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Patient Safety: A Multi-Climate Approach to the Nursing Work Environment: A Dissertation

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"Patient Safety: A Multi-Climate Approach to the Nursing Work Environment"

A Dissertation Presented

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Dedication

This dissertation is dedicated to my husband, Tony. He is patient, kind, loving and understanding, all attributes that were tested at some point or another while I attended classes and then worked on my dissertation. All good things do come to an end and this phase of discovery is coming to an end. I am sure there will be more but I know I can count on you to be there supporting, cooking and being you.

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The completion of this dissertation is much more than just my accomplishment. For me, this work was able to be completed because of wonderful people who helped me academically, professionally and provided the kind of support and interest that I will forever appreciate.

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I feel fortunate to have deep connections to two of our University of Massachusetts campuses and their nursing programs. The Graduate School of Nursing is an exceptional program with wonderful scholars and practitioners on the faculty. My PhD student colleagues have been both sources of support and education as we journeyed through our coursework.

My second connection is with the University of Massachusetts Dartmouth where I began teaching nursing at the same time that I began graduate studies at the GSN. Thank you to all my colleagues at UMD who asked me just the right number of times and at the right time, “how is your dissertation going?”. What a wonderful support system to be surrounded by dedicated faculty and researchers who knew exactly what I was experiencing. In particular, Nancy Dluhy PhD, RN has been a role model, friend, cheerleader and source of much laughter and inspiration

My colleagues in the Massachusetts Organization for Nurse Executives have also been incredibly supportive. They have taken the time to listen to my ideas, share their perspective and cheer me on. Mostly, they continue to work in the trenches every day in every aspect of nursing practice to ensure that we are building work environments that support professional nursing practice and make "patients first" a reality. They are an awesome group in their dedication. In particular, the members of the Program Committee at MONE have been so supportive and encouraging and believed in the substance of this dissertation work.

Mention also goes to the authors of the measures used in the research done for this dissertation. All responded immediately to my request for permission to use their work. That kind of professional sharing is so important to further the knowledge in the area of organization behavior, professional nursing practice and patient safety.

My family and friends have been wonderful and understanding of the all consuming effort it took at times to stay on track to complete this work. Life continues to happen even when you are writing a dissertation and I thank them for understanding and being there.

I have a wonderful Irish Setter named Murphy. He has been a consistent reminder that one still needs to have fun when completing a PhD. He has spent the better part of the last few years lying under my writing table while I wrote. Always ready to go for a walk or go to the beach, he thinks sitting at the computer is a good time. Thanks, Murphy!

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Glossary of Terms

Organizational culture: Organizational culture represents the shared assumptions, values, and attitudes members have about their organization (Schein, 2004). Organizational culture is conceptually abstract and visible only through the behaviors and attitudes displayed in the organization by its members (Glick, 1985)

Organizational climate (OC): OC is the individual employee's perception of and experience with the organizational culture (Denison, 1996; Schein, 2004). OC is the ability of the individual members of the organization to make sense of the organization (Schneider, Bowen, Ehrhart, & Holcombe, 2000) and is considered to be the measurable component of organizational culture (Denison, 1996)

Culture of safety: COS is the observable effort directed towards improving safety by all members of an organization (Cooper, 2000). A COS is generated from the shared values, attitudes and behaviors of individuals and groups to uphold the principles and practices of safety in the organization (Kohn, Corrigan, & Donaldson, 2000).

Safety climate (SC): SC is a subcomponent of a culture of safety. SC is both visible and measurable (Clarke, 2000; Colla, Bracken, Kinney, & Weeks, 2005; Griffin & Neal, 2000) and includes the individual behaviors of the members and their perceptions of the organization's practices, procedures and rewards related to safety (Clarke, 2000; Griffin & Neal, 2000; Tregunno, 2005). Safety climate reflects the true priority of safety in the organization as perceived by its members (Zohar, 2008).

Safety climate in healthcare reflects a concern for the work environment of nurses and other providers as well as the impact of the environment on patients and their safety (Naveh, Katz-Navon, & Stern, 2005). Characteristics of a SC include teamwork,

autonomy, leadership and accountability (Clarke, 2000; Colla, et al., 2005; Griffin & Neal, 2000).

Work-ownership climate (WOC): WOC is the result of engaging employees in work behaviors such as autonomy, control, having voice, and gaining in depth knowledge of their work (Zohar, 2008). Engaging employees in ownership of their work through empowerment (shared decision making) increases organizational commitment (Kanter, 1993; Laschinger & Finegan, 2005; Laschinger, Finegan, Shamian, & Wilk, 2004). Management in a work-ownership climate demonstrates their support by sharing information (collaboration), providing access to power and resources and supporting a decreased bureaucracy (Zohar, 2008).

Magnet Hospital: Magnet hospital has achieved nursing excellence and innovation in professional nursing practice. Magnet status is awarded through the American Nursing Credentialing Center (ANCC) Magnet Recognition program and is based on over 65 quality indicators and standards of nursing practice. Standards are measured through qualitative and quantitative review including an extensive written document and site review. Magnet recognition is considered the "gold standard" of nursing practice reflecting the 14 "essentials of magnetism"("Principles & elements of a healthful practice/work environment," 2004). The elements of leadership quality, professional models of care with authority and responsibility (shared decision making), autonomy and collaborative relationships were identified in the initial magnet research and continue to be present today (Kramer & Schmalenberg, 2002).

Professional practice environment (PPE): A PPE is an organizational climate (Kazanjian, Green, Wong, & Reid, 2005; McClure, Poulin, Sovie, & Wandelt, 1983) that

positively impacts nurse and patient outcomes (Page, 2004). The characteristics of a PPE include the presence of staff autonomy in individual practice decisions, nurse control over practice through shared decision making and support from strong leadership (Kramer et al., 2007; Kramer & Schmalenberg, 2003b; Lake, 2002; Laschinger, Almost, & Tuer-Hodes, 2003).

Organizational Citizenship Behaviors (OCB): OCB are discretionary behaviors by employees considered to be beyond their usual role and which lead to improved function of the organization (Mearns & Reader, 2008; Zohar, 2008). OCB are enhanced when individuals feel supported in their role and leads to greater commitment to the organization by the employee (Mearns & Reader, 2008).

Safety Citizenship Behaviors (SCB): SCB are extra-role behaviors or behaviors above and beyond an employee's job description geared to improve safety in the workplace. SCB, a subset of OCB are described as activities of helping others with safety issues, taking part in safety improvement activities, putting pressure on management to improve safety (having voice), reporting dangers (whistle blowing) and maintaining knowledge about safety practices in the workplace (Hofmann, Morgeson, & Gerras, 2003). Zohar calls these behaviors commitment based safety because discretionary, enhanced role behaviors are contributing to the well-being of the organization beyond the presence of a safety climate (Zohar, 2008).

SCBs thrive with good relationships with management and when employees sense that these behaviors are valued in a safety climate (Hoffman, Morgeson, & Gerras, 2003). SCBs are particularly valuable in less routine or unpredictable circumstances, when

individual initiative as well as SCBs is needed to guide safety practice decisions where procedures alone are inadequate (Gittell, 2003: Zohar, 2008).

ABSTRACT

Patient Safety: A Multi-Climate Approach to the Nursing Work Environment

The purpose of this study was to explore Zohar's Multi-Climate Framework for Occupational Safety to determine the effects of staff nurse perceptions of safety priorities in their organization (safety climate) and their work ownership climate (Magnet Hospital designation) on safety citizenship behaviors viewed as in role or extra role. Safety citizenship behaviors are described as behaviors that go beyond the job description to ensure safety. Participants from a convenience sample of three Magnet designated community hospitals in New England completed three scales (Zohar's Safety Climate Questionnaire, Essentials of Magnetism II and the Safety Citizenship Role Definitions Scale) representing the study variables via an online survey platform. Multivariate analysis of covariance informed the results. Findings include a positive unadjusted relationship between safety climate and work ownership climate ($r_{s=}$.492, p<.001, N=92). Zohar's model was not supported in this study as the interaction of safety climate and work ownership climate on nurse's views about safety behaviors as in role versus extra role was not statistically significant (p=0.143). However, results did indicate that work environment alone exerted a small (effect size = .09) but significant role in predicting whether nurses viewed safety behaviors as in role versus extra role (F (1, 86) = 8.4, p=.005, N=92), controlling for work ownership climate and hospital. Implications include support for a continued focus on better understanding the importance of a positive nursing work environment, a characteristic shared by Magnet designated

hospitals, on the presence of safety citizenship behaviors in the acute care environment. A professional work environment should be considered as an important factor in reducing errors in the acute care setting.

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Chapter I

State of the Science

Purpose

The purpose of this study was to examine the effects of work ownership climate and safety climate on perceived safety citizenship behaviors of registered nurses in the acute care setting. This is an important first step for a future research agenda that includes developing interventions in organizations to enhance safety citizenship behaviors. This chapter presents the state of the science related to the variables of safety climate, work ownership climate and safety citizenship behaviors in the healthcare setting.

Introduction and Problem

The Institute of Medicine (IOM) publication, "To Err is Human: Building a Safe Health System", provided a call to action focused on patient safety in healthcare settings (Kohn, et al., 2000). Organizations were urged to develop a strong culture of safety as a key element to improve patient safety based on literature from industry and transportation (Flin & Yule, 2004; Gaba, Singer, Sinaiko, Bowen, & Ciavelli, 2003; Helmreich, 2000; Sexton, Thomas, & Helmreich, 2000).

Since the IOM report (2000), hospital based patient safety research has demonstrated organizational safety culture is related to patient outcomes (Huang, et al., 2007; Pronovost,et al., 2006; Pronovost & Sexton, 2005; Provonost, et al., 2003; Sexton, et al., 2006; Sexton, et al., 2000; Thomas, Sexton, & Helmreich, 2003; Zohar, 2008). Because registered nurses are the largest single group of health care providers in hospitals, research has focused on patient safety outcomes related to nursing care and the organizational culture in which nursing care is delivered. An organizational culture reflecting the presence of a professional nursing practice has

been demonstrated in research focused on Magnet hospitals. Aiken, Smith & Lake (1994) explored whether hospitals described as good places to work had lower Medicare mortality rates. Thirty-nine magnet designated hospitals were compared to 195 matched hospitals across the United States. The Magnet hospital group (adjusted for differences in predicted mortality rates) had a of 4.6% lower mortality rate ($p = 0.026$) which translates to 0.9 to 9.4 fewer deaths per 1000 discharges (Aiken, Smith, & Lake, 1994).

Research related to culture of safety, nursing care and patient safety outcomes represents a growing volume of studies from a variety of clinical settings in Magnet and non-Magnet hospitals. In an international nursing study, Aiken, Clarke and Sloane (2002) reported nurse rated quality of care was three times more likely to be lower in the presence of poor staffing (OR= 1.30, p <.001) and a perceived lack of support for nursing (OR = 2.44, p <.001).

Freise, Lake, Aiken, Silber and Sochalski (2008) demonstrated that better practice environments for nurses decreased the odds of death in cancer patients after surgery. A large *(N* = 25, 957) secondary data analysis of 164 hospitals was conducted including cancer registry, patient claims and nurse survey data from the state of Pennsylvania. Only one in five hospitals had favorable working conditions as measured by the Practice Environment Scale of the Nursing Work Index (PES-NWI). The PES-NWI measures on a Likert scale (1-4, with higher numbers representing more favorable working conditions) the nursing work environment components of decision making, quality of care, leadership support, staffing and nurse-physician relationships. An unfavorable work environment was reported as 2.5 or lower on the scale. The probability of a higher death rate (*OR*= 1.37, $p = <0.012$), and failure to rescue (*OR* =1.48, $p = <0.05$) were significant in the presence of a lower work environment score (Friese et

al., 2002). The connection between nursing care and patient safety outcomes is clearly significant and suggests that transformation in the work environment is needed (IOM, 2004).

