions of an organization's priorities with respect to employee well-being (Mearns et al., 2010). Employees will then act according to the perceived priority within the organization by behaving safely (e.g. regularly adjusting their seats and desks to the appropriate height). Extensive empirical evidence exists on the relationship between physical safety climate and physical safety. Recent meta-analyses for instance demonstrate that safety climate is related to safety behavior, either direct (Clarke et al., 2010; Nahrgang et al., 2011) or indirect through safety knowledge and safety motivation (Christian et al., 2009). The relationship between *psychosocial* safety climate and *psychosocial* safety behavior is, however, still unclear. We expect that, similar to physical safety climate, psychosocial safety climate will inform employees on the priority of psychological safety at the workplace. As a result, employees will develop compatibly adjusted behavior. This leads to the following two hypotheses:

H3a: Physical safety climate is positively related to physical safety behavior

H3b: Psychosocial safety climate is positively related to psychosocial safety behavior

6.2.4 Safety climate as moderator in the JD-R model

Additionally, we expect that safety climate will moderate the relationship between job demands and safety behavior. We expect this for two reasons. First, the presence of a positive safety climate may enable employees to cope with their job demands, because it acts as an available resource that increases coping capacity (Dollard & Bakker, 2010). For example, organizations with a positive physical safety climate provide relevant practices such as safety equipment training. These practices provide employees with valuable resources that, according to Conservation of Resources (COR) theory, they will conserve and accumulate. In the context of high physical safety climate, these increased resources lead to a higher coping capacity that in turn reduces the impact of demands. Employees for example gain resources in the form of knowledge by following a safety equipment training. This will increase their coping capacity, because they will

manage to use the safety equipment even when they face high job demands. Second, the presence of a positive safety climate provides employees with cues regarding what behaviors will be reinforced, or alternatively, be punished, within the organization. When employees are faced with high job demands, they will look at the safety climate for clues on how to behave. Organizations that display clear signals demonstrating the importance of physical safety will send the message to employees that they should focus on behaving safely, regardless of the demands they face in their job.

We also expect that safety climate influences the motivational process presumed in the JD-R model. DeJoy (1996) argues that safety climate is a primary factor that reinforces self-protective actions enabled by skills and resources. Physical safety climate will thus reinforce the positive effect of job resources that are conducive to safe work practices. In their study among nurses, Mark et al. (2007) for instance found that at higher levels of physical safety climate, better work conditions were related to fewer back injuries. This implies that employees with, for example, more job autonomy, will be more proactive in adhering to safety rules, especially when they operate within an organization characterized by high levels of physical safety climate. Based on the above, we hypothesize the following:

H4a: Physical safety climate will moderate the negative relationship between job demands and physical safety behavior, such that, under conditions of high physical safety climate, the strength of that relationship will be reduced

H4b: Physical safety climate will moderate the positive relationship between job resources and physical safety behavior, such that, under conditions of high physical safety climate, the strength of that relationship will be enhanced

Finally, we expect that psychosocial safety climate may act as a moderator as well. In line with the previous two hypotheses, psychosocial safety climate reduces the negative relationship between job demands and psychosocial safety behavior and augments the positive relationship between job resources and psychosocial safety behavior. Dollard and Bakker (2010) tested psychosocial safety climate as a potential moderator in the JD-R model using a sample of teachers and found support for the detrimental effect of demands on psychological health being moderated by psychosocial safety climate. In a health care context, this for example occurs when an employee faced with high work pressure still decides to join a voluntary support group after being confronted with aggression from a patient because the organization displays clear signals demonstrating the importance of psychological health and safety. Based on the above, we predict:

H5a: Psychosocial safety climate will moderate the negative relationship between job demands and psychosocial safety behavior, such that, under conditions of high psychosocial safety climate, the strength of that relationship will be reduced

H5b: Psychosocial safety climate will moderate the positive relationship between job resources and psychosocial safety behavior, such that, under conditions of high psychosocial safety climate, the strength of that relationship will be enhanced

6.3 METHODOLOGY

6.3.1 Design and participants

Data from a large national research project on the health and safety of health care workers in the Netherlands ('Gezond werken in de zorg') was used to test the hypotheses. Participants in this research project are Dutch health care employees working in hospitals, mental care facilities, nursing homes and home health care organizations, and organizations providing care to clients with disabilities. In this research project, several different approaches to ask employees to fill in an online survey were used, including both direct and indirect approaches. Some employers agreed to send their employees an email with an invitation to participate (direct), while others were only able to mention the study on the organization's intranet and social media pages (indirect). From the total of 10,581 participants who completely filled in the survey, we took a sample of 6,230 participants working in 52 health care organizations: 20 hospitals, 11 mental care facilities, 9 nursing homes and home health care organizations, and 12 disabled care organizations. The average number of participants per organization is 153 and varies from 30 to 593 participants per organization. As there are no standards with regard to a minimum number of employees necessary to calculate an organizational climate measure, we chose to set the minimum number of employees to 30, which resulted in a sample of 52 organizations. This is above the threshold set by Maas and Hox (2005) who show that a sample of 50 or more at level two is a sufficient sample size for accurate multilevel estimation. Our sample includes employees working in numerous occupations, such as nurses, physicians, care-assistants, psychologists, physical therapists, laboratory staff, maintenance staff, cleaning staff, policy advisors, managers, etc. The proportion of female participants (81%) is close to the proportion in the overall population of Dutch health care employees (84%). The participants' average age was 46 years old, which is somewhat higher than the Dutch health care employees national average of 42 years old (Arbeidsmarktinformatie Zorg en Welzijn, 2014).

6.3.2 Measures

All measures where translated to Dutch and tested in a pilot study of 30 health care employees from different ages and educational levels working in a range of occupations. Feedback was given on the terms used, wording and relevance of the items in the survey for their occupation. The items used to measure the safety climate and safety behavior concepts in this study can be found in Appendix II. Unless stated otherwise, all items were measured on a five-point Likert scale, ranging from a low score 1 to a high score 5.

Job demands – We included three job demands in this study using items from the Copenhagen Psychosocial Questionnaire (COPSOQ II) (Pejtersen et al., 2010) and the Job Insecurity Inventory by De Witte (2000). First, we measured *quantitative work pressure* with four COPSOQ II items concerning whether enough time was available to complete work tasks. To measure the second job demand *work-family conflict*, we used three items that assess the degree to which work interferes with family life. These items were measured on a four-point Likert scale, ranging from a low score 1 (no, not at all) to a high score 4 (yes, certainly). *Job insecurity* is the third job demand included in this study and was measured using four items taken from the scale of De Witte (2000). Internal consistencies for all three job demands scales were adequate with Cronbach's alpha coefficients exceeding .70 (Nunnally & Bernstein, 1994): 0.86 (work pressure), 0.77 (work-family conflict) and 0.89 (job insecurity).

Job resources – We measured three job resources using items from the COPSOQ II (Pejtersen et al., 2010). The first job resource is job autonomy and was examined by four items. The next two job resources both concern whether respondents receive help and support from either co-workers or their supervisor. Both supervisor support and co-worker support were measured with three items. Internal consistencies for all job resources scales were adequate with Cronbach's alpha coefficients exceeding .70 (Nunnally & Bernstein, 1994): 0.75 (job autonomy), 0.77 (supervisor support) and 0.83 (co-worker support).

Psychosocial safety climate – To measure psychosocial safety climate we used the four factor PSC-12 scale developed by Hall et al. (2010) and added an extra fifth factor. The PSC-12 four factors each comprise three items and cover four dimensions of psychosocial safety climate: (1) management priority given to psychological health and safety, (2) management commitment to psychological health and safety, (3) organizational communication about psychological health and safety, and (4) organizational participation and involvement in relation to psychological health and safety. In our measure, we made a clear distinction between top management and

direct supervision, with the management priority dimension being attributed to top management and the management commitment dimension being attributed to direct supervisors. Although these four factors cover important safety domains, we felt it missed one essential safety climate dimension. Here we concur with Brondino et al. (2012) and Fugas et al. (2011) who stress the need to consider co-workers in studies of organizational and group safety climate. We therefore added three items to address co-worker influences and group norms concerning psychological health and safety as part of the psychosocial safety climate. Based on items from the Co-workers' Safety Climate (CSC) scale developed by Brondino et al. (2012) we added the following three items: "In our work unit, we discuss psychosocial safety risks and ways to prevent psychological stress", "In our work unit, we care about all of us being aware of the psychological stress that comes with our work", and "In our work unit, we remind each other of the policies and regulations that apply to psychological stress". To examine whether the assumed underlying five-factor structure of the measure was justified, we conducted an exploratory factor analysis, using a principal components approach with oblique rotation. The results are compatible with the assumed multidimensional structure: the four original factors of the PSC-12 can be extended with one 'group norms' factor. Cronbach's alphas for the resulting factors are high with 0.87 for top management priority, 0.90 for direct management commitment, 0.89 for group norms and –behavior, 0.85 for communication and 0.86 for participation. The literature on this subject states that high alpha values may point to redundancies among the items or that the constructs measured are too specific (Briggs & Creek, 1986; Tavakol & Dennick, 2011). However, there is no agreement on what exactly is 'too high' as some argue the cut-off point is 0.90 (e.g. Nunnally & Bernstein, 1994; Tavakol & Dennick, 2011) whereas others suggest 0.95 (e.g. Terwee et al., 2007). In comparison, Hall et al. (2010) found similar alpha values for their safety climate subscales as we did and described this as 'good internal consistency'.

Physical safety climate – We used the same fifteen questions as in the psychosocial safety climate scale to measure physical safety climate, but we changed the wording from, for example, 'psychological stress/health/well-being' to 'physical strain/health/well-being' (see Appendix II). Idris et al. (2012) also used roughly the same measurement scale for both physical and psychosocial safety climate and found both scales to be reliable. We also examined the underlying five-factor structure of the measure by conducting an exploratory factor analysis, using a principal components approach with oblique rotation. The results are compatible with the assumed multidimensional structure: the four original factors can be extended with one 'group norms' factor. Cronbach's alphas for the resulting factors are 0.87 (top management priority), 0.89

(direct management commitment), 0.90 (group norms and –behavior), 0.91 (communication) and 0.86 (participation).

Physical safety behavior – Physical safety behavior was measured using six items based on the safety behavior scale developed by Neal and Griffin (2006). This scale comprises two factors, safety compliance and safety participation. Since our sample consists of employees working in a range of occupations with different safety risks, we chose to slightly adapt the wording of some of the items to better fit the variety in safety risks (see Appendix II). Exploratory factor analysis showed that each factor is reliably measured with three items. Cronbach's Alpha for the physical safety compliance measure is .84, and for the physical safety participation measure 0.79.

Psychosocial safety behavior – We measured psychosocial safety behavior with the same six items as the physical safety behavior scale, but we changed the wording, for example, from 'physical strain' to 'psychological stress', and from 'equipment' to 'procedures' to better fit the meaning of psychosocial safety behavior (see Appendix II). Exploratory factor analysis showed that each factor is reliably measured with three items. Cronbach's Alpha for the psychosocial safety compliance measure is 0.70, and for the psychosocial safety participation measure 0.75.

6.3.3 Aggregation procedures

Since our theoretical model consists of both constructs at the individual level and organizational level we will conduct multilevel analysis to test the hypotheses. To examine whether the individual level responses on safety climate are suitable for aggregation to the organizational level, we calculated three inter-rater agreement and -reliability measures. First, we assessed within-group inter-rater agreement using the mean $r_{WG(J)}$ (James et al., 1993). The results showed that strong agreement exists among employees within organizations for both physical safety climate (mean $r_{WG(J)}$ = 0.95, S.D. = 0.1) and psychosocial safety climate (mean $r_{WG(J)}$ = 0.95, S.D. = 0.1) as both mean $r_{WG(J)}$ values are far above the traditional .70 cut point (Lance et al., 2006).

Next we assessed the between-group variance using a one-way random effects ANOVA and the between-group variance relative to the within-group variance using ICC(1). For physical safety climate we found significant between-group variance ($F(51, 1508) = 8.19$, $p < .01$). The ICC(1) was .19, indicating that 19% of the variance in physical safety climate could be explained by differences between organizations. The between-group variance for psychosocial safety climate was also significant ($F(51, 1508) = 7.22$, $p < .01$) and the percentage of the variance due to organization is 17% (ICC(1)

= .17). These results confirm that safety climate ratings are influenced by organizational membership.

Finally, we calculated the ICC(2). This measure acts as an indicator of the inter-rater reliability. For physical safety climate the ICC(2) was .88 and for psychosocial safety climate it was .86. In their article, Breton and Senter (2011) use an example cut point of 0.80 for climate ratings. Following this example, we can conclude that in our study mean climate ratings taken over employees reliably distinguish the 52 organizations.

Taken together, the mean $r_{WG(J),}$ ICC(1), and ICC(2) provide good justification to aggregate physical and psychosocial safety climate to the organizational level.

6.3.4 Statistical analyses

Given the multilevel nature of our theoretical model, we used linear mixed effects modeling to test our hypotheses. SPSS software version 20 was used to perform the analyses. Before we tested our hypotheses, we confirmed the existence of cross-level effects between safety climate and safety behavior by testing a null model. A chi-square test indicates that employees in the same organization are more alike in their physical safety behavior than employees in different organizations ($\chi^2(51) = 401.04$, $p<.01$). Results furthermore showed that 6% of the variance in physical safety behavior was due to organizational differences. The chi-square test for psychosocial safety behavior also showed significant variance between organizations ($\chi^2(51) =207.85$, $p<.01$) with 6% of the variance in psychosocial safety behavior located at the organizational level. These test results confirm we should perform multilevel analyses.

The models for physical and psychosocial safety behavior were set up separately with job demands, -resources and safety climate as predictors. All level 1 variables in the models were standardized across individuals and level 2 variables were standardized across the 52 organizations prior to the analysis. This makes it possible to properly interpret and compare the regression estimates (Hox et al., 2010). Four control variables were included in each model to control for age, gender, working with patients and organizational tenure effects.

6.4 RESULTS

6.4.1 Descriptive statistics

Means, standard deviations and correlations at the individual level are presented in Table 6.1. Mean scores for job demands show that health care employees experience

Table 6.1 Means, standard deviations and correlations

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
Job demands															
1. Work pressure	3.00	.75													
2. Work-family conflict	1.87	.55	.43**												
3. Job insecurity	2.72	1.01	.17**	.17**											
Job resources															
4. Job autonomy	2.87	.75	-.09**	-.15**	-.05**										
5. Supervisor support	3.16	.82	-.15**	-.22**	-.14**	.25**									
6. Co-worker support	3.59	.67	-.10**	-.21**	-.12**	.19**	.40**								
Safety climate															
7. Physical safety climate	3.17	.70	-.24**	-.24**	-.15**	.22**	.45**	.24**							
8. Psychosocial safety climate	3.14	.70	-.25**	-.30**	-.17**	.27**	.54**	.34**	.70**						
Safety behavior															
9. Physical safety behavior	3.29	.64	-.09**	-.04*	-.07**	.06**	.13**	.09**	.41**	.29**					
10. Psychosocial safety behavior	3.36	.60	-.08**	-.09**	-.03*	.20**	.21**	.21**	.33**	.45**	.42**				
Control variables															
11. Gender (1=female)	.81	.39	-.34**	-.02	-.05**	-.14**	.03**	.10**	.07**	.06**	.04**	.03*			
12. Age	46.35	11.43	-.02	.05**	-.03*	.05**	-.07**	-.16**	.05**	-.06**	.15**	.04**	-.12**		
13. Organizational tenure	4.35	1.82	-.01	.00	-.10**	.02	-.04**	-.06**	.03*	-.04**	.12**	.00	-.04**	.59**	
14. Patient contact (1=yes)	.86	.34	.08	.06**	-.06**	-.20**	-.08*	.05**	-.07**	-.03*	.02	.05**	.09**	-.07**	-.02

*p< .05
**p< .01
S.D. = standard deviation
N(organizations)= 52, N(employees)= 6,230

a fair amount of work pressure (M= 3.00, S.D.= .75) and job insecurity (M= 2.72, S.D.= 1.01). The mean score for work-family conflict is relatively low (M= 1.87, S.D.= .55). The scores for job resources show that health care employees experience high levels of support from their co-workers (M= 3.59, S.D.= .67), on average more than from their supervisors (M= 3.16, S.D.= .82). The results of the correlation analysis were as expected with job demands being negatively related to safety behavior, and job resources being positively related wit safety behavior. However, the strongest correlation exists between safety climate and safety behavior.

6.4.2 Main effects

Results for the hierarchical linear modeling of physical safety behavior can be found in Table 6.2, psychosocial safety behavior results are presented in Table 6.3. The first hypotheses stated that job demands are negatively related to safety behavior. Results from our analysis showed that work pressure is indeed significantly related to physical safety behavior (β= -.03, p< .01), but the two other job demands, work-family conflict and job insecurity, are not. We found the same results for psychosocial safety behavior: only work pressure is significantly negative related to psychosocial safety behavior (β= -.04, p< .01). Given these results, hypothesis 1a and hypothesis 1b were supported for work pressure only.

Hypothesis 2 concerned the relationship between job resources and safety behavior. The findings in Table 6.2 indicate that physical safety behavior is significantly positive related to job autonomy (β= .02, p< .05), supervisor support (β= .05, p< .01), and co-worker support (β= .04, p< .01). When we look at the standardized estimates, we find that supervisor support has the strongest association with physical safety behavior. The coefficients reported here are small; nevertheless Turner et al. (2010) report similar coefficients in their paper. All job resources are also significantly positive related to psychosocial safety behavior. Here we see that co-worker support has the strongest relationship with psychosocial safety behavior (β= .11, p< .01) in comparison with job autonomy (β= .08, p< .01), and supervisor support (β= .07, p< .01). We thus found support for all three indicators included in hypotheses 2a and 2b.

Hypothesis 3 predicted that safety climate is positively related to safety behavior. Physical safety climate is indeed significantly positive related to physical safety climate (β= .10, p< .01). The same goes for psychosocial safety climate and psychosocial safety behavior; these variables are significantly positive related (β= .11, p< .01). Comparison of the safety climate regression coefficients to the job demands and resources regression coefficients shows that safety climate is a stronger predictor of safety behavior than job demands (for both physical and psychosocial safety behavior)

and job resources (only in the case of physical safety behavior). Hypothesis 3a and 3b are supported by the data.

Table 6.2 Results of multilevel analysis on physical safety behavior

	Physical safety behavior			
Model	M1: Main effects		M2: M1 + interaction	
	Estimate	(S.E.)	Estimate	(S.E.)
Level 1 intercept	3.29**	(.02)	3.29**	(.02)
Work pressure	-.03**	(.01)	-.03**	(.01)
Work-family conflict	n.s.		n.s.	
Job insecurity	n.s.		n.s.	
Job autonomy	.02*	(.01)	.02*	(.01)
Supervisor support	.05**	(.01)	.05**	(.01)
Co-worker support	.04**	(.01)	.04**	(.01)
Level 2				
Physical safety climate	.10**	(.02)	.10**	(.02)
Cross-level interaction				
Physical safety climate x work pressure			n.s.	
Physical safety climate x work-family conflict			.03**	(.01)
Physical safety climate x job insecurity			n.s.	
Physical safety climate x job autonomy			n.s.	
Physical safety climate x supervisor support			n.s.	
Physical safety climate x co-worker support			.03*	(.01)
Pseudo R^2	8%		9%	
2x log likelihood deviance***	11435.31		11424.24	
Δ chi-square (d.f.)****			11.07(1)**	

*p<.05
**p<.01
***2x log likelihood deviance of final model
****Δ Chi-square significance of change in deviance when adding the interaction terms
S.E. = standard error
Estimates are controlled for age, gender, working with patients and organizational tenure
N(organizations) = 52, N(employees) = 6,230

Table 6.3 Results of multilevel analysis on psychosocial safety behavior

	Psychosocial safety behavior			
Model	M1: Main effects		M2: M1 + interaction	
	Estimate	(S.E.)	Estimate	(S.E.)
Level 1 intercept	3.34**	(.02)	3.34*	(.02)
Work pressure	-.04**	(.01)	-.04**	(.01)
Work-family conflict	n.s.		n.s.	
Job insecurity	n.s.		n.s.	
Job autonomy	.08**	(.01)	.07*	(.01)
Supervisor support	.07**	(.01)	.07**	(.01)
Co-worker support	.11**	(.01)	.11**	(.01)
Level 2				
Psychosocial safety climate	.11**	(.02)	.11**	(.02)
Cross-level interaction				
Psychosocial safety climate x work pressure			n.s.	
Psychosocial safety climate x work-family conflict			n.s.	
Psychosocial safety climate x job insecurity			.03**	(.01)
Psychosocial safety climate x job autonomy			n.s.	
Psychosocial safety climate x supervisor support			n.s.	
Psychosocial safety climate x co-worker support			n.s.	
Pseudo R^2	10%		11%	
2x log likelihood deviance***	10497.13		10493.16	
Δ chi-square (d.f.)****			3.97(1)*	

*p<.05
**p<.01
***2x log likelihood deviance of final model
****Δ Chi-square significance of change in deviance when adding the interaction terms
S.E. = standard error
Estimates are controlled for age, gender, working with patients and organizational tenure
N(organizations) = 52, N(employees) = 6,230

6.4.3 Cross-level interaction effects

Hypothesis 4a proposed that physical safety climate moderates the negative relationship between job demands and safety behavior. After accounting for control variables and the main effects of demands and resources, we found support for an interaction between physical safety climate and work-family conflict on physical safety behavior (β= .03, p< .05). Physical safety climate did not significantly moderate the relationship between physical safety behavior and the other two job demands. Thus, hypothesis 4a is only partly supported. The second moderation hypothesis concerned the moderating

effect of physical safety climate on the positive relationship between job resources and physical safety behavior. The results in Table 6.2 show that this is only the case for the relationship between co-worker support and physical safety behavior (β= .03, p< .05). Hypothesis 4b is therefore partly supported, with co-worker as the job resource. We found that both interaction effects for physical safety behavior added significant variance to the model.

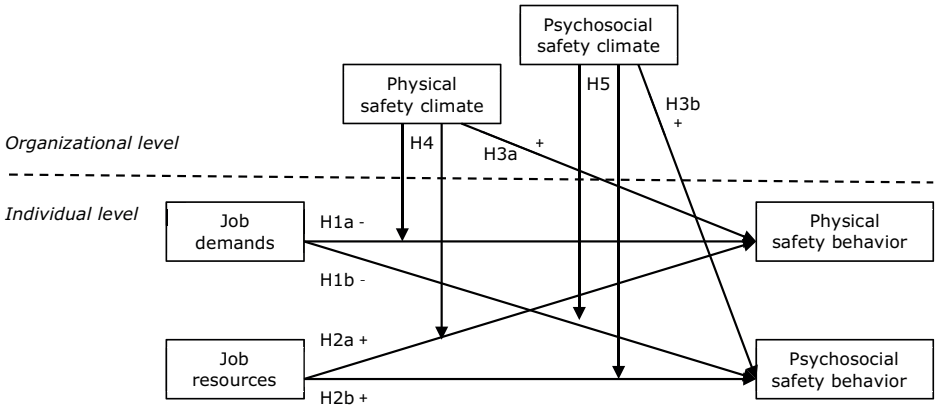

Figure 6.1 Theoretical model linking job demands, job resources, safety climate, and safety behavior for physical and psychological safety

For psychosocial safety behavior, we also found one small but significant interaction effect. The second model in Table 6.3 shows psychosocial safety climate significantly moderates the negative relationship between job insecurity and psychosocial safety behavior (β= .03, p< .05). Psychosocial safety climate did not significantly moderate the relationship between psychosocial safety behavior and the other two job demands. These results partly support hypothesis 5a. Hypothesis 5b predicted that psychosocial safety climate moderates the positive relationship between job resources and psychosocial safety behavior. The results, however, did not provide evidence for such an interaction effect. Hypothesis 5b is therefore not supported. We did find evidence that the interaction effect of job insecurity and psychosocial safety climate added significant variance to the model.

To help interpret the interaction effects for physical safety behavior we plotted the interactions graphically in Figure 6.2 and Figure 6.3. The lower slope of the interaction plot in Figure 6.2 shows that physical safety behavior decreased as work-family conflict increased. However, the upper slope proves that under conditions of high physical safety climate, the negative effect of work-family conflict on physical safety behavior becomes a positive effect. Thus, in support of hypothesis 4a, high physical

safety climate reduces the strength of the negative relationship between job demands (in this case work-family conflict) and physical safety behavior.

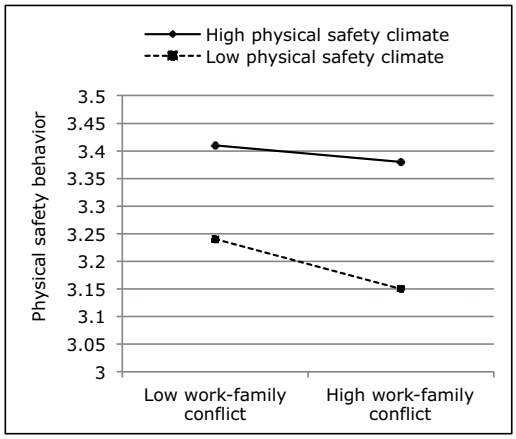

Figure 6.2 Plot of the interaction effect of physical safety climate and work-family conflict on physical safety behavior

Figure 6.3 represents the plot for the positive relationship between co-worker support and physical safety climate. It shows that physical safety behavior increased as co-worker support increased. However, a comparison of the upper slope to the lower slope shows that under conditions of high physical safety climate, the slope is stronger. This means we found support for hypothesis 4b: high physical safety climate strengthens the positive relationship between job resources and physical safety behavior, with co-worker support as the job resource.

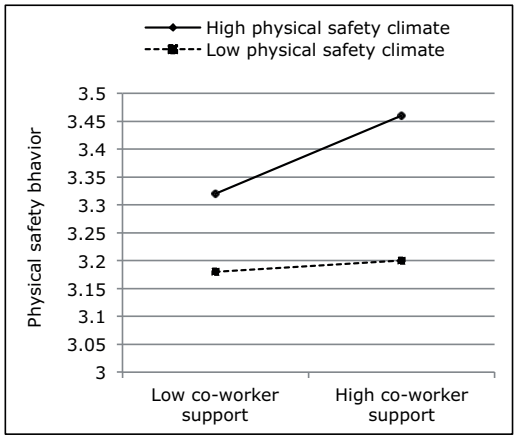

Figure 6.3 Plot of the interaction effect of physical safety climate and co-worker support on physical safety behavior.

The significant interaction effect found for psychosocial safety behavior is shown in the plot in Figure 6.4. Similar to the plot in Figure 6.2, we see that under conditions of a low psychosocial safety climate, job demands (in this case, job insecurity) have a negative relationship with psychosocial safety behavior. The slope representing a high psychosocial safety climate, however, shows that the negative effect of job insecurity on safety behavior diminishes under these conditions. In sum, the direction of the interaction effect is in line with hypothesis 5a.

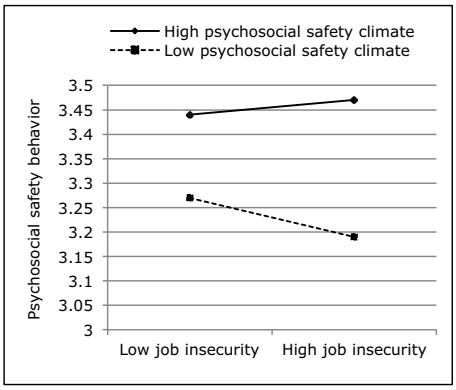

Figure 6.4 Plot of the interaction effect of psychosocial safety climate and job insecurity on psychosocial safety behavior

6.5 DISCUSSION

6.5.1 Conclusions and discussion

The main purpose of this chapter was to examine the relationship between job demands, job resources, safety climate and safety behavior among employees working in health care. By integrating safety climate theory in the JD-R model, we showed that job demands, job resources and safety climate play a role in employee physical and psychosocial safety behavior. To our knowledge no previous study has measured both physical and psychosocial safety behavior and linked them to physical and psychosocial safety climate.

In line with previous research, we found that job demands and job resources are associated with respectively lower and higher safety behavior. All job resources and one job demand (work pressure) turned out to be directly associated with safety behavior. The results showed that job resources are more strongly related to safety behavior than job demands, which is in line with earlier findings (Li et al., 2013). Interestingly, for physical safety behavior, supervisor support was the most important predictor, whereas for psychosocial safety behavior co-worker support had the strongest impact. One explanation for this may be the decision-making authority supervisors have

in matters of workplace physical safety (e.g. allocating budget to the purchase of physical safety equipment such as patient lifting devices). Psychological safety in the workplace may be less dependent on the responsibilities of supervisors and more dependent on day-to-day interactions. In many health care organizations, it is often the case that formal supervisors are not present in the workplace on a daily basis. Hence, employees rely more on co-workers when it comes to behaving psychosocially safe. However, more research on workplace factors that influence psychosocial safety behavior is required to discover the conditions under which employees are likely to control or reduce workplace psychosocial hazards.

This study furthermore underscores the importance of safety climate for employee safety behavior. We found evidence for the direct influence of both physical and psychosocial safety climate on respectively physical safety behavior and psychosocial safety behavior. Thus, psychosocial safety climate probably informs employees on the priority of psychological safety at the workplace in a similar way as physical safety climate. A comparison of the standardized coefficients shows that the direct effect of physical safety climate on physical safety behavior was the greatest among all the exploratory variables. This finding is consistent with results reported by Seo (2005) and Nahrgang et al. (2011). Apparently, physical safety-related concepts are stronger related to physical safety outcomes than general job-related concepts. The results for psychosocial safety behavior, however, did not confirm this: job resources were as important in explaining variance in safety behavior as psychosocial safety climate. Perhaps this can be explained in a similar way as mentioned above: employees' choice to perform psychosocial safety behavior is influenced more by characteristics of the work environment that are located on a lower level in the organization (e.g. individual job resources such job autonomy and co-worker support) and less by factors that originate or occur on the highest organizational level (e.g. top management priority to safety, organizational communication about safety). Research that compares the effects of safety climates with varying foci (units, teams, organizations) could maybe shed more light on this.

Our study also showed that safety climate acts as a buffer in the negative relationship between job demands and safety behavior. For physical safety behavior, we found that the negative impact of work-family conflict was reduced under conditions of high physical safety climate. Following the argument of Cullen & Hammer (2007), this result may indicate that in times of high work-family conflict, attention to safety protocol and perceived ability to devote energy to safety activities may not be a conscious priority, unless employees are working under conditions of high physical safety climate. For psychosocial safety behavior, climate moderated the relationship

between job insecurity and psychosocial safety behavior. Thus, a strong psychosocial safety climate reduces or eliminates the adverse effect of job insecurity on psychosocial safety behavior. This finding is consistent with earlier research documenting the moderating effect of safety climate on the relationship between job insecurity and safety compliance (Probst, 2004).

Finally, with this study we found evidence that safety climate does not only buffer the negative impact of job demands on safety behavior, but also strengthens the positive impact of job resources on safety behavior. Our analysis shows that co-worker support is more positively related to physical safety behavior in the presence of a strong physical safety climate than in the presence of a weak physical safety climate. Although we found one significant interaction effect, most interaction effects were not significant and the regression coefficient of the significant interaction effect was relatively small. One explanation for this may be that moderating effects are found more often for matching job resources than for non-matching job resources (De Jonge & Dormann, 2006). This means we may find more evidence for the moderating role of safety climate when we would include job resources from identical (safety) dimensions. For instance, it would be interesting to examine the moderating effect of physical and psychosocial safety climate on the relationship between safety knowledge or safety training and safety behavior.

6.5.2 Limitations of the study

Although this study is strong in various aspects both theoretically (combining physical and psychosocial safety climate and safety behavior) and empirically (large sample, high reliabilities, multilevel modeling), we must stress several limitations that are associated with the current study.

First, our data are based on a cross-sectional survey. This type of research may result in common method variance. Since we aggregated the safety climate measures to the organizational level, we have drawn data from multiple respondents and accounted for individual subjectivity within the organizational level data. Furthermore, we conducted Harman's one-factor tests (Podsakoff & Organ, 1986), and the results suggest common method variance does not appear to be a serious problem. Additionally, we do not expect common method variance to be a serious threat since multiple interaction effects are observed (Siemsen et al., 2010). Another consequence of this cross-sectional design is that it is not possible to draw conclusions about causality or rule out reverse causality. For instance, we cannot rule out that employee safety behavior influences the perception of job demands or safety climate. This concern highlights the need for a longitudinal or experimental research design.

Second, we used self-reported perceptual data. This is an adequate way to measure physical and psychosocial safety climate, as these concepts are by definition perceptual (Zohar, 2011). For the measurement of job demands, job resources and safety behavior our measures might, however, be prone to social desirability. Respondents could have had the tendency to respond to questions about safety behavior in a manner they believe will present them in a favorable light. We therefore admit that our study would have benefitted from the inclusion of an objective or observed safety behavior measure (see for instance Johnson (2007) who used a behavior checklist to observe (group-level) safety behavior). With regard to the self-report of job demands and resources, we furthermore acknowledge that factors such as social cues from others, individual personality, cognitive processes, mood, attitudes, and feelings about the job could have influenced our self-report measure (Spector, 1992). Respondents who were having a good day at the time they filled in the survey might for instance have reported more positively on questions about work pressure or social support. Future (safety) research examining job demands and –resources should therefore combine self-reports with other type of measures to provide a richer portrait of the job. In this respect, a good example is set by Demerouti et al. (2001) who combine self-reports and observer ratings in their paper on the job-demands and –resources model.

Third, our study is limited to employees working in health care organizations in the Netherlands. Further research is needed to find out whether it is possible to generalize the findings to health care organizations in other countries. It may be possible that cultural or societal factors are at play (see for example Idris et al. (2012) who used two samples from Australia and Malaysia). Nevertheless, we believe our large sample of employees and organizations makes it possible to generalize findings to a broad population of Dutch health care workers.

Fourth, the choice of specific job demands and job resources may have influenced the outcomes of the study. Future research should try to replicate our findings by including other demands such as task complexity or role conflict and resources such as skill discretion or role clarity.

Fifth, our model leaves some questions unanswered as to how safety climate exactly relates to safety behavior. Several different theoretical models on safety behavior propose that the relationship between safety climate and safety behavior is mediated by concepts such as safety skills, safety knowledge and safety motivation (e.g. Griffin & Neal, 2000), burnout and engagement (Nahrgang et al., 2010) or safety attitudes and safety control (Fugas et al., 2012). We therefore encourage other researchers

to include possible mediators in the climate-behavior relationship, especially those interested in investigating psychosocial safety behavior.

6.5.3 Practical implications

Our findings also have practical implications. Regardless of whether the focus is physical or psychological safety, our results show that strengthening the safety climate within an organization may increase employees' safety behavior. The two safety climate constructs included in this study proved their practical utility for two reasons. First, because of the direct effect on employee safety behavior. Organizations that succeed in fostering a positive safety climate will be able to reduce unsafe behavior in the workplace. Second, the moderating effect of safety climate is particularly important because it reduces the impact of work-family conflict and job insecurity on physical and psychosocial safety behavior respectively. Safety climate is therefore an optimal target of intervention to prevent and ameliorate negative health and safety outcomes (Dollard & McTernan, 2011), especially in times of uncertainty and change.

One important note in this respect concerns the level of intervention. Although our research may implicate that safety climate interventions should be located at the organizational level, we acknowledge that safety climates can also vary between organizational units within organizations (i.e. group-level climate, see Zohar & Luria (2005)). We therefore concur with Zohar and Luria (2003: 576) who argue that "the organizational context must be better integrated in intervention programs, taking into consideration that changes taking place at any hierarchical level must be supported by concomitant change at other levels". Complementary interventions at the team level (e.g. employees receive training on how to discuss safety-related issues and speak up about safety during the work day), unit level (e.g. unit managers receive feedback concerning safety-related issues that play at the team-level), and the organizational level (e.g. visible commitment of top management to physical of psychological safety by investments in solutions to safety-related issues) should be conducted concurrently at different organizational levels. This way changes in health and safety outcomes can be maintained over time.

Chapter 7

Improving safety climate and behavior through a multifaceted intervention:

Results from a field experiment

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ABSTRACT

Interventions aimed at increasing priority for employee safety could lead to better safety climate and safety behavior of employees. However, current studies reporting on safety climate interventions lack diversity in contexts and settings, they focus mainly on supervisors and do not take into account the implementation process of the intervention. We aim to add to the safety literature by testing the effects of a multifaceted safety climate intervention using a field experimental design. We analyzed data of 520 health care employees in five organizations and studied the effects of the implementation process. Results showed that safety climate and behavior scores were significantly higher at post-intervention among the intervention group as compared to the control group, while there were no differences pre-intervention. Results also showed that within the intervention group, employees who experienced more positive changes to work procedures and positive attitudes and actions of their supervisor towards the intervention experienced higher post-intervention safety climate and safety behavior. This chapter presents a new, multifaceted safety climate intervention strategy that can be useful for improving safety climate and safety behavior. It also shows the importance of the implementation process when conducting safety climate interventions.

7.1 INTRODUCTION

The occupational health and safety literature has identified many factors that contribute to health and safety in the workplace (Hofmann et al., 2017). One of the factors that received a lot of attention is the safety climate concept. Several studies have shown that safety climate plays an important role in workplace health and safety outcomes of employees, mainly through its influence on safety behavior (Christian et al., 2009; Clarke, 2010). Given the amount of correlational evidence regarding the relationship between safety climate and safety behavior, the number of intervention studies is surprising. Yet intervention studies are important for establishing causal relationships between safety climate and safety behavior, studying the improvement and implementation of changes in safety climate and a better collaboration between researchers and practitioners to increase our understanding of the safety climate concept in theory and practice (Kristensen, 2005).

Indeed, a handful of studies have tested the effects of an intervention on employees' perceptions of safety climate and safety outcomes such as safety behavior, safety knowledge, safety violations, and safety leadership (Zohar, 2002; Zohar & Luria, 2003; Zohar and Polachek, 2014; Nielsen, 2014; Mullen & Kelloway, 2009; Von Thiele Schwarz et al., 2016; Kines et al., 2010; Naveh & Katz-Navon, 2015). Nevertheless, these studies leave three important gaps in our knowledge on safety climate improvement.

First, the interventions in these studies were primarily focused on changing supervisory interaction with employees, which is in line with the emphasis that is placed on the pivotal role of direct supervisors in relation to safety climate (Zohar, 2002; Zohar & Luria, 2003). However, notwithstanding this importance, the influence of other safety agents such as (co)workers and senior managers has also been stressed in the safety literature (Chiaburu & Harrison, 2008; McGonagle et al., 2014; Zohar, 2014). Over the years, research has examined the multifaceted nature of the safety climate concept and proved that it references multiple levels in the organizational hierarchy (e.g. Zohar & Luria, 2005), including senior management and coworkers (Yule et al., 2006; Brondino et al., 2012). However, senior managers' priority for safety and coworkers safety norms have not (or only marginally) been included in safety climate interventions.

Second, the current safety climate intervention studies were mostly located in industrial settings (such as metal processing, construction, and manufacturing) with a focus on physical accidents and hazards. As the targets of safety climate perceptions are context-dependent (Zohar, 2010), these interventions may not provide the

most optimal leverage points for safety climate improvement in other organizational contexts (for instance self-managing teams, emphasis on teamwork) and types of safety risks and hazards (for instance psychological health and safety risks). Since health and safety issues are relevant to a wide range of organizations and industries, it is important to investigate the effects of safety climate interventions across various settings.

The third gap is that previous safety climate intervention studies were mainly concerned with the effects of the intervention itself on safety outcomes, ignoring the implementation process of the intervention and its influence on the intervention effects. Addressing the conditions under which interventions are likely to be most effective is needed to achieve more valid evaluations of safety climate interventions (Pedersen et al., 2012; Nielsen, 2013). Authors such as Randall and colleagues (Randall et al., 2009; Randall & Nielsen, 2012) argue that including information on the implementation process could provide some protection against the threat of Type III error. That is, concluding the intervention is ineffective when it is in fact the faulty implementation that leads to failure (Dobson & Cook, 1980).

This chapter aims to fill these gaps by testing the effects of a multifaceted safety climate intervention and its implementation process in the health care sector. The multifaceted safety climate intervention incorporates different safety climate agents to improve safety climate and safety behavior, including senior managers, supervisors, and employees. We must note that our safety climate intervention is not focused on patient safety climate, but on employee safety climate in health care (that is, the climate concerning health and safety of health care employees). Unless stated otherwise, the term 'safety climate' in our study thus always refers to employee safety and not to patient safety. The study is guided by two main research questions: 1) "Does a multifaceted safety climate intervention improve safety climate and safety behavior?" and 2) "Under which conditions does a multifaceted safety climate intervention improve safety climate and behavior?" To answer these questions, we conducted a field experiment with a pretest-posttest control group design among 520 employees working in five health care organizations.

7.2 IMPROVING SAFETY CLIMATE

Safety climate refers to the perceptions employees have of the policies, procedures and practices concerning safety within the organization (Zohar, 1980). In one of the first papers on safety climate, Zohar (1980) points to the informative function of

the concept regarding the relative importance of safety versus other competing task domains (such as productivity or cost-reduction). The safety climate concept therefore reflects the priority of employee health and safety compared to other priorities within the organization (Zohar, 2008). Thus, an intervention to improve safety climate should explicitly signal to employees that workplace health and safety is a priority in the organization and that behaviors that improve this are expected. Despite the fact that many researchers follow Zohar's (1980, 2008) conceptualization of safety climate, there is not much consensus on the clarification of the concept in terms of its operationalization or dimensionality (Flin et al., 2000; Zohar & Luria, 2005). This makes it difficult to pinpoint specific intervention targets that will demonstrate the priority of health and safety over other demands. However, some common themes within the literature have emerged (Flin et al., 2000; Bronkhorst et al., 2015), which provide important leverage points that can be used to improve safety climate perceptions. We will discuss three of these common themes.

7.2.1 Senior management priority for safety

One of the key dimensions of safety climate is management commitment to safety (Flin et al., 2000). As organizations are hierarchical in structure, employees will form perceptions of management commitment at multiple organizational levels. Zohar and Luria (2005) argue that safety climate can be meaningfully constructed at the group level and at the organizational level, so as to reflect supervisors' and senior management's influence on safety. The role of senior management in establishing organizational priorities and allocating resources is one of the reasons this safety agent is generally acknowledged as the main influencer of safety climate (Flin et al., 2000; Bosak et al., 2013). By using their power over time, money and people, senior managers are able to show the relative importance of safety within the organization. However, there are only a handful of studies including senior management in their safety climate intervention. Zohar and Luria (2003) for instance include higher-level managers by providing them with summary information about safety-related interaction between supervisors and employees, and instructed them to share this information with subordinate supervisors. The intervention tested by Nielsen (2014) included the CEO in staff meetings where he informed employees about the company's safety status. Similarly, Naveh and Katz-Navon (2015) asked senior management to send a support letter to all employees backing the organization's vision about safety. In all three studies, senior management's priority for safety is demonstrated through a top-down, one-sided information exchange.