The challenge for nursing leaders continues to be achieving successful strategies to transform the work environment into a professional nursing practice environment and thus improving patient safety. A body of research focused on adverse outcomes and organizational care delivery factors is accumulating. Despite studies such as Friese et al (2008), results are still inconclusive as to the extent to which organizational characteristics influence patient outcomes such as mortality (Daly, et al., 1997). In a review article, Mitchell and Shortell (1997) suggest that variation in outcomes occurs at the unit level within hospitals. Attributes such as nursing surveillance, quality of the work environment, including interactions among professionals result in some nursing units being better places to work than others (Mitchell & Shortell,1997). In a more recent review of research studies (*N*=17) a negative relationship between a poor nursing practice environment and patient mortality was found (Kazanjian, et al., 2005) Due to the variability in study characteristics the authors were unable to perform a meta-analysis of study results in this sample.

There is a clearly evidence to support the relationship between nursing practice environments and patient outcomes. However, there is little evidence from organizational behavior research to guide nursing leaders in identifying strategies to measure and understand behavioral differences between units or among individual nurses. More research is needed in order to select appropriate interventions to improve work environments and patient outcomes.

Organizations are complex entities and multiple cultures must be considered in studying organizational behavior (Zohar, 2008). A new framework proposed by Zohar suggests that the interaction of safety climate (the measurable aspect of safety culture) and work ownership

climate (shared decision making) results in employee safety citizenship behaviors (SCB). These behaviors demonstrate employee commitment to safety practices ranging from safety defiance (ignoring policies) to safety citizenship behaviors (going above and beyond) (Zohar,2008). Safety citizenship behaviors are important to consider in healthcare and specifically in nursing practice in the acute care setting. Patient care in hospitals is both unpredictable and complex and occurs in an environment requiring concern for quality and safety as well as productivity. Nurses frequently face situations where the clinical decision making for patient care is not guided by written policy and procedure. It is in these critical moments that Zohar suggests there is the opportunity for individuals to respond above and beyond their role to ensure safety (Zohar, 2008). There is no published report confirming the relationships of the variables proposed in Zohar's framework.

Therefore, the purpose of this study was to examine the effects of work ownership climate and safety climate on perceived safety citizenship behaviors (framed by Zohar's model) of registered nurses in the acute care setting.

Setting the Context: Organizational culture

Hospitals are complex organizations each with their own organizational culture and multiple sub-cultures. To better understand the context of the proposed study, organization culture will be described.

Organizational culture is the overarching force that permeates all aspects of beliefs about the organization held by its members (Ruchlin, Dubbs, & Callahan, 2004). These beliefs are shared among organizational members and direct both the perception of the work to be done and how that work gets done (Sovie, 1993). Organizational culture is complex and conceptually abstract yet visible through behaviors and attitudes displayed in the organization by its members. Thus,

the study of organizational culture follows an anthropological approach where the researcher is imbedded in the organization for extended observation over long periods of time. This differs from the study of organizational climate which uses a social psychological approach using quantitative methods of measurement (Glick, 1985). A discussion of organizational climate will be addressed under a separate heading.

Guldenmund (2000) summarized the state of organizational culture research as lacking in the use of theory or frameworks to guide existing research studies. Schein (2004) proposed a model describing three levels of organizational culture ranging from visible artifacts to deeply embedded underlying assumptions (Figure 1). Artifacts such as organizational charts and policies and procedures are the most visible signs of organizational culture. While visible, artifacts alone do not interpret the meaning of the organization to the observer. Espoused beliefs and values are spoken and written words that describe the organizational culture. Examples would be the philosophy, goals and strategies the organization uses to create its overall framework for its members (Schein, 2004). At the deepest level, the underlying assumptions of an organizational culture are found. Schein describes these assumptions as taken for granted beliefs, perception, thoughts and feelings shared by the members of the organization (Schein 2004). Alternately, this level is described simply as the way we do things (Davies, Nutley, & Mannion, 2000).

Embedded culture is stable and not easily molded or changed and provides a frame of reference and meaning to the organization's members (Guldenmund, 2000).The creation of organizational culture, its maintenance and the responsibility to change it lies with leadership (Schein, 2004).

In summary, organizational culture is the shared assumptions, values, and attitudes members have about the organization and is owned by the organization (Schein, 2004).

Organizational culture is sufficiently rooted in history, held by organizational members as a whole and is relatively resistant to direct manipulation (Denison, 1996). Examination of organizational culture addresses values and the way shared meaning develops in the organization (Ashkanasy, Wilderom, & Peterson, 2000).

Organizational climate

Organizational climate (OC) and organizational culture are interrelated but different in depth and scope. OC is defined as the individual employee's perception of and experience with the organizational culture (Denison, 1996; Schein, 2004). Organizational culture is the shared assumptions, attitudes and values of its members (Schein, 2004). The ability of individuals to make sense of the organization is reflected in OC through the behaviors of its members (Schneider, et al., 2000). Climate is subjective and can be influenced by those with power in the organization (Denison, 1996). Perceptions of OC are based on more visible features such as leadership (2006; Lewin, Lippitt, & White, 1939), decision making (Gershon, et al., 2007; Katz & Kahn, 1966; Likert, 1961; Morse & Reimer, 1956) and norms about work such as policies and procedures reflecting what happens in the organization (Cimiotti, et al., 2005; Denison, 1996). Climate is viewed as the measureable components of culture (Denison,1996).

There is renewed interest in studying organizational climate in healthcare based on the assumption that it is connected to performance, quality of care (Davies, et al., 2000) and safety (Zohar, 1980). OC, the measurable aspect of culture, is viewed as a reflection of surface level manifestations of deep rooted culture (Denison, 1996). Unfortunately, measurement of healthcare climate has varied based on how the variables of culture and climate are conceptualized by the researcher, the study purpose, resources available to the researcher and the intended use of results. Further development of theory guided empirical research is needed to

focus on multiple types of climate or sub climates, their coexistence and interaction with organizational outcomes such as safety performance (Guldenmund, 2000; Schneider, et al., 2000; Scott, Manion, Davies, & Marshall, 2003; Zohar, 1980).

To summarize, organizational culture reflects the shared values, assumptions, and attitudes of an organization held by its members. It is characterized by differing levels from visible, such as organizational charts, to deeply embedded, hard to articulate elements (Schein, 2004). Organizational climate is the perception the individual members have of the organization formed through interactions with leadership, policies and practices. OC is more easily influenced, measured and changed. Organizations may have several sub-climates such as customer service, quality and safety. Further research on organizational sub-climates, their interactions and their connection to nurse driven safety outcomes is needed (Zohar, 2008).

The next section focuses on safety culture as one sub-culture of organizational culture that is critical to understand related to nursing practice and patient outcomes. Safety climate, the measureable component of safety culture, will be highlighted as one of the variables in this study.

Safety Climate

In order to provide an understanding of safety climate, an overview of a culture of safety is discussed first.

Culture of Safety

The IOM report on errors in healthcare (Kohn, et al., 2000) prompted healthcare organizations to focus on developing a culture of safety (Coshow, Davis, & Wolosin). COS is a sub-culture of organizational culture (Blair, 2003; Gershon, Stone, Bakken, & Larson, 2004;

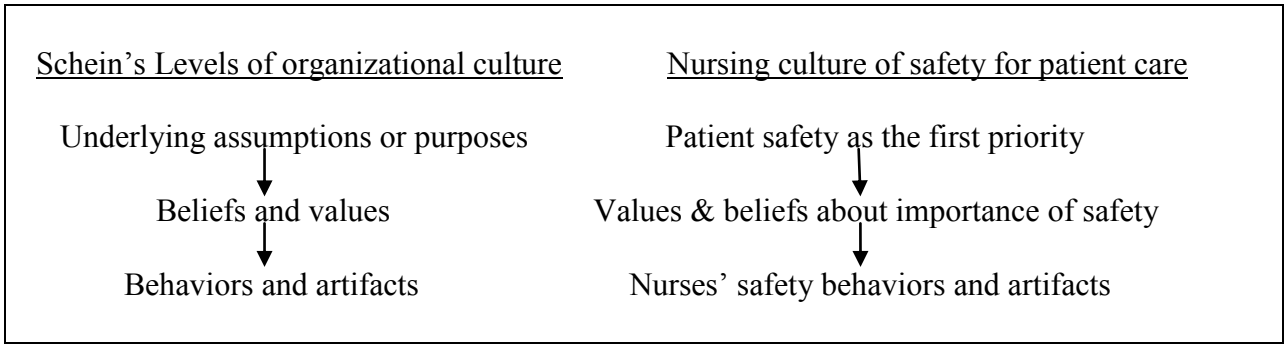
Zohar, 2008) and shares its core attributes (Blair, 2003; Friesen, Farquhar, & Hughes, 2005). COS represents the efforts of all members of an organization towards improving safety (Cooper, 2000; Guldenmund, 2000).

Healthcare definitions of COS include a strong and visible commitment to safety with a positive impact on the health and safety of workers. The organization with a COS recognizes the impact of work stress and its negative impact on quality and safety (Lungstrom, Pugliese, Bartley, Cox, & Guither, 2002). COS includes a commitment to safety across all levels of an organization and possesses a number of features identified in high reliability organizations (Gaba, et al., 2003; Nieva & Sorra, 2003). Organizational attributes include alignment around common goals, heightened awareness, good flow of information, creativity, trust, openness, and confidence (Westrum, 2004). The existence of a positive safety culture has been suggested as a major determinant of safety (Singer et al., 2003).

For a COS to exist in healthcare, there needs to be an organizational culture for patient care, defined leadership roles and responsibilities, and empowerment (Blair, 2003; Westrum, 2004). In addition, open communication, shared decision making and the ability to learn and adapt to change all contribute to a COS (Friesen, et al., 2005; GAO, 2004; Nieva & Sorra, 2003; Pizzi, Goldfarb, & Nash, 2002). Supporting a COS involves making patient safety the number one priority in the organization while recognizing that work in healthcare is complex and error prone. Management actions that promote trust in their commitment to safety include the development of a fair and just culture of safety and the provision of resources needed to support patient safety (Friesen, et al., 2005; Gaba, et al., 2003; IOM, 2004; Pizzi, et al., 2002; Provonost, et al., 2003).

A nursing culture of safety can be viewed as a subset of the organization's culture of safety with a particular focus on patient safety. (Figure 1) In a concept analysis published by Feng, Bobay and Weiss (2008), the authors describe four sub-dimensions in a nursing culture of safety. The system sub-dimension includes the policies and procedures, staffing plans, and financial resources that support patient care as well as leadership support. The personal sub-dimension addresses both the individual competence of the nurse and the degree of their personal involvement in decisions about patient care. The work environment, the level of complexity in the tasks required in caring for patients and the presence of safety behaviors describe the task-associated sub-dimension. Finally, the interactive sub-dimension includes communication about safety among staff and leadership and developing and maintaining partnerships with patients and other caregivers around safe care (Feng, Bobay, & Weiss,2008). System, personal and task-associated and interactive sub-dimensions all interact with one another in a patient oriented safety culture (Feng, et al., 2008).

Figure 1 Comparison of levels of organizational culture and nursing culture of safety



(Feng, et al., 2008) adapted from Schein's model of OC(Schein, 2004)

Although COS is not directly measurable, the desired results of its presence includes fewer errors and improved patient outcomes (Hofmann & Mark, 2006; Kaissi, 2006; Kramer &

Schmalenberg, 2005; Zohar, 2008). Safety climate, considered to be the empirical measurement of a culture of safety, will be discussed next.

Safety Climate

Safety climate (SC) is the individual's perception of an organization's practices, procedures and rewards related to safety (Clarke, 2000; Griffin & Neal, 2000; Tregunno, 2005; Zohar, 1980). SC is characterized by teamwork, autonomy, leadership and accountability. SC is the aspect of a culture of safety that is measurable (Colla, et al., 2005; Gaba, et al., 2003; Pizzi, et al., 2002; Tregunno, 2005). Measurement of SC should be viewed as a safety performance indicator (Guldenmund, 2000) or simply a "snapshot of the current state of safety" (Mearns & Flin, 1999, p. 5).