A different approach to modify senior management priority for safety has been developed in the related field of patient safety climate through so-called 'Leadership

WalkRounds' or management safety rounds. These were first introduced in 1999 by the Institute for Health care Improvement and conceptualized by Frankel et al. (2003) as a tool to improve management commitment to safety by providing an informal method for senior managers to talk about patient safety issues with employees. In contrast to the way senior management was included in the safety climate interventions described above, leadership safety rounds provide two-way interaction between senior managers and employees. This facilitates a learning process and increases employees' participation opportunities (Luria & Morag, 2012). Empirical research has shown that leadership safety rounds have positive effects on patient safety climate and reinforces patient safety as a priority within the organization (Singer & Tucker, 2014; Thomas et al., 2005). To our knowledge, there is only one study that investigated leadership rounds for employee safety, namely Luria and Morag (2012). They examined the introduction of a 'safety management by walking around' intervention using a case study method. Although the authors did not study its effects on safety climate, their results showed that safety rounds increased and improved interaction between managers and employees about safety. Based on their experience, these authors argue that "such an intervention should highlight for employees the importance of the safety facet relative to other organizational facets" (2012: 256). Attempts to increase perceived senior management priority for safety by introducing safety rounds thus seem promising.

7.2.2 Supervisor commitment to safety

Supervisors play a pivotal role in showing employees the priority of safety, as they inform them on the kinds of behavior that are valued and supported in the workplace (Zohar, 2002). The daily interaction between employees and management is therefore considered as one of the building blocks of safety climate. Not surprisingly, most of the safety climate intervention studies are primarily focused on increasing perceptions of supervisor commitment to safety. Zohar (2002), Zohar and Luria (2003), Zohar and Polachek (2014), and Kines et al. (2010) all tested whether providing coaching and feedback information to supervisors on their daily messages improved employees' perceptions of the priority of safety. Overall, the results from these studies showed that the coaching and feedback changed the type of messages employees perceived from their supervisors (i.e. more safety-related messages), which is indicative of a modified priority for safety. In turn, this resulted in changes in safety climate and other safety outcomes such as safety behavior and safety audit levels.

Another extensively researched topic that has been linked to supervisor commitment to safety is transformational leadership (Pilbeam et al., 2016). Safety-specific transformational leadership (SSTL) is a leadership style focused on enhancing workplace safety, and is, in line with general transformational leadership, composed of idealized

influence, inspirational motivation, intellectual stimulation, and individualized consideration (Barling et al., 2002). Supervisors high in SSTL are expected to demonstrate high priority given to safety through their own behavior, encourage employees to reach high levels of safety, suggest new and innovative ways of reaching safety, and show concern for their employees' health and safety (Barling et al., 2002). In a study situated in a long-term health care organization, Mullen & Kelloway (2009) tested the effects of a SSTL training intervention for supervisors on safety outcomes. The results showed that the leadership training resulted in a significant increase in employee scores on perceptions of safety climate. Other experimental studies on the effects of (general) transformational leadership training confirm these findings (Barling et al., 2002; Zohar, 2002; Von Thiele Schwarz et al., 2016). In conclusion, empirical research clearly indicates that increasing perceived supervisor commitment to safety through coaching, feedback or SSTL training results in overall safety climate improvement.

7.2.3 Group norms and group behavior in relation to safety

Finally, research has shown that employees do not only take cues from supervisors and senior managers with regard to workplace health and safety, but also from their coworkers (Jimmieson et al., 2016). Employees in organizations generally consider themselves as members of groups. The norms developed by these groups contribute to the safety climate perceptions of employees belonging to these groups, and consequently influence their behavior (Fogarty & Shaw, 2010). In their study on perceived safety norms, Fugas et al. (2011) showed that employees' perceptions of coworkers' descriptive safety norms directly influenced their safety behavior, whereas supervisor safety norms did not. They conclude that interventions should explicitly consider the role of coworkers as a source of normative influence. In line with this, Meliá et al. (2008) identified coworkers as a safety agent as important as senior managers and supervisors.

Considering the influence of coworkers as safety agents, Brondino et al. (2012) argued that safety climate interventions should target teams and workgroups to strengthen group norms for safety. Among other things, they suggest the introduction of short safety meetings to discuss safety issues and propose ways to improve safety (Brondino et al., 2012: 1854). A safety intervention tested by Kines et al. (2013) provides an example of this. The authors introduced safety meetings (between employees and led by managers) aimed at increasing "participants' dialogue and ownership of dealing with current safety issues through identifying and discussing safety perceptions, attitudes, what works well (why and how), and what needs improvement" (2013: 94). Unfortunately, Kines et al. did not measure the effects of the intervention on employees' perceptions of safety climate. However, considering the opportunities these types

of safety meetings provide to discuss and improve group norms and behavior (and thereby establishing a priority for safety among employees), they might contribute to safety climate improvement.

7.3 A MULTIFACETED APPROACH TO SAFETY CLIMATE IMPROVEMENT

Given the several leverage points outlined above, a multifaceted intervention approach appears to be the optimal choice to improve safety climate. As Zohar and Luria (2003: 20-21) argue: "the organizational context must be better integrated in intervention programs, taking into consideration that changes taking place at any hierarchical level must be supported by concomitant change at other levels [..]". This suggests that interventions aimed at increasing supervisor commitment to safety should be complemented by interventions that involve senior management and (co)workers. Two examples of this are the studies by Kines et al. (2013) and Nielsen (2014). In their study, Kines et al. (2013) tested the effects on safety perceptions of several intervention activities taking place at different organizational levels (informal safety meetings between workers and management safety coaching). Qualitative findings from interviews with managers and employees indicated that the intervention activities improved attitudes towards safety, and showed signs of safety culture change. Nielsen (2014) also reported the results of an intervention program consisting of activities involving different stakeholders (e.g. safety information provided by CEO, safety staff meetings and safety themed workshops for safety representatives). The results showed significant, positive changes in safety climate perceptions at post-intervention, indicating that using different leverage points to modify employee perceptions is a successful strategy to improve safety climate. Moreover, in a comparison of successful and unsuccessful safety culture interventions, Hale et al. (2010) found that involving all employees across organizational levels (i.e. introducing a multifaceted intervention) in an environment where safety issues are openly discussed is a distinguishing factor. Considering the overlap between safety culture and safety climate, this may also be the case for safety climate interventions.

Following these approaches to safety climate improvement, we developed a multifaceted safety climate intervention program that aims to modify employees' safety climate perceptions through the improvement of employee perceptions of senior management priority, supervisor commitment, and group norms and behavior in relation to health and safety (see Methods section and Appendix III). As the main goal of

our intervention program is to improve safety climate perceptions, we first need to examine its effect on safety climate. Hypothesis 1 is as follows:

H1: Compared to a control group of employees, employees who are subject to the multifaceted safety climate intervention will report higher levels of safety climate at post-intervention

7.4 THE EFFECT OF SAFETY CLIMATE IMPROVEMENT ON SAFETY BEHAVIOR

The main premise of safety climate perceptions is that they inform employees of the priority of safety in the workplace (Zohar, 2010). The relative importance of employee health and safety versus other organizational goals (most often productivity) shows the extent to which safety compliant or enhancing behavior is supported and rewarded at the workplace. In their model of safety behavior, Griffin and Neal (2000) make a distinction between two types of behavior: safety compliance and safety participation. Safety compliance describes the core activities that need to be carried out by employees to ensure safety rules and regulations are followed (in health care this for instance includes using patient-lifting devices or adhering to incident reporting procedures). Safety participation refers to behaviors that do not directly contribute to an individual's personal safety, but which do help to develop an environment that supports safety (for instance helping others with patient-handling or voluntarily attending safety meetings). Based on expectancy-valence theory (Vroom, 1964), the safety climate literature states that workers will be motivated to show safety compliant or participative behavior if they believe that these behaviors will lead to valued outcomes (Zohar, 2008). As our multifaceted safety climate intervention includes activities that place emphasis on the importance and value of safety in several ways, the relative priority of this subject will –presumably- increase. As a result, employees will perceive that behaving healthy and safely during work time is valued by the organization. We therefore expect that, in addition to its effect on safety climate, the safety intervention program will also improve safety behavior among the intervention teams.

H2: Compared to a control group of employees, employees who are subject to the multifaceted safety climate intervention program will report higher levels of safety behavior at post-intervention

7.5 THE EFFECT OF THE SAFETY CLIMATE IMPLEMENTATION PROCESS

The study of interventions in organizational settings is inherently difficult and complex (Biron & Karanika-Murray, 2014). In contrast to experiments taking place under controlled circumstances, organizational intervention studies are conducted in a natural setting where many factors are not under the researchers' control. Participants may not use materials, resources or procedures recommended by the researchers, or they may not use it as planned (Murta et al., 2007). To truly determine whether an intervention has had the desired impact on the outcomes under study, it is therefore crucial to understand the implementation process by which the intervention is delivered (Egan et al., 2009). This also applies to safety climate intervention studies, where the success of activities aimed at changing employees' perceptions of the priority for safety also depends on, for example, motivation of managers to introduce changes and the possibilities for learning within the organization (Hale et al., 2010).

Several researchers have outlined how different characteristics of the implementation process and the intervention context may influence the impact of a health and safety intervention. These for instance include employee involvement in the planning and content of the intervention, readiness for change, and employee mental models (Nielsen & Randall, 2013; Nielsen et al., 2015; Biron & Karanika-Murray, 2014). In this study we focus on two aspects of the implementation process: changes made to procedures as a consequence of the intervention, and supervisors' attitudes and actions towards the intervention.

The importance of employee participation in organizational interventions is widely known. However, some scholars state that, especially in the case of health and safety interventions, overall exposure to intervention activities alone does not result in positive intervention outcomes. They argue that the perceptions of employees of the impact of the intervention on changes in their work situation might be more important (Hasson et al., 2014; Randall et al., 2009). Hasson et al. (2014) for examples showed that employees who reported that the intervention activities had a positive impact on their work showed significantly more improvements in the outcomes as compared to those who perceived no or a negative impact. In a study that evaluated the process of teamwork implementation, Nielsen and Randall (2012) found that in order to be successful, the intervention had to involve changes to work procedures. Thus, interventions are more effective when employees experience that they bring about changes in their daily work. This implies that, regardless of the content of the intervention, the success of an intervention depends upon the extent to which it gives

rise to actual changes to daily work practices and procedures (Nielsen & Abildgaard, 2013). Following this line of reasoning, our multifaceted safety climate intervention will improve safety climate and –behavior more effectively, if employees report that the intervention activities actually changed work procedures.

H3: The extent to which employees report changes in work procedures brought about by the safety climate intervention will be positively related to safety climate and safety behavior at post-intervention

Another important aspect of the implementation process is the role that supervisors play in shaping interventions. The social interaction between supervisors and their employees determines the impact of an intervention, as supervisors influence the way their employees perceive an intervention and whether or not they decide to participate in the intervention activities. This makes supervisors powerful actors in the implementation process: they can either 'make or break' an intervention (Nielsen, 2017). Randall et al. (2005) for instance found that supervisors actively resisted the implementation of changes by not communicating the intervention to their employees. A few years later, Randall et al. (2009) tested the effect of supervisors' attitudes and actions towards a team working intervention and found that the positive outcomes of the intervention were mainly driven by the attitudes and behavior of the supervisor, which involved positive communication about the intervention, active involvement of employees, and sharing information. Apparently, the more positive the values, attitudes and behaviors of the supervisor towards the intervention are, the greater the likelihood that employees will actively engage in the intervention themselves (Nielsen, 2013). Given the fact that, in most cases, supervisors are responsible for day-to-day intervention implementation (Kompier et al., 2000), their influence on intervention outcomes should not be underestimated. The supervisor plays an important role in our multifaceted safety climate intervention, not only because they are the ones to show an increase in commitment to safety, but also because they influence employees' choice to participate in intervention activities aimed at increasing senior management priority for safety and group norms and behavior. We therefore expect that the effectiveness of our multifaceted safety climate intervention is related to supervisors' attitudes and actions towards the intervention.

H4: The extent to which employees report that their supervisor shows positive attitudes and actions towards the safety climate intervention will be positively related to safety climate and safety behavior at post-intervention

7.6 METHODS

7.6.1 Design and participants

The study was conducted in five Dutch health care organizations: two organizations providing care for disabled people, one organization providing mental health care, one home health care organization and one hospital. The project was designed as a quasi-experimental field study with pre-intervention (T1) and post-intervention (T2) measurements and comparison groups (intervention- versus control group). The ethics committee of the Erasmus School of Social and Behavioural Sciences declared that the methods of data collection and data analyses were in line with all ethical norms and values for this type of research. The study was pre-registered in the Dutch Trial Register with number NTR5391[3].

Entire teams of employees were selected to participate in the study either as a control or intervention team to prevent contamination of the control group resulting from an exchange of information between control- and intervention employees working closely together in the same team (Cook & Campbell, 1979). Four out of five organizations agreed with random assignment of teams to control- or intervention group. In one organization, supervisors were asked whether they were interested to let their employees participate in a health and safety intervention. Although the employees in this organization were not randomly assigned, we did not find any significant differences between employees participating in the control or intervention group in pre-intervention safety climate and safety behavior scores, nor did we find significant differences in work- and background characteristics (see also Results section).

A total of 1,323 employees working in 91 teams participated in the study, of which 45 teams (630 employees and 37 supervisors) were assigned to the control group and 46 teams (693 employees and 37 supervisors) to the intervention group. All employees in both groups were invited to complete an online survey during a five-week period before the start of the intervention program, which lasted for six months. They were

3 In this article, we present the results directly after the intervention (post-intervention, shown as T1 in the register). In line with good practices for pre-registration and promoting an open research culture (Nosek et al., 2015), we indicate which reported outcomes were in line with the pre-registration and which were not. The primary outcome was improvement of safety climate scores directly post-intervention. This is in line with the pre-registration. A secondary outcome was that we also expected improvement of safety knowledge score at post-intervention. However, we did not find these results for safety knowledge ($F(1, 513)= .01$, $p>.05$) and for safety motivation ($F(1, 513)= .20$, $p>.05$). Another secondary outcome was the intervention effect on safety behavior. We expected this result to be present only at the first follow-up measurement six months after post-intervention (so not directly post-intervention). As we already saw results directly post-intervention, we decided to report them here. Lastly, we did not hypothesize the impact of the implementation process in the pre-registration (hypotheses 3 and 4 in this study). We decided to include these effects due to enhanced insights we gained during the intervention.

asked to fill in another online survey directly after the program finished. All 1,323 employees were invited for pre- and post-intervention surveys. In the end, we were able to match 520 employees who completed both pre- and post-intervention surveys (39.3% response rate). From these 520 employees, 258 employees belonged to the intervention group and 262 employees belonged to the control group.

All participating teams consisted of employees providing direct care to patients or clients, which resulted in the exclusion of administrative, technical or supporting teams. Supervisors assigned to the intervention group could not supervise an intervention team and a control team simultaneously. Employees in the control group did not participate in the intervention program and carried out their work as usual. To prevent that employees and supervisors in the control group became aware of their control group status, all communication about the intervention program was exclusively directed at employees and supervisors assigned to the intervention group.

7.6.2 The safety climate intervention

Based on safety climate literature we developed a six-month intervention program that consisted of three activities that intervened through the three leverage points outlined above. The interventions included 1) the introduction of senior management safety rounds, 2) safety-leadership (SSTL) training for supervisors, and 3) the use of an online discussion platform for team members ('Synmind') to give their opinion on health and safety issues followed by regular team-meetings to discuss the online results. The intervention phase lasted for six months and was composed of three consecutive rounds with different themes, each lasting two months. In each round, the three intervention activities were carried out. To help plan and monitor the intervention activities, a local project manager was appointed at each of the participating organizations. An overview of the safety climate intervention activities, rounds and themes is presented in Figure 7.1. A survey was administered to all employees in the intervention- and control group before and directly after the intervention. For a detailed description of each intervention activity see Appendix III.

7.6.3 Measures

All items were translated to Dutch and tested in a pilot group of five health care employees. Feedback was given on the terms used, wording and relevance of the items for their daily work tasks. All items were measured on a five-point Likert scale, ranging from a low score of 1 (strongly disagree) to a high score of 5 (strongly agree). Appendix II shows an overview of the items used for each measure.

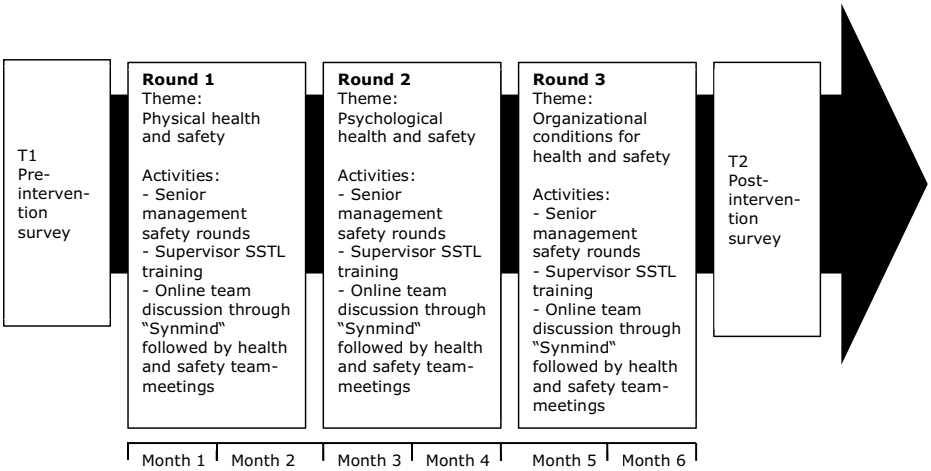


Figure 7.1 Overview of the safety climate intervention program

Safety climate – Safety climate was measured at pre- and post-intervention (T1 and T2) among all employees in the intervention- and control group using an adapted version of the PSC-12 four-factor scale originally developed by Hall et al. (2010) to measure psychosocial safety climate. Two previous studies added a fifth factor to address another important employee safety climate dimension: group norms and behavior concerning employee health and safety (based on coworker safety items developed by Brondino et al., 2012). These two studies showed good internal validity and reliability (Bronkhorst, 2015; Bronkhorst & Vermeeren, 2016). Although the scale was originally developed to measure a specific form of safety climate (psychosocial safety climate), we chose to slightly adapt it so we could use it for our wider conceptualization of safety climate including both physical and psychosocial health and safety among employees. For example, words and phrases that refer to 'psychological health' were substituted by 'health and safety' and 'the prevention of stress' was replaced by 'the prevention of health and safety issues'. Cronbach's alpha values for all five subscales were acceptable at both T1 and T2 (ranging from .80 to .90).

Safety behavior – A six-item scale developed by Neal and Griffin (2006) was used to measure safety behavior in the workplace at pre- and post-intervention (T1 and T2) among all employees in the intervention- and control group. This scale is composed of two factors: safety compliance and safety participation. Each factor was measured by three items. Internal consistency for both subscales was adequate with Cronbach's alpha values of .76 and .82.

Changes to procedures – To measure the extent to which the intervention program brought about positive changes in the day-to-day work of employees, we used a five-item scale based on the 'exposure to intended intervention' scale developed Randall et al. (2009). This variable was measured at post-intervention (T2) among intervention group employees only as it concerns a variable on the implementation of the intervention.

Supervisor attitudes and actions – This was measured using five items from the scale developed by Randall et al. (2009). This variable was – like changes to procedures – measured at post-intervention (T2) among intervention group employees only as it concerns a variable on the implementation of the intervention.

Control variables – Five work- and background characteristics were added as control variables: age, gender, organizational tenure, contract hours and educational level. These variables were measured at pre-intervention among all employees in the intervention- and control group.

7.6.4 Statistical analyses

As safety climate is theoretically considered a group- or organizational level variable (Zohar, 2010), we tested whether aggregation to the team level was appropriate for our data. Inter-rated agreement and reliability measures ($r_{WG(J)}$ and ICC(1,2)) indicated that it was not meaningful to aggregate safety climate perceptions and perform multilevel analyses. Therefore, this study uses individual perceptions of safety climate, commonly referred to as psychological climate (Christian et al., 2009; Clarke, 2010).

To test hypotheses 1 and 2 concerning the effect of the intervention program on safety climate and -behavior we conducted repeated measures multivariate and univariate analyses of covariance (RM MANCOVA and RM ANCOVA) with time (T1 and T2) as a within-person factor and group (control group vs. intervention group) as a between-person factor. Age, gender, organizational tenure, contract hours and educational level were added as covariates.

Next, to test the whether there is a relationship between the implementation process and safety climate and safety behavior at post-intervention (hypotheses 3 and 4), we performed OLS regression analyses with post-intervention measures as the dependent variables and implementation process variables as independent variables, controlling for work- and background characteristics and pre-intervention measures.

7.7 RESULTS

7.7.1 Descriptive statistics and preliminary analyses

Table 7.1 shows the descriptive statistics and correlations for the study variables. We tested the key assumptions before we conducted the analyses to test our hypotheses: the assumption of normality of error terms, homogeneity of variances and regression slopes, and the independence of the independent variable and covariate. All assumptions were met. Independent t-tests were conducted to examine whether there were significant differences in work- and background characteristics such as age, gender, organizational tenure, contract hours, or educational level between the two intervention conditions. There were no significant differences in work- and background characteristics between employees assigned to the control- and intervention group.

7.7.2 Intervention effects on safety climate and safety behavior

The results of the RM (M)ANCOVA's testing the effects of the intervention on safety outcomes are presented in Table 7.2. Hypothesis 1 predicted that the intervention program would have a positive effect on levels of safety climate for the intervention group compared to the control group. Because the activities that comprise our safety climate intervention are focused on the different dimensions of safety climate, we tested the effect of the intervention program on both the composite safety climate score and the individual safety climate dimension scores. The 2 (time) x 2 (group) MANCOVA of the five safety climate dimensions indicated that there was no significant group effect (F (5, 509) =1.95, ns) or time effect (F (5, 509) = .59, ns). Yet, there was a significant group x time interaction effect (F (5, 509) = 4.46, p< .01, *partial* η^2 = .04), showing that the changes in safety climate were different for the two groups. RM ANCOVA's for each safety climate dimension followed up the multivariate results.