The influence of SC on patient safety outcomes has been reported in several studies. One study used a multi-method approach of survey and observation methods to examine the predictive value of safety climate scores in influencing safety practices at the unit level (Zohar, 2008). Nurses (N=955) on 69 inpatient units in three tertiary hospitals in Israel were surveyed about their perceptions of SC at the organizational and unit levels using a tool developed by the authors (2007). Unit safety was measured using observational data collected by the researchers on medication practices (12 item checklist) and emergency equipment readiness (3 item check list). These data were collected three months after the SC surveys were administered using random sampling. Findings suggest that patient safety is at its best when hospital and unit climates are aligned ($Z = 2.78$, $p<.01$) and that higher climate scores predicted stronger safety practices being present for medication and emergency readiness observations ($Z = 3.64$ for medication and 2.28 for emergency safety, $p <.01$). Additional interpretation by the authors indicated a strong unit SC can compensate for the effects of a poorer organizational SC. This

study concluded that nursing unit leadership is important in safety outcomes measured at the unit level (Zohar et al. 2007).

Hofmann and Mark (2006) focused on SC and its relationship to employee incidents (needle sticks and back injury in nurses) and complex outcomes (medication errors, urinary tract infections). Data were used from the Outcomes Research in Nursing Administration Project II representing 1,127 nurses in 80 medical-surgical units across 42 randomly selected hospitals with greater than 150 beds in the United States. Using a predictive design, nurses initially completed a safety climate survey. Three months later, outcome data on the study variables were collected to determine if safety climate scores correlated to outcomes. Data were analyzed at the unit level *(N*=80) while controlling for error at the hospital level. Results of the negative binomial regression analysis supported the hypothesis that a positive safety climate was related to fewer medication errors (r = -1.51, p<.05), urinary tract infections (r = -1.57, p<.05 one-tailed), and back injuries (r = -3.14, p<.05). At the unit level, SC was also strongly predictive of medication error rates (r = -7.85; p<.05) and back injury rates (r = -13.84; p<.05, one –tailed) in the presence of complex patient conditions. Patient complexity was viewed as a moderator of outcome variables. No relationship was found between SC and needle sticks (2004). Results also suggested that higher safety climate scores predicted improved patient satisfaction *(r* =.27, p <.01), positive perception of nurse responsiveness *(r* = .33, p<.01) and nurse satisfaction *(r* =.86, p<.01).

Currently, there are mixed results as to how well existing safety climate surveys predict patient safety outcomes in healthcare (Gershon, et al., 2004; Singla, Kitch, Weissman, & Campbell, 2006). Experts recommend continued focus on the constructs measured by existing valid measures to learn how well they correlate with or describe the organization's safety

performance (Guldenmund, 2000). Guldenmund also concluded in a review article that the development of theory related to safety climate and culture is needed (Guldenmund, 2000).

SC research suggests that work group perceptions vary in the degree to which safety performance is viewed as expected, rewarded and valued in organizations (Hofmann, et al., 2003). Organizational experts view leadership at the work group level, such as a unit nurse manager, as key in influencing staff interpretation of organizational commitment to safety. Useful diagnostic tools are needed for nursing leaders to better understand how staff nurses perceive and operationalize safety at the unit level. Tailored safety initiatives can then be applied at the unit level to improve safety behaviors and ultimately improved patient and nurse outcomes (Cooper & Phillips, 2004)

Summary

Current research on safety climate has been multi-focused. Work has been accomplished in the development of a variety of SC measurement tools, in exploring the differences between safety culture and climate and in relationships of climate to outcomes (Ashkanasy, et al., 2000; Neal & Griffin, 2000). Still, little is known about how to create a SC, the significant behaviors that occur in a SC and the factors present in the organizational climate that contribute to safety behaviors (2000). Even less is known about how individual employees influence safety behaviors through their actions and interactions with peers in an environment of multiple, competing agendas such as quality, safety and efficiency (Hofmann, et al., 2003). These knowledge gaps are significant for nursing leaders in their attempts to influence safety behaviors at the unit level. There is a need for additional organizational behavior research to fill these gaps.

Work Ownership Climate

Work ownership climate (WOC) in Zohar's model (2008) reflects the extent to which management shares information and power in the workplace to create an environment of shared ownership. Attributes of a work ownership climate include autonomy, task identity, exercising control within established policies and developing in-depth knowledge (Zohar, 2008). Engaging employees in ownership of their work through empowerment or shared decision-making increases organizational commitment (Kanter, 1993; Laschinger & Finegan, 2005; Laschinger, et al., 2004).

Nursing professional practice environment as a work ownership climate

Complex organizations such as hospitals have subcultures developed by specialized groups that influence how group members approach their roles and responsibilities (Schein, 2004; Sovie, 1993). Subcultures can be organized by professions such as nursing in a hospital setting (Feng, et al., 2008; Firth-Cozens, 2004; Manojlovich & Ketefian, 2002; Scott, Sochalski, & Aiken, 1999; Sleutel, 2000). The interpretation of the organization's culture related to work ownership by nurses is reflected in their behaviors related to shared ownership of their professional work.

A professional practice environment (PPE) is an organizational climate (Kazanjian, et al., 2005; McClure, et al., 1983) that positively impacts nurse and patient outcomes (Page, 2004). A PPE in the acute care setting is characterized by the presence of staff autonomy in individual practice decisions, nurse control over practice through shared decision making and support from strong leadership (Kramer, 2003; Kramer, Maguire, et al., 2007; Lake, 2002; Laschinger, Almost, & Tuer-Hodes, 2003).

The IOM report, "Keeping Patients Safe: Transforming the Work Environment of Nurses", provides a comprehensive look at factors needed to create a work ownership climate related to nursing practice (Page, 2004). This report highlights the characteristics of Magnet hospitals first identified in studies by McClure and others. (Kramer & Schmalenberg, 2002; McClure, et al., 1983) and further validated in a series of qualitative studies (Kramer & Schmalenberg, 2003; Kramer, Maguire, et al., 2007; Kramer, et al., 2008) Key characteristics of a PPE present in Magnet and Magnet-like organizations include professional autonomy, control over practice by staff nurses, shared decision making, good nurse/physician relationships, and leadership support.

The label "magnet hospital" was initially used to identify a group of U.S. hospitals in the early 1980s who were able to recruit and retain nurses during a national nursing shortage (McClure, et al., 1983). In 1994, the American Nurses Credentialing Center (ANCC) designated its first facility as a Magnet hospital using the conceptual framework of the forces of magnetism from the original magnet research by McClure et al. (Kramer & Schmalenberg, 2002; Lundmark, 2008; McClure, et al., 1983).

Outcome research in Magnet organizations has focused on both nurse and patient outcomes. Registered nurses (RN) working in Magnet hospitals have been shown to have a lower turnover rates, greater job satisfaction and greater nurse-assessed quality of care. These results are attributed to a positive nursing culture that supports professional nursing practice (Lundmark, 2008). Magnet characteristics have also been linked to positive nurse outcomes such as greater workplace satisfaction, lower burnout and lower reported intent to leave (IOM, 2004; Lundmark, 2008) These outcomes have also been linked to patient safety and quality (Page 2004).

Organizational research related to Magnet hospital and work ownership climate has been reported by Kramer et al. (2008). Control over nursing practice is often represented in organizations by a shared governance structure, a system that decentralizes decision making to include staff nurses in decisions related to work environment and nursing practice. Kramer et al. conducted a mixed methods, multi-site study in which they demonstrated that the presence of a viable shared governance structure enables control over practice and staff nurse perceived work empowerment. For this study, a selective sample of eight high scoring hospitals in the National Magnet Hospital Profile database was identified. This database consisted of scores from the Essentials of Magnetism tool (EOM-II) administered in 76 magnet and non-magnet hospitals across the U.S. The EOM-II measures staff nurse perceptions of autonomy, control over practice, nurse/physician relationships and leadership support and has high reliability (Cronbach $\alpha = 0.81$ to 0.90) (Kramer & Schmalenberg, 2004, 2005). Interview data were collected from staff, management and physicians about control over practice and data from participant observations of management and unit council meetings. During the interview, nursing participants were asked to rank control over practice on a scale of 0 to 10 with 10 being highest. (Kramer, et al., 2008).

The Conditions of Work Environment Questionnaire (CWEQ-II) (Havens & Laschinger, 1997), a measurement of perceived empowerment, was completed by staff nurses in the eight hospitals. Cronbach's alpha scores for CWEQ-II subscales of .72 to .90 were reported for subscales in this study, similar to those ($\alpha = .78$ to .93) reported by the scale's authors (Havens & Laschinger,1997). CWEQ-II scores range from 6 (lowest) to 30 (highest) empowerment levels. Results showed that a fairly high degree of empowerment (M = 21.35, SD 1.89) was present in hospitals with high control over nursing practice scores ($M = 7.8$) (Kramer et al., 2008).

An unpublished study by Church (2006) also confirmed a strong association between EOM and CWEQ-II scores in a sample of four hospitals in one mid-western hospital system. A positive predictive relationship of CWEQ-II scores to EOM scores was also found ($F = 968.720$, $p = .001$). In this sample, two of the hospitals were Magnet-recognized and two were not. Higher mean scores for both measures were noted in the Magnet-recognized hospital sample as well as more robust correlations between CWEQ-II and EOM scores ($r = 0.35$ *to* 0.757, $p = .01$) (Church, 2006).

Currently, the Magnet recognition program is recognized as the "gold standard" for excellence in nursing practice ("Principles & elements of a healthful practice/work environment," 2004). The standards most frequently valued by staff nurses are the PPE characteristics of leadership, autonomy, collaboration and control over practice (Kramer, et al., 2008). Evidence increasingly supports that when present, these characteristics improve patient care (Aiken, Clarke, & Sloane, 2002; Aiken, et al., 1994; Friese, Lake, Aiken, Silber, & Sochalski, 2008; Gershon, et al., 2007; Kazanjian, et al., 2005).

Engaging staff nurses in research about their work environment recognizes their value to the organization as professionals who provide both high quality and safe patient care. Examining the factors that support nurses to engage in safe patient care translates to support of professional nursing and highlights their value to the organization. Linking a PPE to safe patient care will create strong evidence for the value of designations such as Magnet recognition for outcomes not only related to patient care but also in attracting and retaining nurses (Lake, 2006a, 2006b).

Summary

In summary, the nursing PPE is an organizational climate reflecting strong leadership, autonomy, and control over practice (Kramer, 2003; Kramer, Maguire, et al., 2007; Kramer, et al., 2008). These elements demonstrate a work ownership climate where nurses at the unit level are empowered to engage in a PPE to provide safe patient care (Aiken, et al., 2002; Aiken, et al., 1994; Friese, et al., 2008; Gershon, et al., 2007; Kazanjian, et al., 2005). Therefore, for this study, PPE describes the work ownership climate of a hospital nursing unit.

Setting the Context: Safety Citizenship Behaviors

Safety citizenship behaviors (SSB) as a concept first appeared in the literature in 2003 as a subset of organizational citizenship behaviors (Hofmann, et al., 2003). A discussion of organizational citizenship behaviors is provided in order to better understand the development of the concept of safety citizenship behaviors in organizational research.

Organizational Citizenship Behaviors

Organizational citizenship behaviors (OCB) are discretionary behaviors exhibited by employees that are considered to be beyond their usual role and lead to improved function of the organization (Mearns & Reader, 2008; Zohar, 2008). These behaviors include volunteering, helping others, upholding rules (Organ & Ryan, 1995), self training and development and supporting the organization (Podsakoff, MacKenzie, Paine, & Bachrach, 2000). OCBs are enhanced when individuals feel that the organization supports them in their role. This support leads to continued OCBs and a greater commitment to the organization by the employee (Mearns & Reader, 2008). .OCBs are thought to be essential to organizational effectiveness and key to an organization's survival in turbulent times (Organ & Ryan, 1995).

In a meta-analytic review of 55 studies of organizational citizenship behavior, Organ & Ryan (1995) found a moderate relationship between job satisfaction and OCB (n = 2,845; Mp $=.284,$ SEMp $= .022, 95\%$ $CI =.241$ $to.327)$ in non-management positions. They were unable to support their hypothesis that personality traits predisposed individuals to OCB. Age, gender, tenure, type and rank of work were also not significant contributors to OCB (Organ & Ryan, 1995). All of the studies measured OCB at the individual level. The authors recommended that further studies should focus on group level analysis to allow comparisons across groups based on governance, homogeneity and reward systems (1995).

Podsakoff et al. (2000), in a review OCB research published since 1995, focused on gaining conceptual clarity with respect to OCB and updating the antecedents and consequences of OCB. Findings related to antecedents of OCB confirmed the work of Organ & Ryan (1995) who included employee satisfaction, loyalty to the organization, perceived fairness, organizational commitment and support from leadership as contributors to OCB. Group cohesiveness, transformational leadership and interesting work tasks were added to the list of antecedents to OCB (Podsakoff, et al., 2000).

More recent research has focused on consequences of OCB such as organizational effectiveness. In a summary of three studies of sales teams and manufacturing groups, OCBs accounted for approximately 19% of the variance in quantity of organizational performance, 18% in quality of performance, 25% in financial effectiveness and 38% of the variance in customer satisfaction. Excluding work quantity, the most significant trait correlated with these outcomes was helping behaviors. This exception was explained by a period of high turnover in the organization (2000). These findings support Organ's assumption that OCB is related to performance (Pronovost, Holzmueller, et al., 2006).

Only one published study was found that reported OCBs in a nursing population. A convenience sample of 392 registered nurses in non-supervisory roles in a private Chinese hospital was studied to validate the antecedents of OCB in a model developed by the authors (Chu, Lee, Hsu, & Chen, 2005). The model suggests that the independent variables of affect, autonomy, procedural justice (fairness in resolving dispute), role ambiguity, workload, pay, promotion, routinization, job involvement and support from others all influence OCB through job satisfaction and organizational commitment.

Of the variables suggested in Chu et al.'s model, affect (r =*.410),* autonomy (r = .242), procedural justice (r =. 206), promotion (r = .207), and support from others (supervisor r = .308; peers r = .317) were significantly and positively related to job satisfaction (p = < .01). Negative work affect (r = -.355), role ambiguity (r = -.216) and routinization of work tasks (r = -441, p = <.01) were significantly and negatively correlated with job satisfaction. Pay was not significant in job satisfaction in this study (r = -.057, NS). Using multiple regression analysis, the authors noted that only job satisfaction (β =.192, p<.05) was significantly and directly correlated with OCB (Chu et al., 2005).

These results indicate that a supportive work environment that engages nurses in their work, treats them fairly, offers opportunities for advancement, and a voice in the organization has a positive impact on employee satisfaction which in turn generates good citizenship behaviors in the nurses (Chu et al., 2005). These interrelationships are significant in understanding both the complexity of organizational culture and key aspects to target for improvements in OCB.

The interest in OCB as a management research focus continues to grow as more knowledge is gained about possible positive outcomes associated with OCBs such as quality and

productivity (Podsakoff, et al., 2000). The characteristics of OCBs serve as a foundation for nurse safety citizenship behaviors which will be discussed next.

Safety Citizenship Behaviors

The focus on safety and related employee behaviors has led to the recognition of safety citizenship behaviors (SCB) as important to organizations. It is theorized that workplace safety is enhanced through positive employee perceptions of safety climate and organizational support (Hofmann, et al., 2003; Turner, Chmiel, & Walls, 2005). SCBs are described as helping others with safety issues, taking part in safety improvement activities, putting pressure on management to improve safety (having voice), reporting dangers (whistle blowing) and maintaining knowledge about safety practices in the workplace (Hofmann, et al., 2003). Zohar calls these behaviors commitment-based safety because discretionary, enhanced role behaviors are contributing to the well-being of the organization beyond the presence of a safety climate (Zohar, 2008). Commitment to safety is theoretically a better predictor of safety outcomes than compliance, the latter being a more passive adherence to rules and procedures (Griffin & Neal, 2000; Hofmann, et al., 2003). In routine, predictable work, discipline and compliance are adequate for maintaining safe practices. In less routine or predictable circumstances, individual initiative and SCBs are needed to guide safe practice decisions where procedures alone are inadequate (Zohar, 2008). Nursing work on acute care units in hospitals is not routine and is more often unpredictable, complex and associated with competing demands (IOM, 2004).

Another important factor in support of SCBs is enhanced organizational decision-making authority by employees or access to empowerment. High job control in non-healthcare industries has been positively related to safety citizenship behaviors even when individuals are experiencing periods of high job demand (Turner, et al., 2005).

Zohar (2008) suggests that employee work ownership coupled with a positive safety climate results in SCBs. Safety citizenship means that employees have a proactive orientation to the use of safety practices in their work, which is particularly important when work processes are not routinized (Zohar, 2008). Non-routine care is likely with the design and implementation of individualized patient care.

Hofmann et al. (2003), using a military sample (N=94), demonstrated through hierarchical linear analysis that a positive SC moderated the relationship of good management and staff interactions and self-reported SCBs (slope = 1.22, *t* ratio (23) = 3.29, p <.01). In other words, in the absence of a strong SC, the relationship of the variables was not significant (Hofmann, et al., 2003).

Employees pay close attention to the attitudes and beliefs of their managers and senior management about safety. The expectations made by management and their actions in regularly promoting or being inconsistent in support of safety practices greatly influences how staff behave. These expectations are the key to perceptions of SC in the organization and reflect the attitude of employees related to the competing demands of safety and production (Zohar, 2008).

Three published studies were found examining safety climate and safety behaviors in a healthcare population. Neal and Griffin (2006) conducted a longitudinal study in an Australian hospital over a five year period. The sample represented 33 work groups across the hospital ranging from 6 to 30 (M =12.1) employees. Job categories within or across groups were not reported. Safety climate, safety motivation and safety behavior (identified as safety compliance and safety participation) were measured three times during the study period. Work related employee injuries (sprains, strains, bruises and fractures) were obtained from the hospital database required for reporting by the Australian government.

Using a series of multilevel statistical analyses, the authors demonstrated that belonging to a group with a positive safety climate at year 2 predicted positive changes at the individual level of safety motivation at year 4 *(r* =.30, SE = 0.11, p <.05). This finding demonstrates a lagged effect of a positive safety climate over two years. Individual safety motivation levels at year 2 demonstrated a positive effect on safety participation (r =.28, SE= 0.14, p <.01) at year 4. This result indicates that when individuals believe safety is important and believe they are supported, they are more likely to increase their participation in safety practices over time. At the group level of measurement, self-reported safety behavior was only partially supported in reducing accidents.

The direction of causation in this study went from individual behavior to group accident rates indicating a bottom-up process potential for this change. The authors concluded that while organizational change takes time, positive results can occur with changes in the work environment that motivate employees to actively participate in safety activities and the changes are sustained over time (Neal & Griffin, 2006).

In related work, Vogus and Sutcliffe (2007) used the term safety organizing behaviors to describe employee actions such as discussing errors, the ways to learn from them, and challenging the status quo on safety practices. Their study, using a convenience sample of 1033 registered nurses from ten Catholic hospitals in the United States, examined the relationship of safety organizing behaviors, trust in leadership and the use of care pathways to reported medication errors. Higher scores of safety organizing behaviors and higher trust in leadership correlated with lower reported medication errors (R= -0.68, SE = 0.18, p <0.05). The effect of higher scores of safety organizing behaviors and use of care pathways was also present (R =

-0.82, SE 0.25, p <0.05). These results translated to approximately one to three fewer reported medication errors per unit respectively where safety organizing behaviors were present (Vogus & Sutcliffe, 2007). This study is included in this discussion due to the similarities in the definitions of safety organizing behaviors and safety citizenship behaviors.

A third study by Hughes, Chang and Mark (2009) examined the strength (within-unit consensus) and quality (positive or negative ratings) of safety climate in medical surgical units and the differences in safety climate using selected unit characteristics of complexity and Magnet status. A secondary analysis was performed using data from a previous study by one of the authors (Mark, et al., 2007). The sample included medical-surgical units (N=286) from 146 general, acute care, Magnet and non-Magnet hospitals in the US with at least 99 beds. A total of 3,689 nurses completed surveys for this study, a response rate of 58%.

The authors described different levels of safety behaviors as compliance with organizational safety policies and voluntary participation in safety behaviors such as discussion errors with co-workers. The conceptual framework for the study suggests that the work environment and management practices must be conducive to engaging employees in safety behaviors and that co-workers communicate their expectations for safety behaviors on their unit as well. Subscales from Zohar's Safety Climate Scale (1980) and the Error Orientation Scale (Rybowiak, Garst, Frese, & Bationic, 1999) were used in this study. Both scales use a Likert-like range of 1 to 5 with five being strongly agree, three as no opinion and one as strongly disagree. Interclass correlation values (ICC) were determined at the item and subscale levels with ICC2 scores all greater than .60, justifying aggregation of data to the unit level. Mean scores were then determined across the units in the sample. Results demonstrated that unit level commitment to safety was the strongest attribute of safety climate scores with mean scores of 3.87 to 4.33 and

67% to 78% respondent agreement followed by management behaviors (M = 3.62-3.96). Previous studies have reported management practices as the strongest attribute of a positive safety climate. Unit differences were also noted with Magnet hospitals (approximately half the sample) more likely to discuss errors amongst peers and participate in problem solving about errors (F= 15.75, df (n.r.), p = <.05 and F = 19.24, df (n.r.), p = <.05 respectively). Smaller hospitals (< 32 beds) also reported greater error discussion and problem solving about errors with peers (F=15.49, df (n.r.), p = <.01 and F= 19.38, df (n.r.), p = <.05). The authors concluded that differences in nursing unit safety climate may need to be considered in tailoring interventions for improvement as well as a better understanding of operant factors on each unit (Hughes et al, 2009)

Zohar (2008) proposes commitment-based safety behaviors as the strongest level in his multi-level, multi-climate and labels them as safety citizenship behaviors. Commitment-based safety behaviors are enhanced role behaviors used in a discretionary manner by employees to contribute to the well-being of the organization beyond the presence of a safety climate (Zohar, 2008). Commitment to safety is theoretically a better predictor of safety outcomes than compliance, the latter being a more passive adherence to rules and procedures (Griffin & Neal, 2000; Hofmann, et al., 2003).

Healthcare organizations have typically added policies and procedures in their efforts to reduce errors. However, the degree to which policies are perceived by staff as suited to the daily work demands of a particular hospital unit impacts how well the policies are followed. The authors also note that rules and procedures cannot cover all possible clinical scenarios and that employee perceptions and interpretations of the importance of the policies plays a key role in safety (Katz-Navon, Naveh, & Stern, 2005).

In less routine or predictable circumstances, individual initiative and SCBs may guide safe practice decisions where procedures alone are inadequate (Zohar, 2008). Nursing work in hospitals is complex, unpredictable, and associated with competing demands (Gittell, 2002; IOM, 2004). More attention to safety citizenship may have a positive impact on safety outcomes in acute care nursing practice.

Another important factor in support of SCBs is enhanced organizational decision-making authority by employees or access to empowerment. High job control in other industries has been shown to be positively related to SCBs even when individuals are experiencing periods of high job demand (Turner, et al., 2005). This evidence supports the notion that a professional practice environment, which included high job control for nursing care, would also encourage the presence of SCBs.