The follow up tests revealed significant group x time interactions for the following safety climate dimensions: senior management priority (F (1, 513) = 8.95, p< .01, *partial* η^2 = .02), group norms (F (1, 513) =12.03, p< .01, *partial* η^2 = .02), and communication (F (1, 513) =6.51, p< .05, *partial* η^2 = .01), but no significant interaction for the supervisor commitment (F (1, 513) = 1.12, ns) and participation (F (1, 513) = .28, ns) dimensions. The mean scores presented in Table 7.2 and the interaction plot in Figure 7.2 show that the significant interactions for senior management priority, group norms, and communication were due to the control group decreasing from pre-test to post-test whilst the intervention group increased from pre-test to post-test. The composite safety climate pre-test and post-test scores show the same pattern with a significant group x time interaction (F (1, 513) =8.08, p< .01, *partial* η^2 = .02). Hypothesis 1 is therefore supported by the data.

Table 7.1 Means, standard deviations and correlations for the study variables

	Control group	Intervention group	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	Mean (S.D.)	Mean (S.D.)										
Safety outcomes												
1. Safety climate (T1)	3.36 (.59)	3.41 (.59)	(.93)									
2. Safety climate (T2)	3.28 (.63)	3.46 (.50)	.52**	(.93)								
3. Safety behavior (T1)	3.29 (.61)	3.30 (.63)	.45**	.26**	(.81)							
4. Safety behavior (T2)	3.22 (.57)	3.36 (.55)	.30**	.46**	.42**	(.82)						
Implementation process												
5. Changes to procedures	-	2.82 (.66)	.30**	.42**	.21**	.31**	(.85)					
6. Supervisor attitudes and actions	-	3.23 (.72)	.25**	.50**	.11	.24**	.54**	(.90)				
Control variables												
7. Gender (1= female)	.85 (.36)	.83 (.37)	.07	.10*	.04	-.02	.02	.04	-			
8. Age	44.7 (11.1)	45.7 (11.6)	.09*	-.04	.12**	.17**	-.04	-.12	-.09*	-		
9. Organizational tenure	4.39 (1.64)	4.34 (1.62)	.03	-.01	.07	.13**	-.02	-.05	.03	.51**	-	
10. Contract hours	3.38 (.59)	3.35 (.60)	-.12**	-.05	.01	.05	-.02	-.01	-.26**	-.06	.02	-
11. Educational level	4.26 (.87)	4.21 (.80)	-.07	-.10*	-.10*	-.13**	-.05	.02	-.07	-.19**	-.02	.16**

*p<.05
**p<.01
S.D. = standard deviation
N (variables 1-4, 7-11) = 520 (intervention group (*N* = 258), control group (*N* = 262))
N (variables 5 and 6) = 258 (intervention group only)
Cronbach's Alpha values are presented on the diagonal

Table 7.2 Repeated measures (M)ANCOVA results of the effect of the safety climate intervention on differences in safety climate and safety behavior between control and intervention groups

	Control group		**Intervention group**		**Group**	**Time**	**Group x Time interaction**	
	T1 Mean (S.D.)	T2 Mean (S.D.)	T1 Mean (S.D.)	T2 Mean (S.D.)	*F (df)*	*F (df)*	*F (df)*	Partial η^2
Safety climate	*3.36 (.59)*	*3.28 (.63)*	*3.41 (.59)*	*3.46 (.50)*	*1.95 (5, 509)*	*.59 (5, 509)*	*4.46** (5, 509)*	*.04*
Senior management priority	3.13 (.81)	3.05 (.83)	3.16 (.77)	3.28 (.69)	4.60* (1, 513)	.01 (1, 513)	8.95** (1, 513)	.02
Supervisor commitment	3.69 (.80)	3.56 (.82)	3.78 (.72)	3.71 (.69)	4.72* (1, 153)	.52 (1, 513)	1.12 (1, 513)	.00
Group norms and -behavior	3.59 (.63)	3.49 (.74)	3.61 (.70)	3.73 (.59)	7.27** (1, 153)	.01 (1, 513)	12.03** (1, 513)	.02
Communication	3.26 (.71)	3.18 (.75)	3.28 (74)	3.35 (.65)	2.77 (1, 153)	1.56 (1, 513)	6.51* (1, 513)	.01
Participation	3.12 (.71)	3.10 (.72)	3.22 (.73)	3.23 (.62)	4.70* (1, 153)	.02 (1, 513)	.28 (1, 513)	.00
Safety behavior	*3.29 (.61)*	*3.22 (.57)*	*3.30 (.63)*	*3.36 (.55)*	*2.17 (2, 512)*	*.00 (2, 512)*	*4.29* (2, 512)*	*.02*
Safety compliance	3.34 (.68)	3.27 (.67)	3.42 (.75)	3.41 (61)	4.27* (1, 513)	.00 (1, 513)	1.11 (1, 513)	.00
Safety participation	3.23 (.73)	3.17 (.73)	3.18 (.71)	3.31 (.66)	.66 (1. 153)	.00 (1, 513)	8.47** (1, 513)	.02

*p<.05
**p<.01
S.D. = standard deviation
All results are controlled for the influence of differences in age, gender, organizational tenure, contract hours, and educational level
N = 520 (intervention group (N = 258), control group (N = 262))

The results from the 2 (time) x 2 (group) MANCOVA for the safety behavior dimensions showed that there was no main group effect (F (2, 512) =2.17, ns) or time effect (F (2, 512) = .00, ns), but there was a significant group x time interaction effect (F (2, 512) = 4.29, p< .05, *partial* η^2 = .02). The univariate analyses that proceeded indicated that this significant interaction was mainly due to the intervention group changing significantly different from the control group when it comes to safety participation (F (1, 513) = 8.47, p< .01, *partial* η^2 = .02). The changes for the safety compliance dimension were not significantly different for both groups (F (1, 513) = 1.11, ns). The composite safety behavior variable also showed a significant group x time interaction effect (F (1, 513) = 5.36, p< .05, *partial* η^2 = .01). The mean scores in Table 7.2 and the interaction plot in Figure 7.2 show that the significant interactions are due to a decrease in safety behavior in the control group and an increase in the intervention group. These findings confirm hypothesis 2.

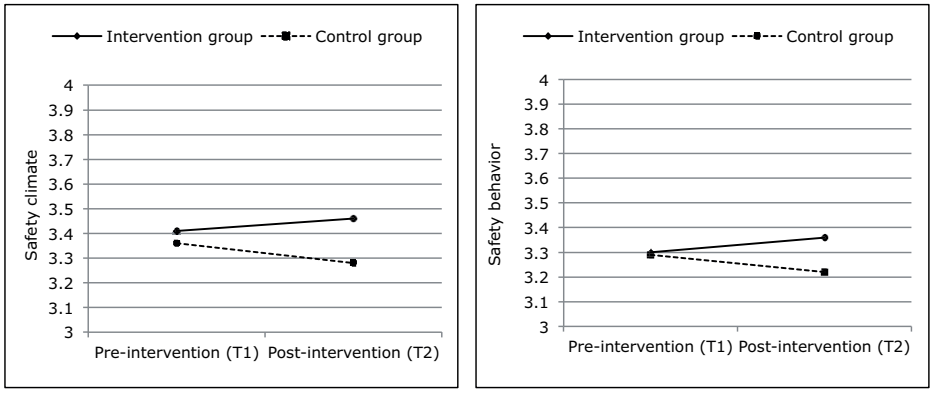


Figure 7.2 Plots of the intervention effect (interaction between group and time) on (a) safety climate and (b) safety behavior

7.7.3 Implementation process effects

Hypotheses 3 and 4 stated that characteristics of the implementation process (that is changes in work procedures brought about by the intervention and supervisor attitudes and actions towards the intervention) are related to post-intervention measures of safety climate and safety behavior. The results are presented in Table 7.3. The analyses showed that both implementation process variables were significantly associated with post-intervention levels of safety climate, controlled for pre-intervention safety climate levels. When we look at the standardized estimates, we find that the supervisor attitudes variable (β= .34, p< .01) has a stronger association with post-intervention safety climate than the changes in procedures variable (β= .12, p< .05). For safety behavior, we also found that both implementation process variables were significantly related to the post-intervention measurement. Here we see that, in

contrast to safety climate, the changes to procedures variable (β= .15, p< .05) has a slightly stronger association with post-intervention safety behavior than supervisor attitudes and actions towards the intervention (β= .13, p< .05). Hypotheses 3 and 4 are thus supported by the data.

Table 7.3 OLS regression results of the relationship between the implementation process and post-intervention measures of safety climate and safety behavior

	Safety climate T2		**Safety behavior T2**	
	Model 1	Model 2	Model 1	Model 2
Pre-intervention variables				
Safety climate T1	.53**	.41**		
Safety behavior T1			.45**	.40**
Control variables				
Age	-.03	.03	.06	.09
Gender (1 = female)	.07	.06	-.03	-.04
Organizational tenure	-.04	-.04	.02	.02
Contract hours	.00	-.01	.11	.11*
Educational level	-.03	-.03	-.11	-.10
Implementation process variables				
Changes to procedures		.12*		.15*
Supervisor attitudes and actions		.34**		.13*
ΔR^2		.15		.06
F for ΔR^2		34.00**		10.64**
Overall adjusted R^2	.27	.43	.23	.28

*p<.05
**p<.01
Standardized coefficients (β) are shown.
Assumptions of OLS regression were met.
N = 258 (intervention group only)

7.8 CONCLUSIONS AND DISCUSSION

7.8.1 Discussion

The current study was guided by two main research questions. The first research question concerned the effectiveness of a multifaceted safety climate intervention for employees' safety climate perceptions and their safety behavior. The data revealed that our intervention including senior management safety rounds, SSTL training of supervisors, and team discussions about employee health and safety significantly

improved composite safety climate and safety behavior. Looking at the effects of the intervention on the safety climate dimensions separately, we found significant positive effects for senior management priority, group norms, and communication. Although the SSTL training was specifically aimed at increasing supervisor commitment to safety, we did not find statistically significant improvements for this dimension. One possible explanation for not finding this effect could be that the time lag for evaluation of the intervention was too short to observe SSTL training effects. Donohoe and Kelloway (2014: 216) suggest "three months may be the minimum time frame required for changes in leadership to be implemented consistently, recognized by employees as a change, and to trickle down to affect employee attitudes and behaviors". Since the post-intervention survey was timed only two months after last SSTL training in the third intervention round, the effects might not have been fully achieved. For safety behavior, we found that the intervention significantly improved the safety participation dimension, but the effects on the safety compliance dimension were non-significant. Although this is not in line with previous research indicating that safety climate is linked to safety compliance, a meta-analysis by Clarke (2006) demonstrated that a stronger relationship exists between safety climate and safety participation. That our intervention did not significantly improve safety compliance might be explained by the fact that the three activities that comprised our safety climate intervention primarily contributed to establishing a safety-supportive environment (a safety goal for safety participation; Griffin & Hu, 2013). The safety goal for safety compliance is to ensure employees work in a manner that adheres to organization-specific safety rules and regulations (Griffin & Hu, 2013). As the safety rules and regulations differ considerably between organizations and even between teams, we decided not to focus on the compliance of specific rules and regulations. Future safety climate intervention studies could incorporate safety compliance as a theme to discuss in team safety meetings or in senior management safety rounds.

Instead of modifying safety climate perceptions by using a single leverage point (Zohar, 2002; Zohar & Luria, 2003; Zohar & Polachek, 2014), our field experiment showed that a multifaceted intervention strategy targeting different levels can be effective. This result is especially important in sectors with a growing interest in self-managing teams, such as the health care and service sector (Van Mierlo et al., 2005). In particular in health care, the shift towards self-managing teams and the professionalization of the nursing profession has emphasized employee autonomy and reduced the authority and responsibilities of the manager (Wynd, 2003). This increases the influence that coworkers have on climate perceptions and behavior. A recent study on hand hygiene climate among nurses by Jimmieson et al. (2016) for instance demonstrated that the perceptions of daily practices of other nurses were more salient cues for shaping

behavior than cues from managers or the hospital in general. Interventions based on daily interactions between managers and employees are therefore not as effective in contexts where managers' visibility is low (Luria et al., 2008). This makes the evidence provided by our study on the effectiveness of a multifaceted intervention including group norms and –behavior particularly relevant.

The second research question concerned the conditions under which a multifaceted intervention improves safety climate and –behavior. Our results indicated that two aspects of the implementation process play a role: the extent to which the intervention brought about positive changes to procedures and the extent to which supervisors showed positive attitudes and actions towards the intervention. Besides the main effect of the safety climate intervention itself, our study revealed that the variability in the implementation process was linked to variability in safety outcomes. More specifically, we found that the intervention was more effective for employees in the intervention group that scored higher on perceived changes to procedures and supervisor attitudes and actions. Although we have not fallen prey to a Type III error - concluding the intervention is ineffective when it is in fact the faulty implementation that leads to failure –we have shown that it is important for organizations to take the implementation process seriously. For an intervention to have its most optimal effect on safety climate, attention needs to be paid to the actions and attitudes of supervisors responsible for the implementation. This conclusion is in line with previous research on the importance of the supervisor in intervention implementation (Randall et al., 2009; Nielsen, 2013). For the most effective change in safety behavior, however, the safety climate intervention also needs to result in actual changes to daily practices and procedures that influence employee health and safety. In other words: espoused values must becoming enacted values (Zohar, 2010), or espoused theory becoming theory-in-use (Argyris, 1995; Nielsen & Randall, 2012) in order for a safety climate intervention to optimally improve the safety behavior of employees. We would therefore recommend that future studies take these aspects of the implementation process into account, both in the design and evaluation of safety climate interventions.

7.8.2 Strengths and limitations

A key methodological strength of this study is that it used a field experimental design – with pretest-posttest design and comparison groups– to study the effects of an intervention. Given the dominance of correlational studies in safety climate research and the paucity of field experimental studies (Zohar, 2014), this can be seen as a useful addition to the literature. However, this study also has a number of weaknesses. Four are in our opinion particularly important.

First, we were unable to make a distinction between the effects of different intervention activities. It would have been valuable to study which of the three types of activities had the largest effect. On the one hand, combining interventions can be useful for practitioners as multiple elements carry higher promise to influence safety climate and behavior. On the other hand, combined intervention strategies make it very difficult to disentangle individual effects (Wassell, 2009:1054). Future studies could try to develop intervention studies using various treatment arms to disentangle individual effects and fruitful combinations.

A second limitation deals with demand effects. Demand effects arise when respondents think they know what the study is looking for and are behaving differently as a result. However, it is unclear whether they would behave in line or against hypotheses (Zizzo, 2010). In the most harmful case, demand effects could result in higher safety climate and behavior scores in the treatment group which would have been absent if there were no demand effects. However, this is not to be expected, given that we did not find effects on every dimension of the safety climate construct. Moreover, we aimed to reduce demand effects by limiting information on the specific goal and hypotheses of the study and by not being present during the time that participants filled in the survey. However, future studies could try to further diminish such effects by for instance using multisource data (Zohar & Polachek, 2014; Von Thiele Schwarz et al., 2016), adding intervention arms with placebo treatments or using 'filler' activities (Mullen & Kelloway, 2009).

A third limitation considers a possible bias that may have played a role in the lower safety climate scores among employees in the control group. As safety climate is based on perceptions of employees (Zohar, 2010), it could be the case that the administration of surveys without the implementation of any other related activities or changes in the workplace in the control group, may have triggered the unintended perception that employee safety is only regarded as paperwork in the organization (a 'paper exercise', see Goh and Goh, 2016). This bias could possibly provide an explanation for the lower scores on safety climate at post-intervention among the control group employees.

A fourth limitation is that we did not collect qualitative data on the intervention process. In recent years, several researchers have argued that in order to truly understand how, why and under which conditions an intervention works, the study of organizational interventions should employ a mixed method design (Nielsen, 2013; Nielsen & Abildgaard, 2013; Pedersen et al., 2012; Abildgaard et al., 2016). The relevance of collecting qualitative process data lies in its ability to provide a rich, and detailed understanding of the context and mechanisms that influence intervention effective-

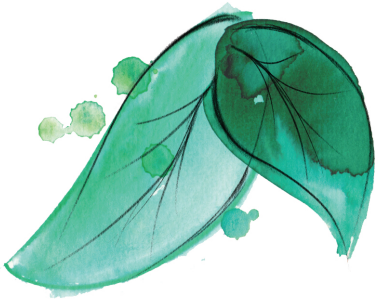
ness (Abildgaard et al., 2016). By only including aspects measured in the quantitative surveys, there is a risk we may have missed nuanced and complex factors in the organization that also affected the results of our safety climate intervention.

7.8.3 Conclusions

In conclusion, this study aimed to add to the safety climate literature by developing and testing the effects of a multifaceted safety climate intervention on the climate concerning employee safety and employee safety behavior. The intervention included 1) senior management safety rounds, 2) SSTL leadership training of supervisors, and 3) an online platform for team members to discuss safety issues followed by team-meetings. The results showed that our multifaceted strategy to safety climate improvement resulted in improved safety climate and safety behavior scores for the intervention group compared to the control group. Moreover, the study also revealed that the implementation process should not be overlooked. Activities undertaken to improve safety climate and –behavior are more successful when supervisors show positive actions and attitudes towards the intervention and changes are made to daily procedures relevant to employee health and safety. Based on these results, we can conclude that a multifaceted intervention including attention for its implementation is a useful strategy for safety climate and -behavior improvement.

Chapter 8

Conclusions and discussion



8.1 INTRODUCING THE CONCLUSIONS

This study aimed to gain a better understanding of the relationship between safety climate and health and safety outcomes of health care employees and organizations. This is an important goal as working in health care involves significant physical and psychological health risks. At the same time, the topic of employee health and safety in health care organizations has suffered as result of the global economic crisis leading to a focus on productivity and efficiency (International Labour Office, 2013). With this study, we examined what role employee perceptions of the importance of health and safety in the organization –i.e. safety climate- play in different health and safety outcomes. This concluding chapter starts in section 8.2 by answering the research questions posed in the introduction in Chapter 1. Next, in section 8.3 we present the main conclusions that can be drawn from this study and its contributions to the literature. An evaluation of the limitations is provided in section 8.4. Finally, recommendations for future research and practice are made in section 8.5, which draws this study to a close.

8.2 ANSWERING THE RESEARCH QUESTIONS

The main research question addressed in this study was formulated as:

What role does safety climate play in the health and safety of health care employees and organizations?

To answer the main research question, we broke it down to the following four research questions:

1. How does employee health and safety –as indicated by health care utilization– differ between health care organizations?
2. How do the differences in employee health and safety outcomes relate to the safety climate in health care organizations?
3. What are the effects of the safety climate on health and safety outcomes of health care employees and organizations?
4. What are the effects of a safety climate intervention on health and safety outcomes of health care employees?

The six empirical chapters of this study all contributed to answering one or more of these questions. Together, they will provide the answer to the main research question.

8.2.1 Large differences in employee health exist between similar health care organizations (RQ 1)

The first research question concerned the differences in employee health between health care organizations. In Chapter 2 we used the physical therapy and mental care utilization of employees as a proxy for employee physical and psychological health. A Dutch health care insurance company provided us with health care utilization records for a sample of 417 organizations employing 136,804 health care workers in the Netherlands. Based on the aggregated organizational level data, our findings showed that there are large differences in employee health both between and within health care industries. Physical therapy and mental care utilization rates are significantly higher among nursing homes, home health care organizations, and disability care homes compared to hospitals and mental care facilities. One possible explanation for this could be that the level of physical and mental workload is higher in these (often) long-term care settings. Perhaps more interesting is our second finding that the variation is even larger between organizations within the same health care industry. Moreover, a large part of this variation could not be explained by differences in age or gender distribution, organizational size or urbanization rate. Thus, there seem to be large differences in employee health across similar health care organizations. This finding answers the first research question and highlights the need for research into organizational factors that could help to explain these differences.

8.2.2 Safety climate can help explain differences in employee health and safety between health care organizations (RQ 2)

The second research question dives deeper into the differences in employee health and safety and relates it to the concept of safety climate. We explored the potential of the climate concept in explaining differences in employee health and safety outcomes in Chapters 3 and 4.

Chapter 3 first examined the academic literature on the relationship between climate and employee health outcomes. More specifically, we conducted a systematic literature review to examine how organizational climate relates to mental health outcomes among health care employees and which climate dimension is most strongly related to these outcomes. Our literature search and quality assessment resulted in 21 studies that were included in a findings database. Based on the analysis of the contents of these studies, the systematic review showed that organizational climate was negatively associated with mental health outcomes such as burnout, depression, and anxiety. Especially perceptions of group relations between coworkers and aspects of leadership and supervision appeared to be important in explaining mental health outcomes among health care workers.

After the systematic review we empirically explored how the differences in employee health and safety -as indicated by health care utilization- across health care organizations relate to differences in climate perceptions. Here, we transition from the molar organizational climate concept to the focused safety climate concept. The findings were described in Chapter 4. Through a set of interviews with Dutch health care employees in a comparative case study setting, we analyzed the safety climate perceptions from employees working in two Dutch hospitals with a low score on health care utilization ('unhealthy' hospitals) and compared these to the safety climate perceptions of employees working in two hospitals with a high score on health care utilization ('healthy' hospitals). The findings indicated that employees working in 'healthy' hospitals have more positive safety climate perceptions than employees working in 'unhealthy' hospitals. Overall, they were more positive about management's priority for health and safety, group norms and behavior regarding health and safety, and participation and communication about health and safety within the hospital.

Considering the findings from Chapters 3 and 4, we can conclude that the climate concept has potential to explain differences in employee health and safety outcomes. As described above, our systematic review and comparative case study suggest that the climate concept is positively related to employee health and safety, as both studies revealed that employees have less negative health and safety outcomes (for example less mental health problems, physical therapy and mental health care utilization) when they are more positive about the organization's safety climate.

8.2.3 Safety climate is positively associated with employee health, safety behavior, and organizational health and safety performance (RQ 3)

The third research question considers the effects of safety climate on health and safety outcomes. We looked at several important health and safety outcomes at the individual and organizational level: employee health, safety behavior, and organizational health and safety performance indicators such as absenteeism, presenteeism and health care utilization. The study described in Chapter 5 examined the relationship between safety climate and organizational health performance mediated by employee health. Chapter 6 reported on the results from a second study that focused on the relationship between safety climate, job demands, job resources, and safety behavior. To examine the relationships in both studies, we collected data through a large survey among Dutch employees working in health care organizations and quantitatively analyzed the results.