Zohar (2008) suggests that employee ownership of work coupled with a positive SC results in SCBs. Safety citizenship means that employees have a proactive orientation to the use of safety practices in their work which is particularly important when work processes are not routinized (Zohar, 2008). These relationships have not been empirically tested. The importance of SCBs to registered nurses working in hospitals is unknown. No studies were found explaining the role of personality characteristics or life experiences in influencing the presence of SCBs in nurses. Exploring relationships among safety climate, work ownership climate and safety citizenship behaviors would enhance what is known about behaviors of professional nurses in acute care hospitals, and in particular at the unit level. This knowledge may enable nursing leaders to better understand how to create work environments that influence the development and use of SCBs to improve patient safety.

Summary

A review of the literature presented the variables of safety climate, work ownership climate and safety citizenship behaviors. These variables were felt to be important in understanding organizational factors in reducing errors in the healthcare setting. Research studies were selected from both non-healthcare and healthcare sources with a focus on nursing related studies in healthcare

Organizational culture and climate are complex entities yet important to study and understand in order to improve organizational outcomes. In healthcare organizations, there has been increased focus on the study of individual work groups or subcultures to identify employee attitudes and beliefs about patient safety and how well the individual work group and hospital are performing in that arena (Davies, et al., 2000; Zohar, 2008). The IOM report on errors concluded that healthcare organizations should develop a strong culture of safety, a subculture of organizational culture, to improve patient safety (Kohn, et al., 2000).

Zohar (2008) has proposed that safety climate and work ownership climate influence safety citizenship behaviors in a model that suggests that increased safety citizenship behaviors will increase safety outcomes in organizations (Zohar, 2008). Zohar's model (2008) has yet to be empirically tested based on current published literature; however, supportive evidence for this model exists in current literature. Therefore, little is known about the interactions of safety climate and work ownership climate on safety citizenship behaviors in nurses on individual patient care units.

There is evidence to support the importance of a safety climate, the measurable component of safety culture, in improving patient outcomes (Guldenmund, 2000; Hofmann & Mark, 2006; Zohar, 2008). Leadership is key in the development and maintenance of a strong

safety climate (Hofmann, et al., 2003). More specifically, unit level leadership such as the nurse manager is key in operationalizing safety improvements as staff look for leadership to role model safety behaviors (Hofmann, et al., 2003); Zohar, Livne, Tenne-Gazit, Admi, & Donchin, 2007). However, less is known about other factors such as peer influence and role modeling that may contribute to safety behaviors in individual nurses (Hofmann, Morgeson & Gerras, 2003).

Work ownership climate for professional nursing is reflected in the characteristics of a professional practice environment and considered key in improving patient safety (IOM, 2004). Characteristics of a PPE include autonomy, control over practice and strong leadership (Kramer, Maguire, et al., 2007; Kramer, et al., 2008; Lake, 2002; Laschinger, et al., 2003). The current gold standard of measurement for a professional practice environment is Magnet certification ("Principles & elements of a healthful practice/work environment," 2004). Outcomes research has demonstrated that a PPE positively influences patient outcomes (Aiken, et al., 2002; Aiken, et al., 1994; Friese, et al., 2008) and nurse outcomes (IOM, 2004; Lundmark, 2008).

Safety citizenship behaviors have more recently been identified as an important component of workplace safety in non-healthcare research (Hofmann, et al., 2003; Turner, et al., 2005). Related healthcare research on safety behaviors and safety climate gives additional to the relationship of a organizational climate for safety and safety compliance and participation by healthcare staff (Neal & Griffin, 2006). Zohar suggests that safety citizenship behaviors may be significant in improving patient safety because they are most effective when there is high job control and work processes are not routinized (Zohar, 2008). This is relevant to acute care nursing practice. In a professional nursing practice environment there is high job control as the environment supports autonomy, control over practice and shared decision making. Work processes in acute care nursing, while guided by standards and policy, are often carried out in a

situation specific, non-routinized manner requiring individual judgment by the nurse at the point of care.

Zohar's model (2008) suggests that safety citizenship behaviors could be significant in reducing errors in a practice environment such as the acute care setting. Therefore, increased knowledge about the interactions among the variables of safety climate, work ownership climate and safety citizenship behaviors may be important in improving patient safety in healthcare organizations. Nursing leaders could utilize this information to enhance strategies to reduce errors as well as improve the work environment for nurses.

Chapter II

Conceptual Framework

The use of theory is important to nursing research as it provides a mechanism for organizing, explaining, predicting and describing phenomena in practice. As the development of nursing knowledge has progressed, the use of the terms model, theory and framework have often been used interchangeably (Meleis, 2005). Meleis supports these terms as interchangeable and suggests there should be less concern about semantic differences. Instead nurse researchers should simply choose their preferred label and then provide a clear definition and purpose for its use in their research (2005). The theory used to frame this study was Zohar's Multi-Climate Framework for Occupational Safety (Zohar, 2008).

In the case of patient safety and organizational culture, there is an absence of theory development in the nursing discipline. In fact, a general absence of the use of theory in patient safety research has been noted across disciplines (Hoff, Jameson, Hannan, & Flink, 2004; Page, 2004; Zohar, 2008). In a review of research focused on connections among organizational factors, medical errors and patient safety, Hoff et al. noted that over 60 percent of the articles reviewed ($N = 42$) had no evidence of theory or framework underpinning the research (Hoff et al.,2004).

The sociological school of thought identifies two approaches to organizational behavior related to safety, Normal Accident Theory and High Reliability Organization Theory. Both theories reflect the critical nature that organizational factors play in safety practices. Normal Accident Theory stresses that accidents are likely to occur in organizations due to the nature and complexity of the work involved (Perrow, 1999). The focus of High Reliability Theory is directed towards organizations with fewer than normal accidents, an achievement usually

reached through a culture focused on safety (Roberts, 1993). The theory does not address the particulars of how culture is changed, however.

Tentative theories are newly proposed relationships among concepts and are less well developed than existing theories. The concepts while well defined may not have been tested in the proposed framework of relationships (Burns & Grove, 2005). The concepts in Zohar's multi-climate framework are not new. However, his assembly of the concepts suggests that their interrelationships provide the underpinnings of a tentative theoretical framework to better understand how multiple organizational climates interact to improve safety (Zohar, 2008). By understanding these relationships, specific strategies for initiating and sustaining climate changes can be developed in different settings such as hospital nursing units.

Returning to the guidance of Meleis, adapting theories or conceptual frameworks from other disciplines and then applying them to nursing practice is justified in order to develop discipline specific knowledge (Meleis, 2005). Theories developed in the discipline of psychology are the most frequent source of borrowed theory reported in the nursing literature (Moody, et al., 1988).

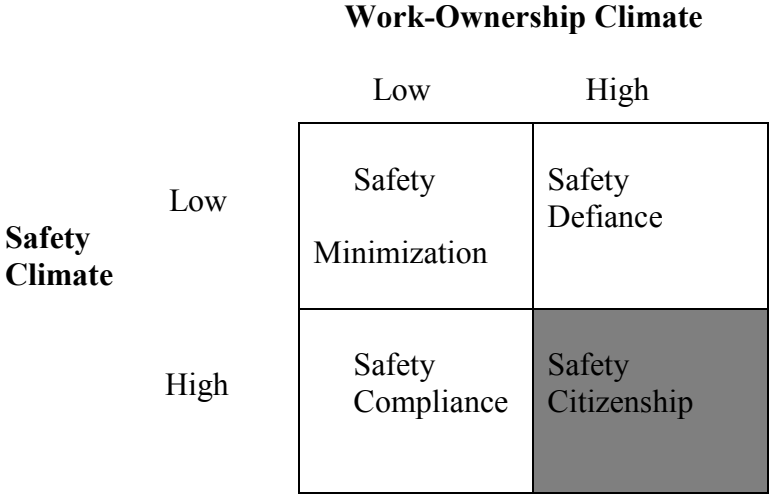
This dissertation study examined the association of the variables of work ownership climate (professional practice environment), safety climate (nursing unit level) and their influence on safety citizenship behaviors (in nurses). The Multi-Climate Framework for Occupational Safety (Zohar, 2008) (Figure 2), addresses the variables of interest outlined in this dissertation study. Zohar has proposed these concepts in a framework, rooted in organizational psychology, in order to have a more theoretical approach to understanding the interactions among multiple organizational climates to improve workplace safety (Zohar, 2008). Application

of this framework to the discipline of nursing in the areas of nursing practice and leadership will enhance what is known about the nursing work environment and patient safety.

Dr. Zohar is a professor of management at the Israel Institute of Technology in Haifa, Israel. He earned his Ph.D. and M.Sc. degrees in psychology from the University of Maryland. For the past twenty years, his work has explored the behavioral aspects of safety at work in a variety of settings including manufacturing, military operations and healthcare ("The William Davidson Faculty of Industrial Engineering and Management,").

In his 2008 publication, "Safety Climate and Beyond: A Multi-level Multi-climate Framework, Zohar reviews his own safety-climate research as well as that of others. He then offers a new research focus to address the interaction of climates and their impact on employee behaviors. The understanding of these interactions will further the understanding of safety outcomes in organizations as well as add to the development of organizational safety theory (Zohar 2008). Zohar (2008) proposes a framework to better explain the interaction of safety climate (the measurable aspect of safety culture) and work ownership climate (shared decision making) on the presence of safety citizenship behaviors in employees. Safety citizenship behaviors demonstrate employee commitment to safety practices ranging from safety defiance (ignoring policies) to safety citizenship behaviors (going above and beyond). To date, there are no published reports confirming the relationship of the variables in the manner proposed by Zohar's framework in a healthcare setting.

Figure 2. Multi-climate framework for occupational safety (Zohar, 2008)



Zohar has validated safety climate as a multilevel construct by taking into consideration that climate is conceptualized both at the work unit or nursing unit level and at the organizational level (Zohar, 2000; Zohar & Luria, 2005). While organizational climate continues to be viewed as one construct, safety climate may be perceived differently at different organizational levels. Organizational level safety climate reflects staff perceptions of senior management beliefs and practices and may differ from unit level safety climate. One reason for the difference is the influence of factors such as unit management practices (Zohar & Luria, 2004) and co-worker influences (Hughes, Chang, & Mark, 2009) on unit level safety climate. Zohar (2008) suggests that employees can differentiate between the organizational and unit level safety climates and thus a multilevel construct should be used for measurement.

Co-existing climates in organizations are represented in the proposed model by adding work ownership climate to the equation. The idea of multiple, co-existing climates has been largely ignored in organizational research according to Zohar (2008). An organizational climate

that rewards extra-role activity (autonomy) versus in-role activity (compliance) would provide additional stimulus for enhanced safety outcomes as proposed in this framework (Zohar, 2008). Work ownership climate is also viewed as multilevel. At the organizational level, policies that support reduced bureaucracy and foster empowerment and autonomy would indicate a high work ownership climate. At the unit level, work ownership attributes could include managerial practices that support having voice in practice decisions, participation in decisions about patient care, professional development opportunities and/or feedback on performance (Zohar, 2008).

Zohar further suggests that the relationship of safety and work ownership climates should be examined at both the unit and organizational levels since variation in safety practices may occur both "across and within hierarchical levels in an organization" (Zohar, 2008, p. 385). Therein lays the richness of a multi-level, multi-climate framework in organizational research.

The multi-climate framework suggests that safety behaviors result in a variety of outcomes depending on the strength of the relationship between safety and work ownership climates. A low work ownership climate and a high safety climate are predicted to result in safety compliance behaviors or following the rules but not going above and beyond in specific safety behaviors. High work ownership climate and low safety climate will result in safety defiance defined as behaviors that reflect an agreement with organizational goals such as production and quotas but at the expense of taking short cuts in safety practices to achieve organizational goals. When the strength of both safety climate and work ownership climates are low, safety minimization behaviors are expected to be evident. These behaviors would reflect a climate where employees had little voice and management's message minimizes safety practices as important. Employees will tend to cut corners where it is easier to perform low risk tasks rather than follow safety practices. Finally, the framework suggests that in the presence of high

work ownership and high safety climates, safety citizenship behaviors would be manifested. These behaviors would enhance safety because employees feel they have a voice in the organization, feel concern and support from management about the importance of safety practices and are willing to make the extra effort to enhance safety (Zohar, 2008).