Based on the literature on physical and psychosocial safety climate, the first study described in Chapter 5 used three pathways to examine the relationship between safety climate and organizational health performance: a physical pathway, a psychosocial pathway, and a combined pathway. Three 2-1-2 mediational multilevel analyses were performed using a sample of 8,761 employees working in 177 health care organizations. The results showed that the physical pathway, starting with physical safety climate and mediated by employee musculoskeletal disorders, was not supported by the data. The data did support the psychosocial pathway for two of the three organizational health performance outcomes. This pathway starts with psychosocial safety climate and indirectly affects absenteeism and presenteeism through its effect on employee emotional exhaustion. The combined physical and psychosocial pathway explained differences in the third organizational health performance outcome: health care utilization. The psychosocial safety climate has an indirect effect on the health care utilization rate of an organization through its successive effect on the emotional exhaustion and musculoskeletal disorders of employees. These results underscore the importance of psychosocial safety climate for both the physical and psychological health of employees as well as for the health and safety performance of organizations.

In Chapter 6 we examined the effect of physical and psychosocial safety climate on two types of employee safety behavior: physical safety behavior and psychosocial safety behavior. In addition, we tested the moderating effect of safety climate on the relationship between job demands and job resources and the two types of employee safety behavior. Using a sample of 6,230 employees nested within 52 health care organizations, we conducted multilevel analyses to test our hypotheses based on the job demands and resources (JD-R) theory. The results from our analyses indicate that job resources (job autonomy, supervisor and co-worker support) and safety climate (both physical and psychosocial safety climate) are directly associated with higher physical and psychosocial safety behavior. Work pressure acted as a job demand and was negatively related to physical and psychosocial safety behavior. We also found some evidence that safety climate buffers the negative effect of job resources and boosts the positive effect of job resources. For physical safety behavior, the results showed that the negative impact of work-family conflict was reduced under conditions of high physical safety climate, and the positive impact of co-worker support was strengthened. For psychosocial safety behavior, we found that the presence of a high psychosocial safety climate reduced the adverse effect of job insecurity on employee safety behavior.

To summarize, we answered the third research question on the effects of safety climate on health and safety outcomes of health care employees and organizations by quanti-

tatively testing the effect of two types of safety climate (physical and psychosocial) on a variety of outcomes. As described above, we found evidence that psychosocial safety climate is associated with employee health (emotional exhaustion and musculoskeletal disorders) and through this effect also impacts absenteeism, presenteeism and health care utilization at the organizational level. Furthermore, both types of safety climate are positively associated with their employee safety behavior variant and moderate the relationship between job demands and resources and employee safety behavior.

8.2.4 A multifaceted safety climate intervention positively influences safety climate and -behavior (RQ 4)

The final research question considered the effects of a safety climate intervention on health and safety outcomes of health care employees. We answered this research question in Chapter 7, where we presented and tested a multifaceted safety climate intervention.

Considering the large amount of studies that has proved the positive effects of safety climate, the small number of safety climate intervention studies is surprising. Moreover, these few intervention studies lack diversity in contexts and settings, focus mainly on supervisors and do not take into account the implementation process of the intervention. Based on the results from the previous chapters and the overall safety climate literature, we developed a multifaceted safety climate intervention program to affect employees' safety climate perceptions. The intervention program consisted of (1) senior management safety rounds (aimed at increasing employees' perceptions of senior management priority for health and safety), (2) safety-specific transformational leadership training for supervisors (aimed at increasing employees' perceptions of supervisor commitment to health and safety, and (3) online and face-to-face team discussions (aimed at increasing employees' perceptions of group norms and behavior related to health and safety). The effects of the intervention program on perceptions of safety climate and employee safety behavior were tested across five health care organizations using a quasi experimental design with pre- and posttest measurements and comparison groups. We furthermore examined the relation between aspects of the intervention process and outcomes of the intervention program.

The results from the analyses of 520 employees who completed both measurements showed that safety climate and employee safety behavior scores were significantly higher at post-intervention among the intervention group of employees compared to the control group, while there were no differences pre-intervention. The findings also revealed that within the intervention group, employees who experienced (1) more positive changes to work procedures and (2) positive attitudes and actions of their

supervisor towards the safety climate intervention, scored higher on post-intervention safety climate and safety behavior. A multifaceted safety climate intervention thus positively influences employees' perceptions of safety climate and employee safety behavior, but the size of the impact is dependent upon aspects of the implementation process.

8.3 MAIN CONCLUSIONS

The overall research question of this study was: "What role does safety climate play in the health and safety of health care employees and organizations?". The answer is that safety climate explains differences in health outcomes and safety behavior among employees, and health and safety performance of health care organizations. A multifaceted safety climate intervention can help health care organizations to improve their safety climate. Based on the answer of the main research question and the results of the individual studies described in Chapters 2-7, we discern four main conclusions and relate them to the literature and to practice.

8.3.1 Conclusion 1 - Employee health care utilization can act as an additional outcome for employee health and safety research

This study started with an exploration of two types of employee health care utilization relevant to the physical and psychological health of health care employees: the use of physical therapy and mental health care utilization. Research in the field of safety science, organizational behavior and occupational health psychology uses many different outcomes to examine how organizational factors impact employee health and safety, but studies in these fields using employee health care utilization data are scarce (with the exception of Ganster et al. (2001) and Manning et al. (1996a) who focus on employee health care costs, and Butler et al. (2009) and Azagba & Sharaf (2011) who focus on health care utilization). However, our study shows that employee health care utilization could be an interesting addition to the array of employee health and safety outcomes. The results from our study provide several reasons why employee health care utilization could act as an additional measure worth examining.

First of all, employee health care utilization can be measured either using 'subjective' or 'objective' indicators (Kompier, 2005). In Chapters 2 and 4 of this study we used aggregated claims data from a national health care insurer to examine health care utilization (an 'objective' indicator), and in Chapter 5 we used a self-report measure (a 'subjective' indicator). Obviously, both types of measurements have their advantages

and flaws. However, by far the most widely used method for assessing health and safety in the workplace is the self-administered survey, which is susceptible to self-report biases (Spector, 1994). It is therefore often suggested that health and safety research should make more use of 'objective' indicators using archival data (Fisher & Barnes-Farrell, 2013) and combine these with self-reports to further advance our understanding of employee health and safety issues (Eatough et al., 2016). This makes employee health care utilization measured using insurance claim data an especially valuable source of information.

Second, employee health care utilization can be used as an indicator of employee health and safety that captures the health and safety consequences of long-term processes in the workplace that take time to develop. The results presented in Chapter 5 show that when examining the impact of organizational factors such as safety climate on health and safety outcomes, it matters what type of outcome is measured. The majority of safety climate research focuses on employee health and safety outcomes through examining its relationship with severe, physical safety outcomes such as workplace accidents and heavy injuries (Zohar, 2010). However, especially in the health care sector, musculoskeletal disorders and psychological stress are currently considered among the biggest threats to employee health and safety (European Commission, 2011). The use of severe, physical safety accidents and injuries data falls short when it comes to the measurement of psychological or physical long-term health and safety outcomes. The inclusion of employee health care utilization to the array of health and safety outcomes could therefore be useful to learn more about the impact of safety climate on employee health and safety beyond the traditional physical safety outcomes.

Third, the use of employee health care utilization in health and safety studies can provide information on the (medical) cost savings of improving health and safety in the workplace. This means that employee health care utilization may not only act as an indicator of health and safety among employees working within an organization, but also as an organizational performance indicator in itself. As shown in Chapter 2, the variations in employee health care utilization rates are large and this translates to large variations in costs. For physical therapy utilization, costs range from €1,648 to €36,435 a year per 100 employees. The differences in costs are even larger for mental health care utilization, where costs for organizations with the highest rate in employee health care utilization can be as high as €138,924 a year per 100 employees. Moreover, when employee health care utilization is examined in combination with indirect productivity-related costs such as absenteeism and presenteeism, the total economic impact of employee health and safety can be quantified (Loeppke et

al., 2007). This is important from a practitioner's point of view as well, as dialogues with senior management in organizations are more successful when the impact of an increase in awareness, support and commitment to employee health and safety is tied to the organization's bottom line (Sinelnikov et al., 2015; Ganster, 2008). Including employee health care utilization as an outcome in health and safety research provides the opportunity to do this.

8.3.2 Conclusion 2 - Safety climate is related to physical and psychological health and safety outcomes at the individual and organizational level

This conclusion reflects on the association between safety climate and a variety of outcomes that were tested in this study. As depicted in the graphical outline of the study in Chapter 1, we examined the relationship between several climate concepts and three different types of outcomes: (1) employee health outcomes, (2) employee safety behavior outcomes, and (3) organizational health and safety performance outcomes. The findings from the systematic review in Chapter 3 show that perceptions of organizational climate are related to employee mental health outcomes. Although the use of the molar 'organizational' climate concept in this chapter is different from the use of the focused safety climate concepts in the following chapters, it did provide a first indication that perceptions of climate are related to employee health outcomes. Our own empirical research in chapters 5-7 confirmed this finding by clearly showing that the focused safety climate concept is related to individual employee health outcomes and to employee safety behavior at the individual level. Chapter 6 furthermore showed that safety climate is related to health and safety performance at the organizational level through the effects on employee health at the individual level. When relating these findings to the safety climate literature, it becomes clear that three things stand out.

First, safety climate is not only associated with safety-related outcomes, but impacts health-related outcomes as well. Although there are several studies examining safety climate's relationship with employee health-related outcomes such as physical and sleeping complaints (Hayes et al., 1998), psychological distress (Law et al., 2011), and depression (Idris et al., 2014), the bulk of the safety climate research is still focused on its effect on safety-related concepts such as safety behavior or safety accidents (Beus et al., 2016; Wallace et al., 2012). In Chapters 6 and 7 we examined the relationship between safety climate and safety behavior as well, and our results confirm the findings from previous research that safety climate impacts safety behavior (Neal & Griffin, 2006; Clarke, 2010). In addition, in Chapter 5 we examined whether safety climate impacts employee health and found that this is the case for musculoskeletal

problems and emotional exhaustion. Our study thus contributes by showing that safety climate not only matters for the (low) likelihood of harm to individual employees during work (i.e. employee safety, Beus et al., 2016), but also for the actual physical and psychological harm individual employees experience (i.e. employee health).

Second, safety climate is related to individual employee safety behavior in the physical domain as well as in the psychological domain. In Chapter 6 we examined if the psychosocial variant of safety climate is related to its own specific type of safety behavior: psychosocial safety behavior. In line with physical safety behavior, psychosocial safety behavior refers to activities carried out by employees to maintain their own workplace psychological safety or help to develop an environment that supports psychosocial safety. Extensive research on the relationship between safety climate and safety behavior in the physical domain has shown support for the underlying theory that connects both concepts (Christian et al., 2009; Nahrgang et al., 2011). This theory states that safety climate informs employees about the real priority of safety relative to other organizational goals such as service or productivity. Based on this information, employees will adjust their behaving accordingly (Zohar, 2010). The results from Chapter 6 support the idea that psychosocial safety climate informs employees on the priority of psychological safety in the workplace in a similar way as physical safety climate, which in turn provides them with the motivation to behave (un)safely with regard to psychological risks in the workplace. Our study thus contributes to the knowledge on the use of the JD-R model in the safety domain, as the relationship between job demands and –resources and psychosocial safety behavior has not previously been examined. However, more research into this new concept of psychosocial safety behavior is needed in order to truly confirm that the theoretical framework for physical safety climate applies to the psychosocial safety domain in the same way.

Third, safety climate is related to outcomes at the individual level and at the organizational level. This study did not only examine employee health and safety behavior outcomes at the individual level, but also looked at three health and safety performance outcomes at the organizational level: absenteeism, presenteeism and health care utilization. The findings from Chapter 4 gave the first indication that organizations with low health care utilization rates have a more positive safety climate, and the quantitative results from Chapter 5 showed that this is indeed the case in a large sample of health care organizations (albeit this only applies to psychosocial safety climate). We also found that psychosocial safety climate indirectly affects organization's absenteeism and presenteeism rates. This is an addition to the knowledge on organizational performance outcomes related to safety climate, as it provides evidence that psychosocial safety climate has an effect beyond individual employee outcomes.

In sum, our study contributes to the safety climate literature by showing that the concept is related to various health and safety outcomes with different foci, in different domains, and at different levels within the organization. Table 8.1 gives an overview of the health and safety outcomes that are related to the safety climate concept according to the results in our study. Figure 8.1 shows a graphical representation of the specific relationships that were revealed in this study.

Table 8.1 Overview of employee health and safety outcomes related to safety climate according to the results of this study

Focus (level)	**Domain**		
	Physical	*Psychological*	*Physical and psychological*
Safety-related outcomes (individual level)	Physical safety behavior (Chapter 6)	Psychosocial safety behavior (Chapter 6)	Safety behavior (Chapter 7)
Health-related outcomes (individual level)	Musculoskeletal problems (Chapter 5)	Emotional exhaustion (Chapter 5)	
Health and safety-related outcomes (organizational level)			Health care utilization (Chapters 4, 5) Absenteeism (Chapter 5) Presenteeism (Chapter 5)

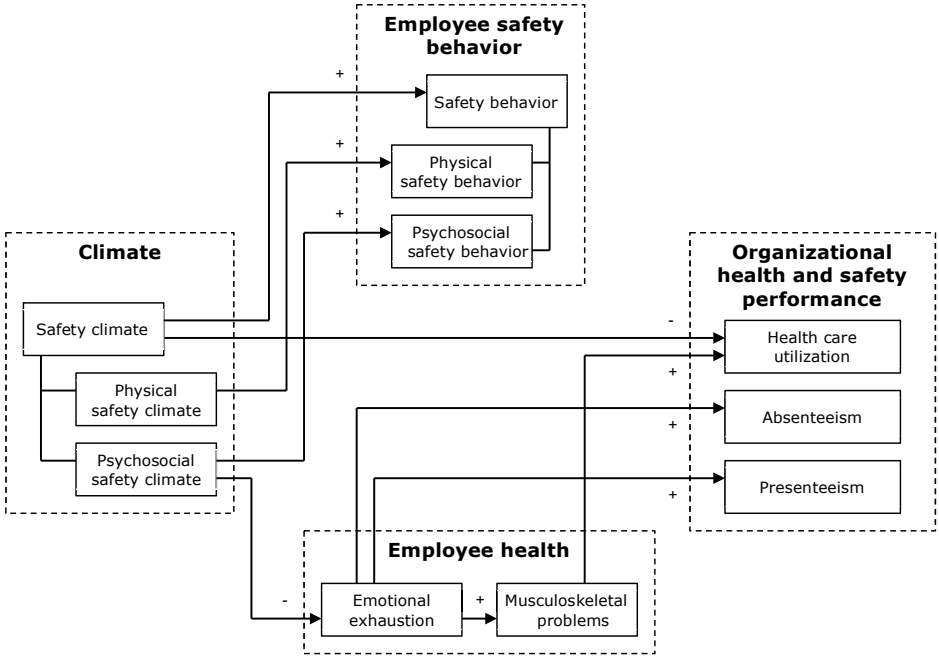


Figure 8.1 Graphical overview of the relationships revealed in this study

Of course, the relationship with outcomes depends on the conceptualization and measurement of the safety climate concept, as the idea behind focused climate concepts is that they have predictive validity if they are matched to their specific outcomes (Schneider et al., 2013). Therefore, we chose to conceptualize safety climate in various ways throughout this study, according to the research goals and outcomes of interest in the separate chapters. As a result, in Chapters 4 and 7 we decided to use a single concept that reflects the perceptions of the priority of employee *physical* and *psychological health* and *safety* within the organization. In Chapters 5 and 6, we focused on both health and safety as well, but we used two specific concepts to measure each domain (physical and psychological).

This is considerably broader than the conceptualization in most studies where the focus is either primarily on employee physical safety (in the field of safety science, e.g. Zohar, 2008; Neal & Griffin, 2006) or on employee psychological health (in the field of occupational health psychology, e.g. Dollard & Bakker, 2010; Idris et al., 2014). By using these broad conceptualizations that include both health and safety in the physical and psychosocial domain, our study has shown that the safety climate concept has explanatory power beyond the traditional safety outcomes such as accidents and injuries (Zohar, 2014; Huang et al., 2016).

8.3.3 Conclusion 3 - The health care context matters for the measurement of safety climate

The third conclusion considers the importance of the research context. With respect to the measurement of the safety climate concept, there has been some discussion on the inclusion of context in safety climate scales (Zohar, 2014; Keiser & Payne, 2017). On the one hand, there is a call for more consistent use of universal safety climate scales that do not include any industry-specific information making them relevant to employees working in any industry. Scholars in favor of using a universal safety climate measure generally point to the possibility to make comparisons across industries or cultures (for instance Barbaranelli et al., 2015) or to the need for universal measures in order to develop theory (for instance Christian et al., 2009). On the other hand, there are scholars that encourage the development of industry-specific climate scales as they argue this is likely to result in new, context-dependent insights and rich diagnostic information (Zohar, 2010; Keiser & Payne, 2017). Zohar (2014) states that the choice for either one of these approaches should be dependent on the objective of climate measurement.

As our study is set in the health care sector and its objective was to examine the role of the safety climate concept for *health care* employees and organizations, we have

paid special attention to the applicability of existing climate measurements for the health care sector. In Chapters 3 and 4 of this study we started our research on the climate concept by distinguishing between three dimensions of climate relevant to the health care sector: leadership and management, group norms and behaviors, and communication and participation (Gershon et al., 2004). The findings from Chapter 4 revealed that within the leadership and management dimension, the perceptions of health care employees about management commitment to health and safety differed substantially between senior management and direct supervisors. Overall, employees' perceptions regarding the priority for health and safety by senior management were more negative and skeptical in nature than their perceptions regarding commitment to health and safety by their direct supervisors. In the following chapters, we therefore decided to explicitly mention the specific management layer in our measurement scales. The results from Chapter 7 show that the safety climate dimension concerning the direct supervisor scored higher than the dimension concerning senior management, indicating that health care employees clearly differentiate between different management layers. These findings confirm the idea presented by Zohar and colleagues (Zohar, 2000; Zohar & Luria, 2005) that employees perceive the attention given to employee health and safety from a dual perspective of being members both of an organization (managed by senior management) and of a particular subunit in that organization (managed by direct supervisors). However, many frequently used safety climate scales do not explicitly and consistently distinguish between management layers, but simply refer to 'management' in general (for instance the scale developed by Neal et al., 2000) or only include the role of either one of these two management layers (for instance the PSC-12 by Hall et al. (2010) which almost exclusively focuses on senior management). The results from our study show that for health care organizations, especially organizations with multiple management layers, the measurement of safety climate (both physical and psychosocial) should include a differentiation between senior management and direct supervisors. This is in line with research in the field of HRM, which shows that activities associated with the management of work and people within organizations are performed by different actors at different levels (Nishii & Wright, 2007), and as a consequence, may differ across levels and actors (Khilji & Wang, 2006).

Another important finding from our study is that the group of people one works with plays an indispensable role in perceptions about employee health and safety in health care settings. This is in line with the emerging safety literature that stresses the importance of co-workers' norms and -behavior for employee health and safety in the workplace (Brondino et al., 2012; Fugas et al., 2011). For example, all hospital workers that we interviewed for our case study in Chapter 4 emphasized that co-workers play

a major role in day-to-day health and safety in the workplace. Our systematic review furthermore revealed that the group norms and -behavior dimension of the climate concept was most strongly related to mental health outcomes among employees working in health care organizations. Moreover, our safety climate intervention described in Chapter 7 significantly increased safety behavior among health care employees and this intervention included activities aimed at improving group norms and –behavior. As demonstrated by the examples from our study, employees' perceptions about the norms and behavior of co-workers are an essential part of safety climate in a health care context. However, physical and psychosocial safety climate measurement scales generally do not include items on norms and behaviors of co-workers, but exclusively focus on the role of management (for instance Zohar & Luria, 2005; Neal et al., 2000, Hall et al., 2010). This is not surprising, as many of these measurement scales were developed based on empirical research in industrial organizations with traditional work environments in which the primary form of interaction is between direct supervisors and employees who work under the same roof throughout the day (Huang et al., 2013). Many health care work environments today do not resemble this image, as with the growing emphasis on teamwork, self-managing teams, and nurse professionalism, the authority and responsibilities of the direct supervisor have reduced (Wynd, 2003; Gray et al., 2015; Maurits et al., 2017). In addition, the health and safety risks workers in traditional industrial organizations are exposed to mainly consist of physical hazards that can lead to acute and extremely severe physical injuries. In the health care sector, two of the most significant risks to employee health and safety are ergonomic and psychosocial risks resulting in musculoskeletal disorders and stress (EU-OSHA, 2014). These types of injuries are often a consequence of long-term processes that take time to develop (i.e. the accumulation of physical or emotional strain) and could therefore be equally dependent on day-to-day interactions with co-workers who they see more frequently than their direct supervisor. As such, our study provides support for the notion that group norms and –behavior regarding health and safety should be part of a safety climate in health care measure (Brondino et al., 2012; Fugas et al., 2011).

In conclusion, the results from our study suggest that the research context requires special attention when examining safety climate in health care organizations. More specifically, the measurement of the safety climate concept should include a differentiation between senior management and direct supervisors, and considers the influence of group norms and –behaviors on the perceived priority of employee health and safety.