The strength of a climate is also an important factor to consider. The continuity of a climate depends on its strength. A strong climate is more than a positive value (quality) on a climate scale. It is also the degree of variability within the group members around climate perceptions (Hughes, et al., 2009; Schneider, Salvaggio, & Subirats, 2002). Less variability indicates a more cohesive group view of practices within their work group and an indication of consistency of management expectations related to that climate (Klein, Conn, Smith, & Sorra, 2001; Zohar & Luria, 2004). In this dissertation study, the strength and quality of safety climate and work ownership climate were measured within and across groups to compare the relationships between the safety climate and work ownership climate. An analysis of the association of safety climate and work ownership climate to staff reported perceptions of safety citizenship behaviors was then conducted.

Specific Aims

Safety citizenship behaviors (SCB) are important to consider in healthcare and specifically in nursing practice in the acute care setting. Patient care in hospitals is both unpredictable and complex and occurs in an environment requiring concern for quality and safety as well as productivity (Page, 2004). Nurses frequently face situations where the clinical decision making for patient care is not guided by written policy and procedure. It is in these

critical moments that Zohar suggests there is the opportunity for individuals to respond above and beyond their role to ensure safety (Zohar, 2008).

This link is significant to RNs in acute care as their nursing practice is characterized by non-routine tasks and processes not always covered by standards and policy. Nursing work also has competing demands on time and attention (Zohar, 2008). A professional practice environment (work ownership climate) and strong safety climate would be expected to enhance safety citizenship behaviors. The importance for nursing in examining SCB is to determine how nurses perceive these behaviors as a part of their role, how their work environment contributes to the use of SCB and the degree of variability that exists across the organization in the use of SCB. Future research can then address strategies to enhance the use and support of SCB in practice and measurement of their effect on safety outcomes.

Thus, the purpose of this study was to investigate the effect of safety climate and work-ownership climate on safety citizenship behaviors among acute care registered nurses.

The specific aims of the study were to:

1. Examine the relationship of unit work-ownership climate and unit safety climate as perceived by staff nurses in the acute care setting.
2. Explore the association of work-ownership climate and safety climate on the perception of safety citizenship behaviors in staff nurses.

An exploratory aim was proposed to detect the possibility of moderators in the interaction of the variables in aim #2.

3. Explore the relationship of demographic variables (age and tenure) to safety citizenship behaviors in staff nurses.

Chapter III

Methods

Introduction

The purpose of this study was to examine the effects of work ownership climate and safety climate on perceived safety citizenship behaviors of registered nurses in the acute care setting. This chapter describes the methods used to investigate this organizational issue.

Study Design

A non-randomized cross-sectional study design was used to explore the relationships among the study variables of work-ownership, safety climate and safety citizenship behaviors. A convenience sample of staff nurses in three acute care community hospitals in New England with Magnet status was used for the study population. Demographic data were collected and respondents were asked to complete three reliable and valid measures, each relating to one of the variables of interest in this study.

Data were collected using internet based survey techniques using electronic links provided to the participants via their work email system. Internet survey methods using Dillman's tailored approach (Dillman, 2007) offer a convenient method of collecting data that has been shown to enhance response rates in recent nursing studies (Hart, Brennan, Sym, & Larson, 2009; Kramer, Schmalenberg, & Keller-Unger, 2009; McFall & Milke, 2007).

Zohar's multi-climate framework for occupational safety (Zohar, 2008) was used to guide the exploration of the relationships between the independent variables of safety climate and work ownership climate and their influence on staff nurse safety citizenship behaviors (dependent variable). Testing of the framework has not been reported in the literature. Studying the correlation of the independent variables as they exist in the population without manipulation

through the use of a framework is representative of a correlational design. Multiple linear regression analysis was used to identify the relationship of the independent variables on safety citizenship behaviors (Brink & Wood, 1998).

Sample

A non-random, convenience sample of registered nurses (RN) was recruited from three acute care community hospitals with Magnet recognition and located in New England. Magnet hospitals were chosen in order to control for the presence of a professional practice environment using a known groups approach (Kramer & Schmalenberg, 2004). A convenience sample was appropriate for this study because the study proposal addresses exploration of new knowledge (Burns & Grove, 2005). The use of Magnet designated hospitals also reinforced the presence of a shared decision making model (work ownership climate) for staff nurses. Targeting three hospitals also allowed for the potential for a larger study sample within each hospital and enhanced sample representativeness of the variables of interest. A total available sample of 1153 RNs was estimated for this study. The actual study sample (n = 92) is described in Chapter 4 and 5.

Inclusion criteria.

Inclusion criteria consisted of regular employment as an RN (defined as 16 hours or greater per week), at least 3 months of RN experience with 3 months tenure on the current unit, and regular assignment to direct patient care. All nursing care units, inpatient and outpatient participating in the shared governance structure were eligible for participation in the study. Participants also needed to have access to the internet and be able to use a computer and mouse.

Kramer and Schmalenberg initially recommended excluding nurses with less than one year of experience since they may perceive control over practice differently than more

experienced nurses. The authors based this recommendation on their findings in the development and evaluation of the Essentials of Magnetism scale (Kramer & Schmalenberg, 2004). Later publications by these authors indicated that nurses with less than one year of experience be included and comparisons across groups be conducted to determine if differences are related to tenure (Schmalenberg & Kramer, 2008)

Exclusion criteria.

Registered nurses not meeting the employment criteria listed in the inclusion criteria, those having a primary role in management, education, as a nurse practitioner, clinical nurse specialist, or case manager were excluded. Agency or temporary nurses were not eligible for participation in the study. Nurses who did not wish to participate in the study at work and lacking internet access via a computer at home were also excluded.

Power analysis

An a priori power analysis based on the highest level of statistical analysis proposed for each specific aim was performed to determine the study sample needed. G*Power version 3.0.10 was used to perform the power analysis calculations. For specific aim #1, correlation of the variables safety climate and work ownership was planned. A small effect size was desired to allow for the smallest meaningful effect to be detected in study focused on a new area of research (Burns & Grove, 2005). Based on a 2-tailed test with a power of .80, an effect size of .17, and a .05 level of significance, the appropriate sample size for this correlational study was 266. This represents a 23% response rate from the estimated total available population.

Specific aim #2 addresses the influence of safety climate and work ownership climate on perceived safety citizenship behaviors. Hierarchical linear modeling using multiple regressions was the statistic of choice. A small effect size ($d = .2$, $\alpha = 0.05$), powered at .80 with ten

predictors indicated the need for a sample size of 172 and a response rate of 15% of the available population.

In order to adequately power the study, a sample size of 300 (26% of available sample) was needed to allow for incomplete surveys and failure to meet inclusion criteria. Initially, two hospital sites were identified to participate in the study. Due to difficulties in accessing the survey via email at one site, a third hospital was added to the study.

Setting

Newport Hospital (Hospital #1), located in Newport, Rhode Island, is a 129- bed community hospital providing surgical services, inpatient adult medical-surgical and behavioral services, a birthing center and acute inpatient and outpatient rehabilitation services. Inpatient admissions annually are approximately 5608 with 31,093 emergency visits per year. The hospital serves the surrounding communities in Newport County with a population predominantly white population (93%) of 85,433 with a median age of 38.6 years. Newport became a Magnet hospital in 2004, the first community hospital in Rhode Island to do so, and was re-designated as Magnet in May 2009. Newport Hospital is a member of Lifespan, a large healthcare system in Rhode Island (Lifespan, 2009).

Winchester Hospital (Hospital #2) is a 229-bed community hospital in Winchester, Massachusetts, a suburban community northwest of Boston. The hospital provides care in general, bariatric and vascular surgery, orthopedics, pediatrics, cardiology, pulmonary medicine, oncology, gastroenterology, rehabilitation, radiation oncology, pain management, obstetrics/gynecology and a Level IIB Special Care Nursery and serves approximately 14,500 inpatients per year. Emergency department visits approach 50,000 per year and a home care agency provides over 45,000 visits per year to surrounding communities. Located in Middlesex

County, the hospital serves Winchester and five surrounding communities with a population of approximately 206,401 predominantly white (93%) individuals with a median age of 41.1. Winchester Hospital has clinical affiliations with several nationally recognized hospitals in the region, including Children's Hospital Boston, Tufts Medical Center and Beth Israel Deaconess Medical Center. Winchester Hospital is the first community hospital in Massachusetts to earn Magnet recognition, the American Nurses Association's highest honor for nursing excellence. The hospital received is initial Magnet certification in 2003 and again in 2008 ("Winchester Hospital," 2010).

Middlesex Hospital (Hospital #3) is also a three time Magnet designated hospital having just completed re-certification in 2010. This 275 bed hospital is located in Middletown, Connecticut, near Hartford. The hospital provides a full range of community hospital services including adult medical and surgical care, maternity and Level II nursery, behavioral health, rehabilitation, oncology, home care, emergency services as well as a network of community outpatient services. The hospital supports a resident training program ("Middlesex Hospital," 2010). The Middletown community has a growing population of approximately 48,383 primarily white (75%), black (12.4%) and Hispanic (4.5) residents with a median age of 36.3. Unemployment in the area is reported as 4.4% ("Hospital_Data.com: Hospital and nursing home profiles,").

Procedures

Recruitment

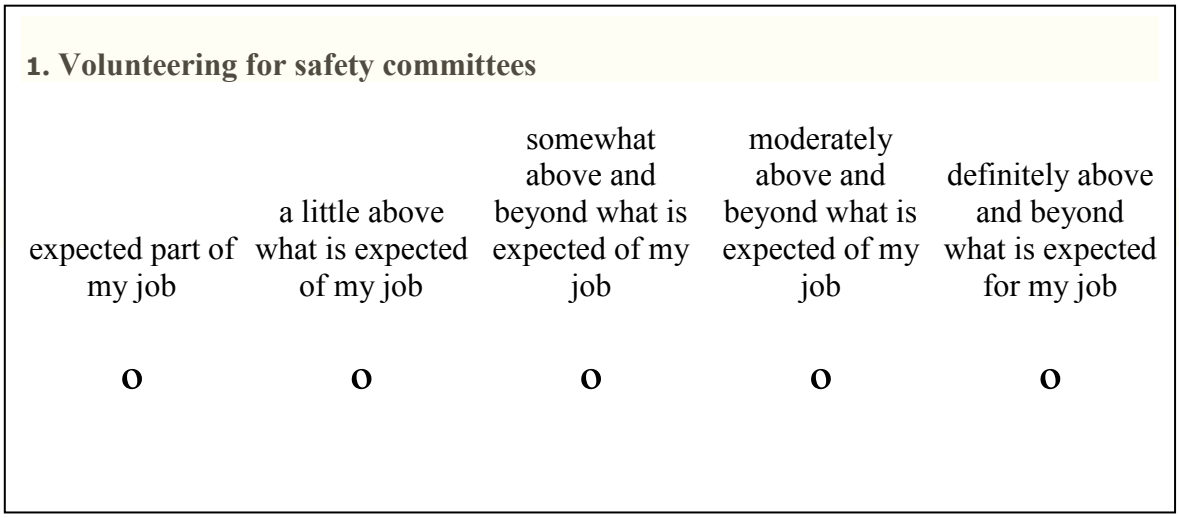
Following approval from the nursing research committees and IRB committees at each hospital as well as the IRB at the University of Massachusetts Memorial in Worcester, RNs from all patient care units in each hospital were invited to participate in the study. Emails written by

the primary investigator (PI) were sent via the hospital email system to invite potential participants in the study. A hospital staff member was asked to host the study emails as the researcher did not have access to the hospital email system or employee emails. At Hospital 1, the internal PI hosted the emails sent to all staff. At Hospitals 2 and 3, the administrative assistant to the chief nurse hosted the emails as she had access to all staff email groupings.