8.3.4 Conclusion 4 – When testing the effectiveness of a safety climate intervention, both the multifaceted design and the implementation process are important

To date, only a handful of studies have tested the effects of a safety climate intervention on perceptions of safety climate and health and safety outcomes such as safety behavior and leadership (Zohar, 2002; Zohar & Luria, 2003; Zohar & Polachek, 2014; Nielsen, 2014; Mullen & Kelloway, 2009; Von Thiele Schwartz et al., 2016; Kines et al., 2010; Naveh & Katz-Navon, 2015). Based on the findings from Chapters 4-6, we expanded this small group of studies in Chapter 7 with our own field experimental study that tested the effects of a safety climate intervention on perceptions of safety climate and safety behavior. The results from our study indicate that both the design and process of a safety climate intervention matter for its effectiveness.

First, we purposefully designed our safety climate intervention to affect multiple stakeholders and different hierarchical levels within the organization. The multifaceted intervention program consisted of several activities aimed at modifying perceptions of senior management priority, supervisor commitment, and group norms and –behavior in relation to health and safety. This approach to safety climate improvement is consistent with the multilevel model of safety climate that is adopted in both the physical domain (Zohar, 2003; Zohar & Luria, 2005) and in the psychosocial domain (Dollard et al., 2012; Dollard & Idris, 2017). These multilevel models are based on the proposition that organizational processes take place simultaneously across different levels of the organizational hierarchy (Zohar, 2010). As a result, many conceptualizations of safety climate include multiple dimensions that match different health and safety stakeholders at different places in the organization, such as senior management, direct supervisors and co-workers. Interestingly, most of the previous safety climate interventions do not adopt a multifaceted approach, but instead focus on modifying one dimension (for example supervisor commitment to health and safety, see Zohar, 2002; Zohar & Luria, 2003; Zohar & Polachek, 2014; Kines et al., 2010). Although we were not able to disentangle the effects of individual intervention activities, the results from Chapter 7 show that our multifaceted safety climate intervention was able to increase overall safety climate perceptions, and multiple dimensions of the concept, including senior management priority, group norms and –behavior, and communication. Based on the findings of our study combined with the consensus in the literature that safety climate is a multilevel concept that includes multiple stakeholders on multiple organizational levels, we conclude that the design of an effective safety climate intervention should be multifaceted in nature.

Second, we considered the implementation process of our safety climate intervention by testing the effect of the extent to which (1) positive changes where made to existing health and safety practices and procedures, and (2) direct supervisors showed positive attitudes and actions towards our safety climate intervention program. The results revealed that the variability in intervention outcomes across employees is related to the variability in the implementation process. This is an important finding, as the recent literature on organizational interventions argues that it is time to move beyond the 'what works?' question, and move towards answering 'what works for whom in which circumstances?' (Nielsen & Randall, 2013; Pedersen et al., 2012; Nielsen & Miraglia, 2017). The results from Chapter 7 provide evidence that for a safety climate intervention to have its most optimal effect, attention needs to be paid to the implementation process, especially to the practical implications of the intervention in terms of actual changes to health and safety practices and procedures (i.e. it needs to actually bring about changes in their work environment and procedures), and to the role of the direct supervisor in the intervention implementation (i.e. the direct supervisors who are involved in the intervention need to actively promote it and positively communicate about the activities to their employees). Our study thus contributes to the safety climate literature by showing that the effectiveness of a safety climate intervention does not only depend on the content of the intervention, but also on the process by which it is implemented. Safety climate interventions, like other organizational interventions, do not occur in a vacuum (Nielsen et al., 2010; Greasley & Edwards, 2015). Indeed, they are often needed most in organizations where smooth implementation processes are not self-evident (Nielsen et al., 2010). Including information on the implementation process is thus needed in order to truly evaluate the effectiveness of a safety climate intervention. Such information is paramount to assess whether the intervention as such has failed (theory failure), or that is has not been implemented adequately (program failure, also known as Type III error; Kristensen, 2005). This question still remains unanswered in previous safety climate intervention studies. For example, the study by Kines et al. (2010) found significant increases in safety climate only in one of the three intervention groups. Information on the implementation process might have shed more light on why this occurred.

8.4 LIMITATIONS OF THE STUDY

Despite its theoretical, methodological and practical value, this study is also subjected to shortcomings. In our opinion, the following limitations are particularly important and should be taken into account.

First, the use of archival health care utilization data for research purposes has its limitations. In our study, the IZZ health care utilization data used in Chapters 2 and 4 were originally generated primarily for administrative purposes. These data are collected when an IZZ insured health care employee has an encounter with a health care provider (in our case a physical therapist or a mental health care provider), which is often, -but not always- accompanied by a diagnosis. This encounter must then be filed and coded accurately in a computer system, both by the health care provider and by the IZZ health care insurer. Each of these steps can potentially lead to bias. For example, employees with insufficient coverage in their IZZ health care insurance are less likely to seek professional care and could therefore be underrepresented. Other potential sources of bias in this process include incomplete documentation or record keeping. This may lead to limited generalizability of the study (Schneeweiss & Avorn, 2005). Another limitation of this study regarding the use of health care utilization data is that it was not possible to link the archival data to the safety climate survey scores. Unfortunately, the sample of organizations with an adequate IZZ participation rate of 10 percent (see Chapter 2) did not match the sample of organizations with an adequate number of employees to calculate safety climate scores included in our survey database. For this reason we collected the self-reported health care utilization data as well. However, neither self-reports nor archival data serve as a perfect gold standard for the measurement of health care utilization (Bhandari & Wagner, 2006).

Second, our study does not include the strength of the climate, but focuses exclusively on the level of the climate concept. The level of climate refers to the quality of the climate as positive or negative and corresponds to the mean of the individual employee's perception, or, at the organizational level, describes the average climate perception among its members as good or bad. The strength of the climate considers the variability of individual employee climate perceptions within the group (Beus et al., 2010b). The usual research model including climate strength hypothesizes that strength will moderate the relationship between climate level and outcomes such that the relationship will be stronger when climate strength is high (Schneider et al., 2013). The empirical evidence on the role of safety climate strength is scarce in comparison to research focusing on safety climate level. The few studies including safety climate strength have, among else, shown that climate strength at the organizational level reduces variability at the team level (Zohar & Luria, 2004), strengthens the relationship between personality and safety behavior (Lee & Dalal, 2016), and at the team level strengthens the relationship between climate level and task performance (Koopmann et al., 2016). Zohar and Luria (2004) also found that in their study safety climate strength did not strengthen the relationship between safety climate level and behavior-related injuries. With respect to our own study, these results indicate that

climate strength could have played a role in the relationship between safety climate and the health and safety outcomes we studied (employee safety behavior, employee health and health and safety performance). For instance, it could be that the relationships we found between safety climate and employee behavior or employee health are stronger when climate strength is high. However, a recent study by Afsharian et al. (2017) found that for psychosocial safety climate, safety climate level was a better predictor than safety climate strength or their interactions for employee health. More research on safety climate strength is needed to truly understand the relevance of this concept for employee health and safety outcomes.

Third, we did not analyze our data at the team or unit level. Although our research questions are targeted at the individual and organizational level, we acknowledge that safety climates can also vary between teams or units within the same organization (i.e., group-level climate, Zohar and Luria (2005)). The conceptualization and measurement scales we used to measure the safety climate concept in Chapters 3-7 include aspects of the team or unit. Employee perceptions of direct supervisor commitment to health and safety and group norms and –behavior regarding health and safety are located at the team or unit level, but we did not analyze the variations in perceptions at this level. With regard to the survey data in Chapters 5 and 6, we were not able to assign all individual respondents to their own team or unit. Moreover, the majority of the teams we were able to distinguish did not comprise multiple respondents (and thus do not constitute a team). In Chapter 7, the survey data collected in the field experiment did not show enough inter-rater agreement and –reliability for meaningful aggregation to the team level. We therefore chose to analyze our data at the individual and organizational level. Nonetheless, we must note that our study is limited by the fact that, to some extent, our conceptual and measurement models do not coincide with our analytical models (Kozlowski & Klein, 2000).

Fourth, the results in Chapters 5 and 6 are based on a cross-sectional survey with employees rating all variables. One consequence of this is that it is not possible to draw conclusions about causality or rule out reverse causality. With other words, we cannot rule out that the scores on outcomes such as employee safety behavior, employee health or organizational health and safety performance are actually influenced by the perception of safety climate. Employees' experience of health problems or performance outcomes in their organization might influence their perception of the priority of health and safety in the organization (i.e. the safety climate). In the field of safety climate this reverse causation hypothesis is said to be equally plausible as the hypothesized model (Clarke, 2006), but the empirical evidence on the direction of the relationship is still unclear (Tholén,et al., 2013). As the relationships tested

in Chapters 5 and 6 were all based on survey data collected at one point in time, longitudinal relationships could not be observed. This means we should be cautious with the interpretation of the results in terms of causality and mediation. In Chapter 7 we analyzed data on safety climate and -behavior at two points in time (pre- and post-intervention), which provides more evidence for a causal relationship between the two concepts[4].

Finally, the field experimental design employed in Chapter 7 also has its limitations. By examining the effects of a safety climate intervention in actual health care work settings this study sought to maximize generalizability of the findings to real health care employees and organizations. However, the process of maximizing external generalizability can be at the expense of internal validity (Campbell & Stanley, 1963). An example of this in our study could be that we were not able ensure all employees in the intervention group actually participated in all intervention activities and that they participated during all three rounds (some employees might have been sick or not able to attend activities as a result of work scheduling problems). Nevertheless, the overall results showed that our multifaceted intervention positively influenced safety climate perceptions and employee safety behavior. One explanation may be that even though some employees might not have participated in all activities every round, they were informed about the fact that these activities were taking place. It could be that this alone increased their perceptions of safety climate and their behavior. This implies that the exact content of the activities may not matter, as long as they involve various safety agents across the organization paying attention to employee health and safety. To rule this out, the effects of different activities should be tested separately by adding extra (placebo) activities. This involves a far greater number of teams and employees than we were able to include in our sample. Another shortcoming in our field experiment concerns the loss of respondents during the intervention period. Due to organizational reforms and turnover, our sample was slightly reduced during the intervention period. Combined with the lower response rate at post-test measurement, the final response rate of the sample analyzed was 39.3 percent. Given that the perceptions of health and safety among the employees who responded may not be representative of the perceptions hold by non-respondents, non-response bias

4 In addition to the results presented in Chapter 7 we used the data from our field experiment to test whether the positive effect of our multifaceted safety climate intervention on safety behavior was mediated by changes in safety climate. The results from a mediation analysis using a PROCESS macro (Hayes, 2013) revealed a significant indirect effect from the intervention condition to safety behavior through its effect on safety climate (b= .12, 95% CI [0.06, .21]). In the analyses, we controlled for the stability of safety behavior by including pre-test safety behavior as a predictor. Other control variables included were age, gender, organizational tenure, contract type, and educational level. The results provide support for the relationship between safety climate and safety behavior in such a way that safety climate precedes safety behavior.

could potentially pose a threat the validity of the results (Taris & Schreurs, 2007). Unfortunately, we do not have information from employees who did not respond to the surveys explaining why they non-responded. However, the direct supervisors involved in the study stated that the low response from their employees was the result of a lack of time for filling in the survey due to patient care obligations, which is a common problem in research among health care employees (Cho et al., 2013).

8.5 RECOMMENDATIONS FOR FUTURE RESEARCH AND PRACTICE

8.5.1 Theoretical and methodological recommendations

The conclusions and limitations outlined above also imply that there is a need for further research on the role of safety climate in employee health and safety outcomes in a health care context.

First of all, future research should use health care utilization data as an addition to the array of health and safety outcomes. Despite issues concerning privacy, time and financial resources that might be associated with using health care utilization data for scientific purposes, we believe it could provide useful insights. We especially encourage researchers to link archival health care utilization data to organizational safety climate survey scores to gain a better understanding of the relationship between safety climate and psychological, long-term or chronic health and safety outcomes. This also provides benefits from a methodological perspective, as the use of archival and self-report data in the same study could help prevent common source bias (Podsakoff et al., 2003).

Based on our research, we further urge researchers to combine the two separated streams of research focusing on physical and psychosocial safety climate. There is a scarcity of research combining the physical health and safety perspective with the psychological perspective as most research is focused either on one or the other approach (Leitão, 2015). In order to move forward when it comes to the effects of safety climate on health and safety outcomes, we would encourage scholars to take a comprehensive view of health and safety in the workplace and extend their conceptualization and measurement of (the) safety climate concept(s) they use in their research. Dependent upon the research question and outcomes under study, this can either be done by broadening the conceptualization of the safety climate concept or by simultaneously examining multiple specific safety climate concepts in the same study. This latter approach may be especially interesting, because it provides the possibility

to compare the effects of physical and psychosocial safety climate concepts. As our research has shown, these specific safety climate concepts have their own unique consequences (for instance, psychosocial safety climate is related to employee health outcomes, whereas physical safety climate is not), but they also show some overlap (for instance, they are both related to a safety behavior outcome). Future climate research could further examine these differences and similarities in outcomes between various focused climates. A good example of this is the recent study by Lee and Idris (2017) who compared the effects of psychosocial safety climate and team climate on job resources and job performance. Similar studies could be done for physical and psychosocial safety climate.

In line with this recommendation, we suggest that safety climate researchers regularly cross the borders of their field to further examine how safety climate relates to employee health and safety outcomes. There are various theories linking safety climate and outcomes, with the research on physical health and safety mostly basing its empirical work on models from the safety science field (for instance the model of safety climate and performance by Griffin and Neal, 2000), and the research on psychological health and safety relying on models that have their origin in the occupational health psychology field (for instance the JD-R model by Bakker and Demerouti, 2007; 2017). However, as we saw in Chapters 5 and 6, there may be more to learn from integrating both fields when performing research on the subject of employee health and safety. For example, the results from Chapter 5 suggested that employees might not start to use health care services until their psychological complaints have physical consequences. Perhaps this could be explained using frameworks or theories from the occupational health psychology field (for instance, civility norms theory (Andersson & Pearson, 1999)). On the other hand, the relationship between psychosocial safety climate and psychosocial safety behavior found in Chapter 6 could be further examined by testing the mediating effects of concepts frequently used in safety science (for instance the psychosocial variants of safety knowledge and safety motivation introduced by Neal et al., 2000). We believe that safety climate scholars should be encouraged to integrate theoretical frameworks from different domains.

Our study has shown that the health care context matters for the measurement of the safety climate concept. We would recommend that future research further examines the impact of the health care context on research outcomes by examining the influence of this specific context on the relationship between safety climate and health and safety outcomes. One distinctive characteristic of the health care work environment is that health care employees have a very strong perception about their role of caring for the patient or client and the responsibilities this involves, in some cases this

could even be characterized as 'overcommitment' (Van der Heijden et al., 2017). As a result, they often put patients' needs above their own ('patient first' approach to care-giving, Myers et al., 2012), which can come at the expense of their own health and safety when they sacrifice themselves too much for their patients (Schoenfisch et al., 2011; Van der Heijden et al., 2017; Van Loon et al., 2015). This implies that in a health care context, in terms of priorities, employee health and safety often competes with patient health and safety. However, there are studies that provide evidence showing that health care organizations with a high level of employee safety climate also have high levels of patient safety climate, indicating that the two are mutually reinforcing (Mohr et al., 2015; Pickering et al., 2017). Others argue there might be an overarching safety climate that influences both employees and patients (Flin, 2007). Future research should shed more light on the relationship between patient safety climate and employee safety climate, and how this influences employee health and safety outcomes. This subject could be examined using both qualitative methods (how do employees' perceptions of patient safety influence their perceptions of employee health and safety?) and quantitative methods (does patient safety climate moderate the relationship between employee safety climate and employee health and safety behavior?).

Our study has shown that the effectiveness of a safety climate intervention on climate and behavior depends on two aspects of the implementation process. This finding resulted from a quantitative process evaluation whereby employees' perceptions of the intervention process were measured post-intervention using process evaluation scales. However, there might be other aspects of the implementation process that we did not measure, but nevertheless influenced the effectiveness of our safety climate intervention. Examples could be the characteristics of the context such as the general organizational climate and conditions of the intervention group (omnibus context), or specific events that occurred during the intervention period such as other conflicting change programs or change in management (discrete context) (Augustsson et al., 2015; Nielsen & Randall, 2013). In order to gain a more complete understanding of the context, meaning and narratives of the intervention we would therefore encourage future safety climate intervention studies to collect qualitative process data as well and integrate data collection methods. By applying a mixed methods design, the safety climate intervention implementation can be accurately rated and compared between individuals or groups through quantitative surveys, and at the same time the qualitative data will provide a richer understanding of the intervention and its context (Abildgaard et al., 2016).

8.5.2 Practical recommendations

This study also provides useful insights for practice. As explained in the introduction and Appendix I, the study took the form of a collaborative research project with the twofold goal of collecting information to advance scientific knowledge, and offer actionable insights back to the organizations under study and the Dutch health care sector in general. Below we describe the practical implications and suggestions that resulted from this study.

The present study revealed that there are large differences between similar health care organizations in their employees' use of physical therapy and mental health care services, even after controlling for employee- or organizations characteristics such as age, gender, organizational size and urbanization rate. Besides the direct and indirect financial cost savings associated with a healthy employee workforce with low subsequent health care utilization, health care organizations should also undertake actions to improve employee health and safety (and minimize health care utilization in the long run) for the benefits in terms of productivity and quality of care provided by healthy and safe employees. In order to improve the health and safety of employees, we would recommend practitioners to gain more insight into the health of their employees by gathering and monitoring aggregated information on employee health care utilization. Health care utilization data could, in combination with other archival data such as absenteeism and injury rates, inform policy decisions by providing information on the extent to which employee health and safety issues are apparent within the organization and what type of health problems need to be addressed (physical, psychological or both).

From a public policy perspective, monitoring and analyzing employee health care utilization has its advantages too. The insights gained from comparing health care utilization rates between health care organizations and industries can also serve as input for sector or industry specific policies aimed at increasing employee health and safety in health care. Our analyses presented in Chapter 2 for instance show that health care industries significantly vary in employee health care utilization rates and costs, especially when it comes to physical therapy utilization. Given the expected labor shortages, ageing workforce and increasing demand for care in industries that are largely characterized by long-term care settings such as nursing homes and home care (AZW, 2015), they may be more at risk and extra attention should be paid to employee health and safety in these industries. In addition, the analysis of health care utilization data can provide policymakers with leverage points that can be used to improve employee health and safety, especially when these data are linked to factors

that are susceptible to change. From this point of view, our results regarding the relationship between health care utilization and safety climate are particularly interesting.

Turning to safety climate, our study showed that the organizational differences in health care utilization are related to differences in safety climate. As safety climate refers to the perceived priority for employee health and safety within the organization, this implies that health care organizations could benefit from moving the subject of employee health and safety higher on the agenda. The results furthermore indicated that health care organizations will not only benefit in terms of better employee health and lower health care utilizations rates, but also in terms of lower absenteeism and presenteeism rates, and safer and healthier behavior in the workplace. Improving the safety climate thus appears to be a fruitful avenue for health care organizations. Based on our findings, we have several recommendations on how health care organizations can achieve this and what they should keep in mind when they wish to improve health and safety outcomes within their organization.

First of all, health care organizations should apply a multifaceted strategy when they wish to improve employees' perceptions of the importance of health and safety within the organization. This means that they should put effort into modifying leverage points located at different hierarchical levels within the organization, and not focus on changing just one aspect that influences health and safety in the workplace. Our study showed that aspects regarding senior management, direct supervision and group norms and –behavior are particularly important. Health care organizations should therefore focus on improving employees' perceptions regarding these aspects. We provide some examples of how this could be done based on the multifaceted safety climate intervention program described in Appendix III and summarized in Table 8.2.

In relation to the first two management aspects, it is important to note that health care organizations have been transitioning towards self-managing teams in which employees are responsible for managing themselves (Gray et al., 2015; Maurits et al., 2017). However, our results indicated that organizations should not underestimate the importance of the management role in improving the organization's safety climate. In line with much of the safety climate literature, our study underscores the crucial role of management commitment to employee health and safety, both at the level of senior management and direct supervisors. For senior management, this means that they should clearly demonstrate employee health and safety is of great concern to them. One way they could do this is by introducing senior management safety rounds that take the form of informal conversations between senior managers and employees about health and safety issues. If senior managers engage in such safety rounds, they

Table 8.2 Overview of activities that comprise a multifaceted safety climate intervention (see also Appendix III)

	Safety climate dimension	Activity	Health and safety stakeholders involved
Multifaceted safety climate intervention	Senior management priority for health and safety	1. Senior management health and safety rounds: informal meetings between senior managers and employees to discuss health and safety issues	Senior management, employees
	Direct supervisor commitment to health and safety	2. SSTL training: safety-specific transformational leadership training	Direct supervisors
	Group norms and –behavior regarding health and safety	3. Health and safety team meetings: meetings during which all team members openly discuss issues concerning their health and safety. Employees prepare for these meetings by responding to (online) statements and direct supervisors prepare through SSTL-training	Direct supervisors, employees
	Communication about health and safety	All three activities described above	Senior management, direct supervisors, employees
	Participation and involvement in relation to health and safety	All three activities described above	Senior management, direct supervisors, employees

will be able to show employees that employee health and safety is highly valued within the organization relative to other organizational facets.

Our study furthermore showed that direct supervisors (or in the case of self-managing teams, the team member responsible for employee health and safety) perform two essential roles when it comes to safety climate improvement. First, they inform employees on the value of employee health and safety through the extent to which they show commitment to this subject in their daily interactions with employees. Training supervisors in the safety-specific transformational leadership style, which focuses on enhancing health and safety among employees, could improve this. Second, supervisors are powerful actors in the process of implementing changes in an organization. This means that when health care organizations decide to introduce activities to improve the safety climate, special attention needs to be paid to the attitudes of supervisors towards the planned changes. We would therefore urge practitioners to involve direct supervisors in an early stage of safety climate improvement in order to ensure that they believe in the benefits of the activities and will show a positive attitude to their employees. Preferably this would take place before the final decision is made whether or not activities will be implemented, as the support of supervisors is

an important condition that influences the effectiveness of all intended changes aimed at improving safety climate perceptions.

Lastly, changes should also occur at the team level. The results from our systematic review indicate that for health care employees, the group norms and behavior dimension of safety climate was most strongly related to employee health outcomes. One way to improve group norms and –behavior regarding employee health and safety would be to organize health and safety team meetings during which all team members openly discuss issues that concern their health and safety. In a health care context, it might be difficult to organize a meeting where all team members can be present at the same time. We therefore suggest that the topic of employee health and safety becomes an integral part of the regular team meetings. However, the direct supervisor or team member that presides these meetings must be able to keep this topic on the agenda and have the abilities and skills to lead a fruitful team discussion (hence, direct supervisors should be trained in this regard). In this way, opportunities are created to discuss health and safety issues, establish group norms and agreements about behavior between co-workers, and thereby improving safety climate perceptions among employees.

One of the advantages of the multifaceted safety climate activities described above, is that they can be applied to improve any specific health and safety climate, as long as they are jointly carried out in an intervention program. However, we must stress that the effects from our multifaceted safety climate intervention were found in a situation where we chose to focus on both physical and psychosocial health and safety in two rounds and supplemented these topics with a final round aimed at discussing the organizational conditions for workplace health and safety. As a result, we cannot guarantee the same results when other topics are chosen. Naturally, this will need to be tested with a similar field experimental research design.

That said, our multifaceted safety climate intervention program could also be used to improve a specific health and safety climate, for instance physical safety climate or psychosocial safety climate. Although this gives practitioners the freedom to choose any health and safety topic they deem appropriate for their organization, we must point out that they should carefully consider which health and safety outcomes they wish to improve and which specific safety climate domain is related to that outcome. For example, as described in Chapter 5, we did not find evidence for a relationship between physical safety climate, musculoskeletal problems and organizational health performance outcomes, which would imply that increasing the perceived priority for physical health and safety in the organization does not necessarily result in less

musculoskeletal problems among employees. At the same time, we found support for a combined pathway from psychosocial safety climate to musculoskeletal disorders through a decrease in emotional exhaustion. Thus, it could be that health care organizations interested in decreasing musculoskeletal disorders benefit more from an improved psychosocial safety climate, than from an improved physical safety climate. Health care organizations that explicitly aim to reduce unsafe behavior in the workplace will probably benefit from improving the safety climate regardless of the domain.

Concluding, this study provided insights on the role that safety climate plays in explaining differences in health and safety between health care employees and organizations. We hope that our practical recommendations and suggestions will help health care organizations to improve their safety climate. Overall, we hope this study inspires managers, policy-makers and other practitioners to move the topic of employee health and safety higher on the agenda in order to achieve healthy and safe workplaces in health care.

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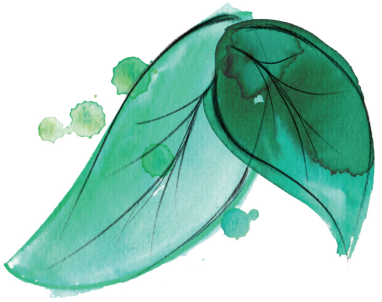
Appendices



APPENDIX I

Information on the collaborative research project

This study was carried out as part of a four-year collaborative research project between the Erasmus School of Social and Behavioural Sciences and Stichting IZZ. Stichting IZZ is a (non-profit) collectivity of health care employees in the Netherlands, which arranges collective health care insurance for its members and conducts research in order to improve the health and safety of health care employees. The goal of the research project was to gain actionable insights into the organizational factors that help explain the differences in employee health and safety –as indicated by employee health care utilization– between health care organizations. These insights were translated into two types of products:

1. Academic publications to further develop scientific knowledge on the subject of employee health and safety;
2. Specific resources that can be used directly by health care organizations and practitioners to improve the health and safety of health care employees, such as research reports, presentations, infographics, manuals and toolkits to implement a multifaceted safety climate intervention (see www.izz.nl/organisatieklimaat).

The research project was fully financed by Stichting IZZ. However, the author carried out the data analyses and interpretations independently. Moreover, all conclusions and recommendations in this study are those of the author and co-authors.

APPENDIX II

Measurement scales used in Chapters 5, 6 and 7

Physical safety climate (Chapters 5 and 6)
Management priority for physical health and safety (based on Hall, 2010)
1. Physical well-being of staff is a priority for this organization
2. Senior management considers employee physical health to be as important as productivity
3. Senior management show support for physical injury prevention through involvement and commitment
Management commitment to physical health and safety (based on Hall, 2010)
4. In my workplace, my direct supervisor acts quickly to correct problems/issues that affect employees' physical health
5. My direct supervisor clearly considers the physical health of employees to be of great importance
6. My direct supervisor acts decisively when a concern of an employees' physical health status is raised
Group norms and behavior related to physical health and safety (based on Brondino et al., 2012)
7. In our workplace, we discuss physical safety hazards and incident prevention
8. In our workplace, we care about peers physical safety awareness
9. In our workplace, we remind each other of the rules and regulations regarding physical safety
Communication about physical health and safety (based on Hall, 2010)
10. There is good communication here about physical safety issues which effect me
11. Information about workplace physical well-being is always brought to my attention in this organization
12. My complaints, remarks and contributions to resolving physical health concerns in the organization are listened to
Participation and involvement in relation to physical health and safety (based on Hall, 2010).
13. Participation and consultation in physical health and safety occurs with employees, works councils and health & safety coordinators
14. Employees are encouraged to become involved in physical safety and health matters
15. In my organization, the prevention of physical injury involves all levels of the organization

Psychosocial safety climate (Chapters 5 and 6)
Management priority for psychological health and safety (based on Hall, 2010)
1. Psychological well-being of staff is a priority for this organization
2. Senior management considers employee psychological health to be as important as productivity
3. Senior management show support for stress prevention through involvement and commitment
Management commitment to psychological health and safety (based on Hall, 2010)
4. In my workplace, my direct supervisor acts quickly to correct problems/issues that affect employees' psychological health
5. My direct supervisor clearly considers the psychological health of employees to be of great importance
6. My direct supervisor acts decisively when a concern of an employees' psychological health status is raised
Group norms and behavior related to psychological health and safety (based on Brondino et al., 2012)
7. In our workplace, we discuss psychological safety risks and incident prevention
8. In our workplace, we care about peers psychological safety awareness
9. In our workplace, we remind each other of the rules and regulations regarding psychological safety
Communication about psychological health and safety (based on Hall, 2010)
10. There is good communication here about psychological safety issues which effect me
11. Information about workplace psychological well-being is always brought to my attention in this organization
12. My complaints, remarks and contributions to resolving psychological health concerns in the organization are listened to
Participation and involvement in relation to psychological health and safety (based on Hall, 2010).
13. Participation and consultation in psychological health and safety occurs with employees, works councils and health & safety coordinators
14. Employees are encouraged to become involved in psychological safety and health matters
15. In my organization, the prevention of stress involves all levels of the organization

Physical safety behavior (Chapter 6)
Physical safety compliance (based on Neal & Griffin, 2006)
1. I use all the necessary safety regulations and equipment to minimize physical strain in my job
2. I use the correct procedures and regulations for physical safety when carrying out my job
3. I ensure the highest levels of physical safety when I carry out my job
Physical safety participation (based on Neal & Griffin, 2006)
4. I promote the physical safety program within the organization
5. I put in extra effort to improve the physical safety of the workplace
6. I voluntarily carry out tasks or activities that help to improve workplace physical safety

Psychosocial safety behavior (Chapter 6)
Psychosocial safety compliance (based on Neal & Griffin, 2006)
1. I use measures to prevent or minimize psychological strain in my job
2. I use the correct regulations and protocols for psychological safety when carrying out my job
3. I ensure the highest levels of psychological safety when I carry out my job
Psychosocial safety participation (based on Neal & Griffin, 2006)
4. I promote the psychological safety program within the organization
5. I put in extra effort to improve the psychological safety of the workplace
6. I voluntarily carry out tasks or activities that help to improve workplace psychological safety

Safety climate (Chapter 7)
Senior management priority for health and safety (based on Hall, 2010)
1. Employee health and safety is a priority for this organization
2. Senior management considers employee health and safety to be as important as productivity
3. Senior management shows support for physical and mental injury prevention through involvement and commitment
Supervisor commitment to health and safety (based on Hall, 2010)
4. In the workplace, my supervisor acts quickly to correct problems/issues that affect employees' health and safety
5. My supervisor clearly considers the physical and mental health and safety of employees to be of great importance
6. My supervisor acts decisively when a concern of an employees' physical or mental health or safety status is raised
Group norms and –behavior in relation to health and safety
7. In our workplace, we discuss employee health and safety hazards and incident prevention
8. In our workplace, we care about peers' physical and mental health and safety awareness
9. In our workplace, we remind each other of the rules and regulations regarding employee health and safety
Communication about health and safety (based on Hall, 2010)
10. There is good communication here about health and safety issues which effect me
11. Information about workplace health and well-being is always brought to my attention in this organization
12. My complaints, remarks and contributions to resolving health and safety concerns in the organization are listened to
Participation and involvement in relation health and safety (based on Hall, 2010)
13. Participation and consultation in employee health and safety occurs with employees, works councils and health and safety coordinators
14. Employees are encouraged to become involved in employee health and safety matters
15. In my organization, the promotion of employee health and safety involves all levels of the organization

Safety behavior (Chapter 7)
Safety compliance (based on Neal & Griffin, 2006)
1. I use all the necessary health and safety equipment and follow relevant regulations to prevent physical and mental strain in my job
2. I use the correct procedures and regulations for health and safety when carrying out my job
3. I ensure the highest levels of health safety when I carry out my job
Safety participation (based on Neal & Griffin, 2006)
4. I promote the employee health and safety program within the organization
5. I put in extra effort to improve employee health and safety in the workplace
6. I voluntarily carry out tasks or activities that help to improve employee health and safety

Changes to procedures (Chapter 7)
(based on Randall et al., 2009)
1. As a consequence of the implementation of the program activities we openly discuss which methods or procedures we wish to change and which we wish to keep
2. New procedures have been introduced or existing procedures have been changed after the implementation of the program activities
3. Through the implementation of the program activities we finally got to straighten up some bad work methods that we had accepted
4. The implementation of the program activities has made it easier to tackle the changes in the organization
5. I have changed my attitude to the role of my supervisor after the implementation of the program activities

Supervisor attitudes and actions (Chapter 7)
(based on Randall et al., 2009)
1. My supervisor has done a lot to involve employees throughout the activities of the program
2. My supervisor communicated clearly the advantages of the program activities
3. My supervisor shared whatever he/she knew about the implementation of the program activities
4. My supervisor has actively worked towards the implementation of the program activities
5. My supervisor was positive about the implementation of the program activities

APPENDIX III

Multifaceted safety climate intervention activities

The safety climate intervention consisted of three activities that were repeated during three rounds with different themes. The first theme was physical health and safety in the workplace. Considering the work and daily tasks of long-term care employees, topics such as physical workload, quantitative work pressure and the use of lifting equipment were discussed. The theme for the second round was psychosocial health and safety. Example topics that were discussed here are qualitative work pressure, work-life balance, aggression and violence from clients, gossiping and interpersonal conflicts. The final round was themed organizational conditions for workplace health and safety. Topics such as the relationship between employee safety and client safety, legal and financial issues relating to safety, and the role of management could be discussed here. We made a protocol for each program activity, which was send to the organization's project manager.

Intervention activity 1: Senior management safety rounds

As part of our safety climate intervention, we introduced senior management safety rounds in each of the organizations to improve employee safety climate through an increase in senior management priority for health and safety as perceived by employees. These safety rounds took the form of bi-monthly meetings between senior managers and employees assigned to the intervention group. During these meetings, employees were encouraged to have an informal conversation with senior managers about health and safety issues. The senior managers that participated in the safety rounds consisted of members of the board or senior line managers. At each organization, the project manager organized the safety rounds, made notes during the rounds and provided support to the senior managers. Safety rounds lasted for about 30-60 minutes and were conducted in the care setting of the employees. From each intervention team, one to three employees were asked to participate in the meeting. Employees prepared for these meetings by asking other team members (who were not able to join the meeting) which topics they should discuss with senior management. The project managers made notes of the meetings and send these to all members of the team afterwards.

Intervention activity 2: SSTL training for supervisors

Supervisors in the intervention group participated in three half-day sessions aimed at improving their transformational leadership skills in relation to workplace health and safety. The sessions lasted for three hours and were led by professional team coaches familiar with the theory of SSTL. Each session started with a short theoretical discussion of the four dimensions of transformational leadership (inspirational motivation, idealized influence, intellectual stimulation and individualized consideration) followed by roleplaying exercises to practice with communication skills and implementing behaviors consistent with these dimensions. The team coaches asked the supervisors to use their new communication skills and techniques during the safety team-meetings (see intervention activity 3).

Intervention activity 3: Online team discussion through 'Synmind' followed by health and safety team-meetings

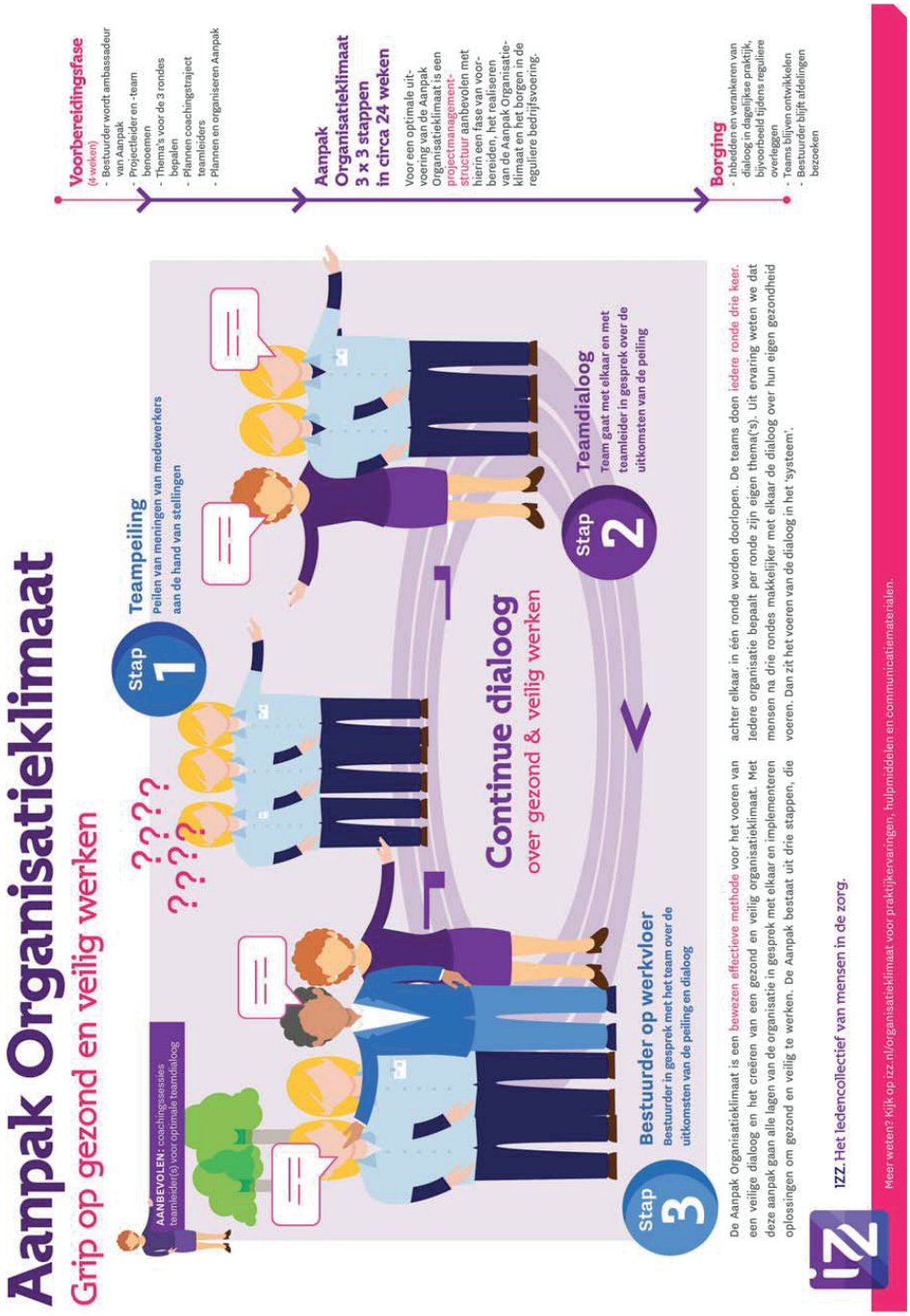
The third intervention program activity comprised two sub-activities both aimed at reaching consensus on group norms and group behavior concerning health and safety among employees working together. All intervention team members were invited to participate in an online discussion through the 'Synmind' platform. Synmind is a digital communication platform where health and safety norms can be scored and discussed online. For each round, we programmed six statements that employees scored and discussed. The full list of statements is shown in Table A.1 below. Anonymity during the online discussion was guaranteed by the exclusion of participants' names. Employees had two weeks to respond to the statements. After the online discussion period, the results were sent to the supervisors in order for them to prepare the second sub-activity: a face-to-face team meeting during which the entire team discusses the outcome of the online discussion. These meetings were presided by the supervisors, who could implement behaviors and communication skills introduced in the SSTL training sessions (see intervention activity 2).

Table A.1 List of statements programmed in the online platform 'Synmind' which was used during intervention activity 3

Round 1 statements Theme: *Physical health and safety*	**Round 2 statements** Theme: *Psychological health and safety*	**Round 3 statements** Theme: *Organizational conditions for workplace health and safety*
1. When time pressure is high during work, it is impossible not to go beyond your own physical limits.	1. We can tell each other everything in our team without it being discussed with others behind our backs.	1. Employee health and safety is as important as patient/client health and safety.
2. It is possible to make sure no one in our team experiences excessive physical load, even when we are understaffed.	2. If one team member's work pressure is too high, we will address this as a team and resolve it together.	2. The procedures we follow to ensure patient/client health and safety are aligned with the procedures we follow to ensure our own health and safety.
3. Coworkers in our team inform each other adequately when there are new methods or when there is new equipment available to prevent physical strain in the workplace.	3. During busy periods, it is normal to still be engaged in work (physically or mentally) while at home, even though this hinders activities with family/friends.	3. Due to recent legislative changes in the health care system, it will become more difficult to ensure employee health and safety
4. A change of work schedules is needed in our team to prevent physical strain in the workplace.	4. The prevention of work stress is the responsibility of the employer (organization).	4. Even without additional funding, we can find (new) ways to ensure employee health and safety in the workplace.
5. Every member of our team corrects a coworker when they see them lifting or moving incorrectly, irrespective of age or tenure.	5. If team members have difficulties carrying out their work because of circumstances in their private life, they should discuss this in the team.	5. The management is willing to hear our opinions and make ample use of our experience when making decisions concerning employee health and safety.
6. I will not be able to reach my retirement age doing this job if the physical load in my work remains the same.	6. The difference between teasing and bullying someone is clear to all members in our team.	6. I would recommend my organization as employer to my family and friends.

APPENDIX IV

Infographic 'Aanpak Organisatieklimaat'



Dankwoord

(acknowledgements in Dutch)

Na jaren werken is het dan eindelijk zover: mijn proefschrift is klaar. Met trots kijk ik terug op een periode die weliswaar ups en downs heeft gekend, maar waarin ik vooral ontzettend veel heb geleerd over de wetenschap, de praktijk van zorgorganisaties en mezelf. Dit proefschrift zou echter niet tot stand gekomen zijn zonder de hulp van diverse mensen. Daarom wil ik graag van deze gelegenheid gebruikmaken om iedereen te bedanken die een rol heeft gespeeld tijdens mijn promotieonderzoek.

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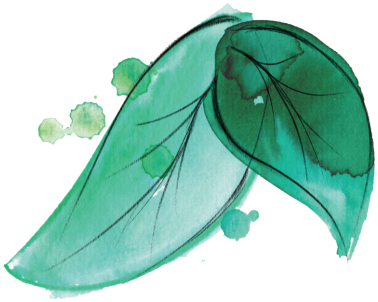
Babette Bronkhorst

Januari 2018

Samenvatting

(summary in Dutch)



GEZOND EN VEILIG WERKEN IN DE ZORG: EEN ONDERZOEK NAAR DE ROL VAN EEN GEZOND EN VEILIG ORGANISATIEKLIMAAT

Introductie en onderzoeksvragen

Werken in de zorg brengt specifieke gezondheids- en veiligheidsrisico's met zich mee. Onderzoeken wereldwijd laten zien dat zorgmedewerkers kampen met fysieke en psychische gezondheidsproblemen. Het is dan ook niet verwonderlijk dat een onderzoek uit de Verenigde Staten aantoont dat zorgmedewerkers zelf meer zorg gebruiken en hogere zorgkosten hebben dan de gemiddelde beroepsbevolking. Zorggebruikgegevens in Nederland bevestigen dit beeld en laten tevens zien dat er grote verschillen bestaan in het zorggebruik onder medewerkers tussen vergelijkbare zorgorganisaties in dezelfde branche. Dit roept de vraag op waarom deze verschillen in gezondheid en veiligheid van medewerkers –uitgedrukt in zorggebruik– tussen organisaties bestaan.