The tailored design method of internet surveys was used for this study (Dillman, 2007). Flyers posted on the nursing units announced the study and indicated that the invitation to participate would be via email. The initial email (email #1) was sent the week before the study started. The purpose of this email was to inform potential participants about the study in more detail and announce that the invitation to participate in the study would arrive in the next few days. A second email (email #2) sent to RNs three to five days later provided instructions on access to the study materials using an imbedded electronic link to the study in the body of the email. The link opened with an explanation of the study purpose and an approved consent form with instructions that accepting the consent would open the study materials. Instructions for completing the survey were followed by a demographic survey and then the study scales in the following order: Safety Citizenship Role Definition Scale, Essentials of Magnetism II, and Zohar's Safety Climate Questionnaire. The average time to complete the survey was twenty minutes. As respondents completed the study, instructions for submitting the study were presented followed by a thank you response confirming successful completion of the study. If the participant was interrupted during the data collection, a prompt appeared if they attempted to exit before completing the study. The prompt will simply invite the participant to return at a later time to complete the scales with instructions on how to do so and assurance that already completed answers would be saved. Participants exiting the study at that time and indicating that

they do not plan to complete the study received a thank you message prior to exiting the study site. The presentation of each scale allowed the participant to scroll through the questions and visualize the scale in a manner similar to a paper and pencil format (Figure 3).

Figure 3 Sample question format using SurveyGizmo



The study plan included follow up reminders and an incentive, procedures known to maximize the response rate (Bourque & Fielder, 2003; Dillman, 2007). Reminder emails were sent participants at two weeks (email #3) and four weeks (email #4) to ensure an appropriate study sample (Dillman, 2007). All follow up emails included the link to the electronic survey. The email address and phone number of the PI was included in each electronic communication. Emails received by the PI from participants were addressed and then maintained in a secure, locked file in the PI's office until the completion of the study. No record of email addresses of participants was kept by the PI to ensure confidentiality of the participants in the study. Only one email was received related to difficulty with initial entry to the study (Hospital 1) and the problem was resolved.

An incentive to participate in the study was offered to increase the response rate. The unit with the greatest percentage of participation at each hospital earned a party hosted by the PI and provided at work.

Specific factors related to successful recruitment of nurses into research studies using electronic surveys have been reported. The convenience of electronic access (McFall & Milke, 2007), bundling of surveys rather than multiple contacts for each individual survey, use of personalized contacts to participate, the benefits of the research to nurses and tailored incentives all contribute to greater success in recruiting RNs (Kramer, Schmalenberg, & Keller-Unger, 2009).

Dillman (2007) addresses the importance of careful design of internet based surveys. Key factors include a simple design, the configuration of questions and response options, use of vertical display in formatting questions, clear instructions for completion of the survey as well as technical instructions for user success (Dillman, 2007; Gordon & McNew, 2008). A progress bar indicating the percent of questions completed in the survey is also helpful for the participant to gauge their progress. Equally important is a clearly marked submit button at the end of the survey (Gordon & McNew, 2008). Both a progress bar and submit button were incorporated into the online survey design for this study.

Pretesting the surveys using different web browsers and different types of computers (personal computer vs. Macintosh) was also helpful in avoiding technical problems with respondents (Dillman, 2007; Gordon & McNew, 2008). Additional design considerations included recording the date, time and internet provider (IP) address of the computer used by the participant. Multiple responses from the same IP address may indicate multiple responses from one person (Gordon & McNew, 2008). In this study, nurses could choose to respond during work

hours. Hospitals typically use a network configuration for their unit based computers and responses from different nurses could show the same IP address. Having nurses respond from their work computer provided another layer of confidentiality as their response could not be traced to a personal computer.

Retention

Retention of subjects was not an issue as there was only one data collection point per participant. Participants entered the site and completed the surveys during one encounter which then ended their participation in the study. The survey presentation allowed a participant to exit before completing the survey with entered data saved. This feature was recommended as nurses accessing the study from their workplace were likely to be interrupted while entering data. The potential to lose subjects with this design still existed. However, the internet survey design offered the opportunity for the nurse to return to the study at the point they exited without re-starting the survey at the beginning. A personally selected confidential password allowed participants to re-enter their original survey. Follow up emails and instruction embedded in the survey addressed this feature.

Barriers to successful retention may include the competing pressures of patient care responsibilities at work, lack of perceived relevance to nursing practice, and lack of follow up reminders (Kramer, Schmalenberg, & Keller-Unger, 2009). Successful response rates for electronic surveys in nursing populations have been reported ranging from 50 percent to 93 percent (Hart, et al., 2009; Kramer, Schmalenberg, Brewer, Verran, & Keller-Unger, 2009; McFall & Milke, 2007). The use of described procedures for successful administration of internet surveys was followed to attempt to generate acceptable response rates for this study.

Table 1

Description of Study Measures by Aim

Aim	Measure	Description
Aim #1: Examine the relationship of unit work-ownership climate and unit safety climate as perceived by staff nurses in the acute care setting.	Essentials of Magnetism II (EOM-II)	Sixty item scale measuring nursing work environment. Sum of eight weighted subscales reported as total Professional Job Satisfaction score. High total score 456 (personal communication C. Schmalenberg, 2011)
	Zohar Safety Climate Questionnaire (ZSCQ)	Eleven item scale measuring perceptions of unit level patient safety practices with high total mean item score of 7.
Aim #2: Explore the association of work-ownership climate and safety climate on the perception of safety citizenship behaviors in staff nurses.	Essentials of Magnetism II	See Aim #1
	Zohar Safety Climate Questionnaire	See Aim #1
	Safety Citizenship Role Definition Scale (SCRDS)	Perceptions of safety oriented behaviors as normal part of job (in role) or extra role. Thirty-three item scale with high total average score (in role) of 5 (Hoffman et al., 2003).
Aim #3: Explore the relationship of demographic variables on the perception of safety citizenship behaviors in staff nurses.	Demographics- age, tenure	Age categorized in 5 year increments (21 to 61+ years) Tenure categorized in 5 year increments (3 mos. to 26+ years)
	Safety Citizenship Role Definition Scale	See Aim #2

Description of Measures

Essentials of Magnetism

The Essentials of Magnetism II (EOM-II) scale, a proprietary measure of healthy work environment (including a professional practice environment), was used to measure work ownership climate (Kramer & Schmalenberg, 2004) in Aim #1 and Aim #2. The scale was derived from the original Nursing Work Index (Kramer & Hafner, 1989) which utilized Donabedian's framework (1988) to describe the interactions of organizational structure, process and outcomes. The authors felt the scale needed updating to reflect contemporary nursing practice and proceeded to develop the EOM scale (Kramer & Schmalenberg, 2004). Items from the Nursing Work Index were organized into eight processes or essentials for quality care including "good RN/MD relationships, autonomous nursing practice, a culture for concern for patient care, clinically competent peers, adequacy of staffing, control over practice, support for education and nurse manager support" (Kramer & Schmalenberg, 2004, p. 366) A qualitative approach using grounded theory guided the revision process. Interviews were conducted with 289 staff nurses, educators and nursing leaders in 14 magnet hospitals to guide the development and ranking of the subscales for autonomy, control over practice and RN/MD relationships. The remaining 5 essentials (educational support, management support, peer competence, the value of patient care and staffing) were conceptually derived from previous work reported by the authors (Kramer & Schmalenberg, 1993, 2002).

Administration of the EOM scale (65 items) to staff nurses (N=3602) in 26 Magnet and non-Magnet hospitals was the quantitative phase in the revision process. Item factor loadings of

.31 or greater were included in the resulting ten subscales (Kramer & Schmalenberg, 2004). Content validity was conducted on the eight of the subscales. The other two subscales described nursing care delivery systems such as team nursing and primary care and the authors chose to exclude them from the scale in the revised format (EOM-II). Expert endorsement was obtained using a panel of 23 staff nurse experts, each with at least five years of experience and selected from six Magnet hospitals. Content validity demonstrated agreement amongst the experts ranging from 0.88 to 1.00 (M=0.92) at a 0.05 level of significance with no omissions noted. Additional content validity was reported as a result of determining that 90% of the items focused on the unit level of activity as intended (Kramer & Schmalenberg, 2004).

The validity of scale ranking and weighting of scores on RN/MD relationships, autonomous practice, nurse manager support and control over practice was provided by a sample of 398 staff nurses in seven Magnet hospitals (r = 0.659 to 0.978, p = >0.05). Criterion-related validity was tested based on sample of Magnet and non-Magnet hospitals (N =26) using a known group method. It was felt that Magnet hospitals should be expected to demonstrate the essentials of magnetism using the EOM scale and score differently than non-Magnet hospitals. A significant difference in all subscale scores was reported with Magnet hospitals scoring higher on all scales ($p \leq .05$). Reliability was determined through a test-retest process conducted 2-3 weeks apart using a convenience sample of 42 nurses in a variety of study hospitals (Magnet, Magnet aspiring and non-Magnet). Inter-item correlations between time 1 and time 2 (r = 0.609 to 0.882, significance M= .823) and alphas (.689 to .937) indicated stability across scales. The least stable scale, working with competent peers (.689), was felt to be influenced by the number of nurses present with less than one year of experience. Internal consistency reliability coefficients were

.80 to .90 for all scales based on samples of (n = 2355) of Magnet hospital and (n =1247) non-Magnet hospital nurses.

The authors reported changes to the subscale measuring perceived adequacy of staffing in the EOM from a single-item measure to a six-item scale due to its lack of discrimination related to excellence in the Magnet environment (Kramer & Schmalenberg, 2005). Perceived adequacy of staffing is a measure of more than just numbers of staff. The subscale includes items that identify whether staffing structures are present and sustained to support quality patient care. Fifteen items were generated based on previous EOM results and interviews with staff nurses and nurse leaders. Content experts (n = 5-6 staff nurses) in each of the seven Magnet hospitals across the country provided feedback on the relevance of these items resulting in an 11 item subscale (CVI= 0.86-0.98, M = 0.92, p = .05). A larger sample (n=729) from the same 7 Magnet hospitals was used to test the subscale. Factor analysis indicated only two factors with factor 1 representing 59.376% of the variance. Factor 1 included questions about enough positions, teamwork, delivery system, adequate staffing, and nurse satisfaction. Factor 2 was eliminated as it contributed only 9.6% of the variance (2005).

In 2007, changes were made by the authors of the Essentials of Magnetism scale in the nurse manager support subscale based on additional observations and interviews (Kramer, Schmalenberg, et al., 2007). The scale was renamed the Essentials of Magnetism II (EOM-II) (Schmalenberg & Kramer, 2008) and psychometrics performed including stability between EOM and EOM-II in the unchanged subscales. A 34 hospital sample representing all major census tracts, teaching and community hospitals, magnet and comparison sites was recruited (N =10,514 nurses) to perform psychometric analysis of the scale. Factor analysis demonstrated 10 factors, seven of which confirmed the factor structure of initial EOM. Support for education and

competent peers loaded on the same factor, another factor included only negative and reverse scored items, and two additional factors loaded one item each. Cronbach's alpha scores, ranging from .83 to .97, are reported in Table 2. Reliability, using ANOVA, compared subscale scores from the Magnet sample in the original psychometric testing (N = 16) and a different Magnet hospital sample using the EOM- II (N =18). F ratios were not significant between the two samples indicating the two scales measured the same concepts (Kramer & Schmalenberg, 2008).