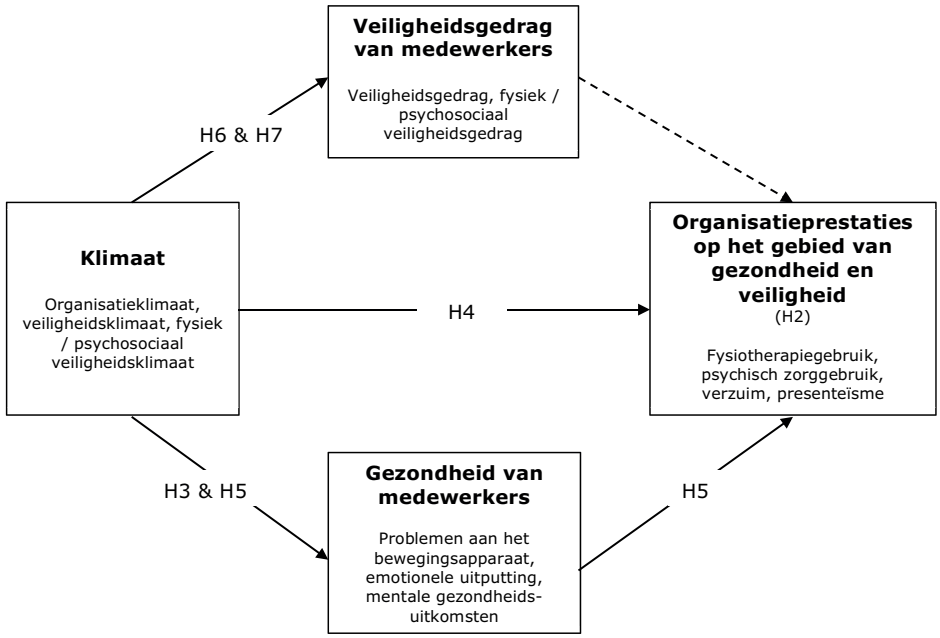
Eén van de concepten waarvan we weten dat het verschillen in uitkomsten op het gebied van gezondheid en veiligheid tussen medewerkers verklaart, is een gezond en veilig organisatieklimaat (hierna: veiligheidsklimaat). Veiligheidsklimaat kunnen we omschreven als de percepties die medewerkers hebben van het beleid, de procedures en de dagelijkse praktijk omtrent het belang van fysieke en psychische gezondheid en veiligheid binnen de organisatie. Het gaat hierbij om de percepties van de volgende vijf dimensies: (1) de prioriteit voor gezond en veilig werken vanuit hoger management, (2) de betrokkenheid van de direct leidinggevende, (3) de groepsnormen en het groepsgedrag, (4) de communicatie en (5) de participatie van medewerkers in dit onderwerp.

In deze studie dienden de zorggebruikgegevens van zorgmedewerkers als startpunt om de verschillen in gezondheid en veiligheid tussen organisaties te onderzoeken en te bepalen welke rol het veiligheidsklimaat hierbij speelt. De studie bestaat uit zes empirische hoofdstukken die gezamenlijk antwoord geven op de hoofdvraag: "*Welke rol speelt het veiligheidsklimaat in de gezondheid en veiligheid van zorgmedewerkers en zorgorganisaties*?". Deze vraag is opgedeeld in vier deelvragen:

1. Welke verschillen in gezondheid en veiligheid van medewerkers –uitgedrukt in zorggebruik– bestaan er tussen zorgorganisaties?
2. Hoe hangen de verschillen in gezondheid en veiligheid van medewerkers samen met het veiligheidsklimaat in zorgorganisaties?
3. Wat zijn de effecten van het veiligheidsklimaat op gezondheids- en veiligheidsuitkomsten van zorgmedewerkers en zorgorganisaties?

4. Wat zijn de effecten van een veiligheidsklimaatinterventie op gezondheids- en veiligheidsuitkomsten van zorgmedewerkers?

In deze studie is het verband tussen veiligheidsklimaat en verschillende uitkomsten op het gebied van gezondheid en veiligheid onderzocht (zoals gezondheid van medewerkers, veiligheidsgedrag en organisatieprestaties). In sommige hoofdstukken staan directe verbanden centraal, maar in andere hoofdstukken zijn ook indirecte verbanden getoetst (zie figuur S.1).



Figuur S.1 Schematisch overzicht van de studie

Resultaten

In hoofdstuk 2 is het gebruik van fysiotherapie en psychische zorg onder medewerkers geanalyseerd om de variatie in fysieke en psychische gezondheid binnen en tussen zorgbranches te onderzoeken. De geaggregeerde resultaten op organisatieniveau laten zien dat er grote verschillen tussen zorgbranches bestaan. Daarbij scoren de organisaties in de sectoren verzorging, verpleging, en thuiszorg en gehandicaptenzorg significant hoger op het gebruik van fysiotherapie en psychische zorg in vergelijking met de ziekenhuizen en de organisaties in de geestelijke gezondheidszorg. Wellicht interessanter is de bevinding dat de variatie nog groter is tussen organisaties binnen dezelfde zorgbranche. Een groot deel van deze variatie tussen organisaties is bovendien niet te verklaren door verschillen in leeftijd van personeel, man-vrouw verhouding, organisatiegrootte of verstedelijkingsgraad.

In hoofdstukken 3 en 4 is verkend in hoeverre het klimaatconcept de verschillen in gezondheid en veiligheid van medewerkers tussen organisaties kan verklaren. Daartoe is eerst in hoofdstuk 3 een systematische literatuurstudie uitgevoerd waarin is onderzocht hoe het klimaat van een organisatie samenhangt met de mentale gezondheidsuitkomsten van medewerkers. De literatuurstudie wijst uit dat het organisatieklimaat negatief samenhangt met mentale gezondheidsuitkomsten zoals burn-out, depressie en angststoornissen. Vooral de percepties van de relaties tussen collega's en aspecten van leiderschap blijken volgens de literatuur belangrijk te zijn in het verklaren van verschillen in mentale gezondheid van zorgmedewerkers.

In hoofdstuk 4 is nagegaan hoe de verschillen in gezondheid en veiligheid van medewerkers –uitgedrukt in zorggebruik– tussen zorgorganisaties verband houden met verschillen in klimaatpercepties. Door middel van een vergelijkende case study met interviews zijn de veiligheidsklimaatpercepties vergeleken tussen medewerkers van twee ziekenhuizen met een laag zorggebruik ('gezonde' ziekenhuizen) en van twee ziekenhuizen met een hoog zorggebruik ('ongezonde' ziekenhuizen). De bevindingen laten zien dat medewerkers in de 'gezonde' ziekenhuizen positievere veiligheidsklimaatpercepties hebben dan de medewerkers in de 'ongezonde' ziekenhuizen. Zo waren ze over het algemeen positiever over de prioriteit die het management geeft aan gezondheid en veiligheid, de groepsnormen en het groepsgedrag omtrent gezondheid en veiligheid, de mate van participatie en de communicatie over gezondheid en veiligheid van medewerkers. Het klimaatconcept lijkt dus verschillen in gezondheid en veiligheid tussen organisaties te kunnen verklaren.

In hoofdstukken 5 en 6 zijn vervolgens de effecten van twee specifieke soorten veiligheidsklimaat (fysiek veiligheidsklimaat en psychosociaal veiligheidsklimaat) op gezondheids- en veiligheidsuitkomsten onderzocht. In hoofdstuk 5 zijn eerst drie paden getoetst om meer te weten te komen over het verband tussen veiligheidsklimaat en organisatieprestaties op het gebied van gezondheid en veiligheid: een fysiek pad, een psychosociaal pad en een gecombineerd pad. De resultaten van het vragenlijstonderzoek onder 8.761 medewerkers werkzaam in 177 zorgorganisaties lieten zien dat binnen organisaties met een beter psychosociaal veiligheidsklimaat, de medewerkers minder emotioneel uitgeput zijn. Hierdoor kent de organisatie ook minder verzuim en presenteïsme (het psychosociale pad). De data toonden verder aan dat organisaties met een beter psychosociaal veiligheidsklimaat ook een lager zorggebruik hebben. Dit verloopt via een vermindering van problemen aan het bewegingsapparaat en emotionele uitputting van medewerkers (het gecombineerde pad). Er is geen bewijs gevonden voor een fysiek pad waarbij organisaties met een beter fysiek veiligheidskli-

maat ook betere organisatieprestaties hebben door een vermindering van problemen aan het bewegingsapparaat.

In Hoofdstuk 6 is het effect van het fysieke en psychosociale veiligheidsklimaat op fysiek en psychosociaal veiligheidsgedrag van medewerkers beschreven. Tevens is getoetst of deze veiligheidsklimaatconcepten het verband tussen werkeisen en hulpbronnen enerzijds en veiligheidsgedrag anderzijds beïnvloeden. De resultaten van het vragenlijstonderzoek onder 6.230 medewerkers werkzaam binnen 52 organisaties lieten zien dat medewerkers met veel hulpbronnen (autonomie, steun van leidinggevenden en collega's) of een beter veiligheidsklimaat binnen hun organisatie zich vaker veiliger gedragen. Dit geldt zowel voor het fysieke als voor het psychosociale domein. Medewerkers die werkdruk ervaren, vertonen juist minder vaak fysiek en psychosociaal veiligheidsgedrag. Daarnaast gaf het onderzoek nog enig bewijs dat het veiligheidsklimaat binnen een organisatie het negatieve effect van werkeisen kan verzachten en het positieve effect van hulpbronnen kan versterken.

Gebaseerd op de resultaten uit de vorige hoofdstukken en de literatuur over veiligheidsklimaat, is er in hoofdstuk 7 ten slotte een veelzijdige interventie getoetst waarmee de veiligheidsklimaatpercepties binnen een organisatie kunnen worden verbeterd. Het interventieprogramma bestond uit (1) gezondheids- en veiligheidsrondes door hoger management (2) transformationeel leiderschapstraining gericht op gezondheid en veiligheid voor direct leidinggevenden en (3) online en face-to-face discussies over gezondheid en veiligheid in het team. De effecten van dit interventieprogramma op de veiligheidsklimaatpercepties en het veiligheidsgedrag van medewerkers zijn getoetst binnen vijf zorgorganisaties door middel van een quasi-experimenteel onderzoeksontwerp met voor- en nametingen en een controlegroep. De resultaten van de analyses lieten zien dat de scores op veiligheidsklimaat en veiligheidsgedrag naderhand significant hoger lagen binnen de interventiegroep in vergelijking met de controlegroep, terwijl er vooraf geen verschillen waren. De resultaten lieten tevens zien dat medewerkers binnen de interventiegroep die meer positieve veranderingen in hun werkprocedures hadden ervaren na de interventie en van wie de direct leidinggevende positiever was over de interventie, naderhand hoger scoorden op veiligheidsklimaat en veiligheidsgedrag. Een dergelijke veelzijdige interventie beïnvloedt de veiligheidsklimaatpercepties van zorgmedewerkers positief, maar de grootte van dit positieve effect is dus afhankelijk van het implementatieproces.

Conclusies

Het antwoord op de hoofdvraag "*Welke rol speelt het veiligheidsklimaat in de gezondheid en veiligheid van zorgmedewerkers en zorgorganisaties?*" is dat het veiligheidsklimaat verschillen verklaart in gezondheidsuitkomsten en veiligheidsgedrag tussen zorgmedewerkers en in prestaties op het gebied van gezondheid en veiligheid tussen zorgorganisaties. Een veelzijdige veiligheidsklimaatinterventie kan zorgorganisaties helpen om hun veiligheidsklimaat te verbeteren. Op basis van dit antwoord en de resultaten beschreven in de afzonderlijke hoofdstukken zijn vier centrale conclusies getrokken.

1. *Gegevens over zorggebruik van medewerkers kunnen dienen als een zinvolle aanvulling op de huidige uitkomsten die worden gebruikt in onderzoek op het gebied van gezondheid en veiligheid*

De onderzoeksresultaten bieden verschillende redenen waarom het zorggebruik van medewerkers een waardevolle aanvulling is. Ten eerste kan zorggebruik worden gemeten met 'subjectieve' en 'objectieve' indicatoren. Daarnaast bieden zorggebruikgegevens een mogelijkheid om gezondheids- en veiligheidsuitkomsten inzichtelijk te krijgen die pas na een langere periode ontstaan. Ten slotte kan met gegevens over zorggebruik ook informatie worden verkregen over de (medische) kostenbesparingen die een verbetering van gezondheid en veiligheid op de werkvloer met zich meebrengt.

2. *Veiligheidsklimaat houdt verband met fysieke en psychische gezondheids- en veiligheidsuitkomsten op individueel- en organisatieniveau*

Dit onderzoek heeft laten zien dat het concept veiligheidsklimaat is gerelateerd aan verschillende gezondheids- en veiligheidsuitkomsten met verschillende foci, in verschillende domeinen en op verschillende niveaus. Zo is het veiligheidsklimaat gerelateerd aan de fysieke en psychische gezondheid van medewerkers en de mate waarin zij gezond en veilig gedrag vertonen op de werkvloer. Ook hangt het veiligheidsklimaat samen met het verzuim, het presenteïsme en het zorggebruik op organisatieniveau.

3. Voor de meting van het veiligheidsklimaatconcept doet de zorgcontext ertoe

De context waarin onderzoek wordt gedaan naar veiligheidsklimaat binnen organisaties vraagt om speciale aandacht. In de zorgsector is het belangrijk dat binnen het veiligheidsklimaatconcept een onderscheid wordt gemaakt tussen percepties van hoger management en direct leidinggevenden. Daarnaast moet ook de invloed van

groepsnormen en –gedrag op de aandacht voor gezondheid en veiligheid worden meegenomen.

4. *Bij het toetsen van een veiligheidsklimaatinterventie zijn zowel het veelzijdige ontwerp als het implementatieproces van belang*

Op basis van de onderzoeksresultaten en de consensus in de literatuur dat veiligheidsklimaat een concept is dat meerdere belanghebbenden en verschillende organisatielagen beslaat, kan de conclusie worden getrokken dat het ontwerp van een effectieve veiligheidsklimaatinterventie veelzijdig van aard is. Bovendien hebben de resultaten laten zien dat voor het meest optimale effect van een veiligheidsklimaatinterventie ook aandacht moet worden besteed aan het implementatieproces, met name aan de rol van de direct leidinggevende en de daadwerkelijke veranderingen op de werkvloer die de interventie teweegbrengt.

Aanbevelingen voor toekomstig onderzoek en de praktijk

Deze studie is één van de eerste onderzoeken waarin het zorggebruik van medewerkers wordt verbonden aan organisatiefactoren. Daarom is een eerste aanbeveling voor toekomstig onderzoek om zorggebruik van medewerkers toe te voegen aan de bestaande gezondheids- en veiligheidsuitkomsten om zo meer te weten te komen over de relatie met organisatiefactoren zoals veiligheidsklimaat. Onderzoekers wordt ook aangeraden om vaker de twee afzonderlijke onderzoeksgebieden rond fysieke en psychosociale veiligheid te combineren en een omvangrijkere opvatting van gezondheid en veiligheid op de werkvloer te hanteren. Een andere aanbeveling is om het effect van de zorgcontext op het verband tussen het veiligheidsklimaat en gezondheids- en veiligheidsuitkomsten verder te onderzoeken. Dit zou bijvoorbeeld kunnen door de invloed van het patiëntveiligheidsklimaat op deze relatie te onderzoeken. Ten slotte wordt onderzoekers die veiligheidsklimaatinterventies willen toetsen, aangeraden om niet alleen te focussen op kwantitatieve data, maar ook kwalitatieve data over het interventieproces te verzamelen en beide onderzoeksmethoden te integreren. Op deze manier kunnen zij een completer beeld schetsen van de effectiviteit van de interventie.

Zorgorganisaties wordt aangeraden om meer inzicht te verkrijgen in de gezondheid en veiligheid van hun medewerkers door het verzamelen en monitoren van geaggregeerde zorggebruikgegevens. Deze gegevens kunnen namelijk, in combinatie met andere vormen van archiefdata zoals verzuimcijfers of incidentmeldingen, informatie geven over de mate waarin bepaalde gezondheids- en veiligheidsproblemen een rol spelen binnen de organisatie. Organisaties die hun veiligheidsklimaat willen verbeteren zouden een veelzijdige interventiestrategie moeten hanteren waarbij verschillende kli-

maatdimensies worden aangesproken. Ondanks de huidige trend binnen Nederlandse zorgorganisaties om over te schakelen op zelforganiserende teams, moet het belang van de rol van het management in de verbetering van het veiligheidsklimaat niet worden onderschat. Een overzicht van activiteiten die onderdeel kunnen uitmaken van een veelzijdige veiligheidsklimaatinterventie is te vinden in tabel S.1.

Tabel S.1 Overzicht van activiteiten die onderdeel kunnen uitmaken van een veelzijdige veiligheidsklimaatinterventie

	Veiligheidsklimaatdimensie	Activiteit	Belanghebbenden die betrokken zijn
Veelzijdige veiligheidsklimaatinterventie	Prioriteit van het hoger management voor gezondheid en veiligheid van medewerkers	1. Gezondheid en veiligheidsrondes door hoger management: informele bijeenkomsten waarin directieleden of bestuurders samen met medewerkers in gesprek gaan over gezond en veilig werken.	Hoger management, medewerkers
	Betrokkenheid van de direct leidinggevende bij de gezondheid en veiligheid van medewerkers	2. SSTL training voor direct leidinggevenden: direct leidinggevenden worden getraind op een transformationele leiderschapsstijl met speciale aandacht voor gezond en veilig werken	Direct leidinggevenden
	Groepsnormen en –gedrag omtrent gezondheid en veiligheid van medewerkers	3. Teambijeenkomsten over gezond en veilig werken: bijeenkomsten waarin alle teamleden gezamenlijk relevante onderwerpen op het gebied van gezond en veilig werken bespreken. Medewerkers bereiden deze bijeenkomsten voor door (online) hun mening te geven over stellingen en direct leidinggevenden bereiden zich voor middels SSTL training (zie hierboven)	Direct leidinggevenden, medewerkers
	Communicatie over gezondheid en veiligheid van medewerkers	Alle drie de activiteiten hierboven	Hoger management, direct leidinggevenden en medewerkers
	Participatie in het verbeteren van gezondheid en veiligheid van medewerkers	Alle drie de activiteiten hierboven	Hoger management, direct leidinggevenden en medewerkers

About the author

PORTFOLIO

PhD training

Professional advisory skills, Boertien Vergouwen Overduin	2016
2-1-2 multilevel meditational analyses, tutorial dr. Brenda Vermeeren	2015
Multilevel modeling with HLM, Utrecht Summer School	2014
Advanced Studies in HRM and Organizational Behavior, Dutch HRM Network	2013

Teaching

Bachelor 1: Management & Organization, Governance Structures in the Netherlands, Introduction to Economics, Introduction to Law, Qualitative Research, Professional skills: general study skills	2011-2015
Bachelor 2: International Governance, Quantitative research, Supervision of honors student	2012-2013
Bachelor 3: HRM in the Public Sector	2013-2016
Master: SPSS seminar (introductory and advanced), Secondary supervision of masters theses	2013-2016

International conferences

Seminar on Improving People Performance in Health care, Belfast, The UK	2016
Academy of Management (AoM) Conference, Vancouver, Canada	2015
International Conference of the Dutch HRM Network, Utrecht, The Netherlands	2015
International Research Society for Public Administration (IRSPM) Conference, Prague, Czech Republic	2013
Seminar on Improving People Performance in Health care, Rotterdam, The Netherlands	2012
International Conference of the Dutch HRM Network, Groningen, The Netherlands	2012
Netherlands Institute of Governance (NIG) Conference, Leuven, Belgium	2012

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Awards

Award for Highly Commended paper – Emerald Literati Network Awards for Excellence	2017
Nominated for the Graduate School Award for PhD Excellence for the Best Article – Erasmus Graduate School of Social Sciences and the Humanities (EGS3H)	2015

ABOUT THE AUTHOR

Babette Bronkhorst (1989) studied Public Administration at Erasmus University Rotterdam. In 2010, she obtained her Bachelor's degree with a minor in Work- and Organizational Psychology. Her interest in organizational studies led her to specialize in Human Resource Management in the public sector and obtain her Master's degree in 2012 at the same university.

After graduating, Babette joined the Erasmus School of Social and Behavioural Sciences (ESSB) at Erasmus University Rotterdam as an academic lecturer and worked on research examining the work-life balance of health care employees. Late 2012, she continued her research in the health care sector with the start of a PhD on the role of safety climate in the health and safety of employees working in health care. This PhD took the form of a collaborative research project between the ESSB and Stichting IZZ. During this PhD project, Babette published several articles in international scientific journals (*Safety Science*, *Journal of Safety Research*, *Health Care Management Review*, *International Journal of Workplace Health Management* and *Health Services Management Research*) and presented her work at international academic conferences organized by the Academy of Management, the Dutch HRM Network, Improving People Performance in Health Care, and the International Research Society for Public Management. She simultaneously worked as a researcher at Stichting IZZ where she wrote several research reports and gave presentations about her research to practitioners at various health care organizations, labor unions and employer organizations. Alongside her PhD research and work at Stichting IZZ, she taught several courses in the Public Administration Bachelor program.

As of May 2017, Babette works as a project manager at Stichting IZZ. Stichting IZZ is a collectivity of health care employees in the Netherlands, which arranges collective health care insurance for its members and conducts research in order to improve the health and safety of health care employees. Here, she continues to work on the valorization of her PhD research and develops and implements new research projects on the subject of healthy and safe workplaces in health care.

Working in health care involves significant health and safety risks. This dissertation uses health care utilization data of Dutch employees working in health care as a starting point to investigate variation in employee health and safety across organizations. It furthermore examines the role safety climate plays in explaining these differences. Safety climate can be described as employees' perceptions of the policies, procedures and practices as it relates to the value and importance of physical and psychological health and safety within the organization.

The results show that an organization's safety climate is related to various outcomes at the individual level, such as employee health and behavior. At the organizational level, the results demonstrate that health care organizations with a more positive safety climate also have lower absenteeism, presenteeism and employee health care utilization rates. Based on these findings, a multifaceted safety climate intervention program was developed and empirically tested in five health care organizations. The results of this study indicate that the multifaceted safety climate intervention positively influences safety climate perceptions and behavior in the workplace. The findings furthermore reveal that attention needs to be paid to the implementation process, especially to the role of the direct supervisor and the actual changes in the workplace the intervention brings about.

This dissertation thus contributes to the scientific knowledge on the effects of safety climate and provides practical recommendations on how to improve safety climate and achieve healthy and safe workplaces in health care.