Table 2

EOM and EOM-II reliability data

EOM scale	EOM (2003) Cronbach's Alpha	EOM –II (2006) Cronbach's Alpha	ANOVA 2003 & 2006 *F*	*p* Sig.
Clinically competent peers	.80	.92	19.839	.000
Support for education	.82	.89	19.293	.000
Nurse-Physician relationships	.88	.83	14.446	.001
Clinical Autonomy	.90	.97	27.735	.000
Control of Nursing Practice	.89	.89	54.340	.000
Nurse Manager Support	.*	.94	9.627	.004
Patient-Centered Values	.90	.90	35.365	.000
Adequacy of Staffing	*	.88	25.412	.000
Total EOM –Professional Work Satisfaction	-	.96	-	-

*changes in these subscales prevent comparisons as well as total EOM totals

In reviewing the individual questions within each subscale, four questions appear to be double-barreled. A double-barreled statement is one that asks two or more questions at the same time (Streiner & Norman, 2003). The items of concern (6,8,11,23) loaded on one of four different subscales; RN-MD relationships, clinically competent peers/support for education,

autonomy and control over nursing practice respectively (Kramer & Schmalenberg, 2004). One method to address potential confounding responses is pre-testing of questions in a large sample (Streiner & Norman, 2003). Updated psychometrics were published following a revision of the original EOM scale. However, no changes were made to the subscales identified for discussion in this section. A secondary analysis of EOM-II data from a large sample (N = 34 hospitals, n =10,514 staff nurses) was performed. Using ANOVA, EOM data from sixteen hospitals were compared to EOM-II data from eighteen hospitals on all scales except those that had been changed and where no comparison was possible. F ratios comparing the group responses from the EOM and the EOM-II were not significant for any of the subscales including those with double-barreled questions (Table 3) indicating scale reliability across the sample (Schmalenberg & Kramer, 2008). The use of the double-barreled questions does not appear to be a significant factor in the proposed study.

Table 3

Significant Group Differences in Subscales With Double-barreled Questions

Subscale	***F***	***p* ***
Control of Nursing Practice	54.340	.000
RN-MD Relationships	14.446	.001
Clinically competent peers/ Support for Education	19.839	.000
Autonomy	27.735	.000

*= significant (Schmalenberg & Kramer, 2008)

The EOM-II is a 60 item scale with 58 items rated using a 4-item forced choice scale (Appendix A1). The majority of items offer response choices of; strongly agree, agree, disagree

and strongly disagree. Items describing nurse-physician relationships use response choices of true for most MDs most of the time; true for some MDs some of the time; true for one or two MDs on occasion; and not true for any MDs. Responses are weighted and added for a total EOM-II score called the Professional Work Satisfaction total score by the scale developers with a high possible score of 456 (C.E.Schmalenberg, personal communication, January 2011). Two additional items are presented describing nurse assessed quality of care (response anchors "dangerously low" to "very high quality") and general job satisfaction ("It's terrible" to "I love it"). Responses are rated 1 to 10 with ten being highest. The latter two items were not used in the present study.

EOM-II mean total scores of 286.51 (*SD* = 9.1687) have been reported for magnet hospitals while non-magnet hospital mean scores were 264.68 (*SD* =9.3414)(*F (1,32)* 47.141 *p* =.000) (Schmalenberg & Kramer, 2008). The scale has consistently differentiated Magnet from non-Magnet hospitals in identifying excellent work environments (Kramer & Schmalenberg, 2004, 2005; Kramer, et al., 2008; Schmalenberg & Kramer, 2008). Unit response rates of forty percent have been found to support data aggregation to the unit level (Kramer, Schmalenberg, Brewer, et al., 2009). All eight essentials must be present to achieve an excellent work environment. The EOM-II will be used to measure work ownership climate in the proposed study. Author permission to use this scale has been obtained (Appendix A2).

Zohar Safety Climate Questionnaire

The Zohar Safety Climate Questionnaire (ZSCQ) (Zohar, 2000, 2002; Zohar & Luria, 2005), revised by Johnson (Johnson, 2007), is an 10 item scale measuring individual perceptions of group or unit level safety climate (see Appendix B1) (Aims 1, 2 & 3). Items are measured using a 1 to 5 ranking with 5 indicating the highest score (Zohar, 1980). Mean scores for factors

and total mean score are reported as results. Both Zohar (Zohar & Luria, 2005) and Johnson (Johnson, 2007) report a 3-factor structure with alphas of 0.96 to 0.98. The ZSCQ was used to measure safety climate in Aim #1 and Aim #2.

The ZSCQ was selected from a dizzying array of scales reported in both industry and healthcare literature. The measurement of safety climate should help to achieve a better understanding of how individual nurses view safety in their workgroup and organization. It is therefore significant to first select the definition of safety climate pertaining to the area of research interest and used in similar research contexts with acceptable psychometric rigor (Ginsberg et al., 2009). However, there still remain issues with the definition of safety climate, unit of analysis and methodological challenges such as lack of stable factor structures in organizational research (Ginsburg, et al.).

For this dissertation study, a measure of safety climate was needed that has previously been used to test relationships with other variables without significant overlap in content domains. The scale needed to reflect individual staff nurse perceptions of safety and demonstrate that the data can be aggregated at the unit level (Ginsburg, et al., 2009) in order to understand if perceptions are truly shared (Zohar, Livne, Tenne-Gazit, Admi, & Donchin, 2007). The measure needed to have acceptable psychometric rigor with use in a variety of settings (Guldenmund, 2007). The ability to differentiate both the level and strength of safety climate is also needed in order to explain Zohar's multi-climate framework in this study (Zohar, 2008).

The definition of safety climate for this study focused on unit level measurement of individual perceptions of the level (leadership's focus on safety) and the strength (within group agreement) of safety climate at the unit or work group level (Zohar, 2002, 2008). The ZSCQ (Zohar, 2000, 2002; Zohar & Luria, 2005) was chosen because of its focus on the leadership role

in safety, factor stability across time and settings and its use in multi-level climate research to detect differences at the work group level.

The ZSCQ was initially developed for a study examining the relationship of work group safety climate and the incidence of minor accidents in the workplace (Zohar, 2000). Interviews were conducted with 71 production workers in three manufacturing companies in Israel. The research team asked for examples of interactions with management related to safety incidents and used three memory prompts to guide the interview to include penalties for unsafe behavior in the workplace, praise for safe behaviors and safety expectations by management. The interviews were then coded by three experts (current MBA students with management experience) not involved in the interviews to identify themes. The themes were then used to develop the initial 23-item questionnaire by the research team. A sample of 152 production workers (excluding those interviewed) completed the questionnaire by rating the questions using a 5 point Likert-like scale with 1 indicating completely agree and 5 indicating completely disagree. Half of the items were reverse coded due to negatively worded negative questions. Factor analysis was performed using exploratory principal-components analysis with a resulting two factor structure. This method is appropriate when survey development is a theoretical as was the case in this study (Burns & Grove, 2005). The study ($N = 534$) results also generated a two factor structure. The final scale, designed for ease of administration in the workplace, was ten questions long using the top five loading questions in each factor. Factor 1 was labeled supervisory action and Factor 2 labeled supervisory expectations (Zohar, 2000) with Eigen values of 2.623 and 2.09 respectively.

A second study using the ZSCQ (Zohar, 2002) explored work group level climate and leadership style on work accidents using a sample of 411 workers in a manufacturing plant in

Israel. Principal component analysis showed three factors consisting of supervisor preventative action, reactive action and prioritization (Eigen values 1.93, 1.16 & 2.98), indicating adequate validity across samples. Cronbach's alphas for prioritization (0.78), preventative action (0.80), and reactive action (0.78) indicate good scale reliability. Alphas for individual questions were not reported in this study.

The use of the ZSCQ in a healthcare setting was first reported by Naveh, Katz-Navon & Stern (2005). The purpose of the study was to examine the influence of safety climate on treatment errors in two Israeli hospitals. Part one of the study included a sample of physicians and nurses ($N = 241$) in a 300 bed acute care hospital. The study was cross validated using a second hospital of similar size and complexity (N=218). The authors modified five items from Zohar's (2000) safety climate scale to measure managerial safety practices (moderating effect) in the study ($\alpha = 0.83$). Five additional items from Zohar's scale were used to measure priority of safety as the mediating variable in the study ($\alpha = 0.81$). Fifteen additional items unrelated to Zohar's ZSCQ were also included in the study.

Exploratory factor analysis with Varimax rotation resulted in four factors as designed by the authors. Confirmatory factor analysis revealed that the four factor model exceeded acceptable fit measures ($\chi^2 = 887.92$, $df = 288$; [GFI] = .89; [REMSA] = 0.07; $p = <0.05$) (Naveh, Katz-Navon, & Stern, 2005). A three factor structure has been demonstrated however theory and past use supports a one factor structure (Zohar et al.,2007). A one factor structure was used in this study.

A potential drawback to the ZSCQ is its lack of use in a healthcare setting in the United States. However, selected factors (managerial safety practices) have been used successfully in healthcare samples in other countries. Two healthcare studies using a sample of physicians and

nurses in Israeli hospitals reported the use of the ZSCQ (2000 version) with acceptable reliability and validity properties (Naveh, et al., 2005; Naveh, Katz-Navon, & Stern, 2006). Permission to use the scale in this study was granted by the author (see Appendix B3). Modifications to questions selected from Zohar's (2000) ZSCQ are shown in Appendix B2.

Safety Citizenship Role Definition Scale

Safety citizenship behaviors (Aim #2) were measured using the Safety Citizenship Role Definition Scale (SCRDS) (Hofmann, et al., 2003). (Appendix C1). The scale was originally used both as a self rating scale indicating which behaviors were considered in-role (perceived as part of the job role) or extra-role (perceived as outside the job) and also a management appraisal of observed behaviors in the employee population under study (Hofmann, et al.,, 2003). Hofmann and colleagues, using hierarchical linear modeling, were able to demonstrate variability in safety citizenship role definitions across groups and the influence of leadership on higher scores on the SCRDS ($y10 = .44$, $p = .05$, one-tailed) (2003). For this dissertation study, the scale was used only for self-appraisal to identify behaviors as in-role or extra-role as perceived by staff nurses in their own practice. Asking nursing managers, who may supervise sixty or more staff, to perform individual ratings of frequency of safety citizenship behaviors in each staff member was felt to be a significant survey burden.

The SCRDS was initially developed by Hofmann and colleagues (2003) for use in a study sample of military personnel ($n = 94$ individuals) in a U.S. Army transport unit. Items were generated based on the theoretical and empirical work of Van Dyne and colleagues which focused on aspects of organizational citizenship behavior such as helping, voice, stewardship and whistle-blowing (Van Dyne, Graham, & Dienesch, 1994; Van Dyne & LePine, 1998). Four

items measuring safety changes initiated by individuals (Morrison & Phelps, 1999) were added. Finally, three items addressing knowledge of safety practices (Podsakoff, MacKenzie, Moorman, & Fetter, 1990) were adapted for safety content. The resulting scale was a 27-item measure with six subscales. Most items were adapted from other valid scales and altered to fit safety content with the remainder reflecting theoretically derived content. The scale uses a Likert-like scale with response choices of 1 (expected part of my job) through 5 (definitely above and beyond what is expected for my job). Total score is calculated as a mean score of all items with a range of one to five for a total mean score. For analysis of the responses, items were re-coded so that higher scores indicated perceptions of items being in-role behaviors or part of the job description. High correlations among the subscales (r = .78) were demonstrated and were then combined into a one factor measure per author recommendations (Hofmann, et al., 2003)

Construct validity for the measure was strengthened by adding a six-item subscale of safety practices behaviors that were clearly in-role expectations such as wearing of protective gear at all times (α = .89) (Burke, Sarpy, Tesluk, & Smith-Crowe, 2002). It would be expected that participants would rank these behaviors as more in-role (higher scores) and thus differentiate in-role from extra-role behaviors. Internal consistency reliability of this subscale was .97. The reliability of the SCRDS with this subscale added was .98 using a one factor structure. Mean scores for the safety practices subscale were higher (M = 4.15) than the other subscales (M = 3.95), $t(94) = 3.33$, p = <.01) reflecting the perception that the behaviors were required in the role (in-role behaviors) versus outside the role description (Hofmann, et al., 2003).

A second study exploring the relationships of job demands, job control and safety citizenship role definition in railway workers (N = 334) in the United Kingdom also reported the use of the Safety Citizenship Role Definition Scale (Turner, et al., 2005). The original 27 item

scale was administered using a Likert scale of 1-5 to rate whether the behavior was 1 (expected part of my job) through 5 (beyond what is expected for my job). One overall score for each respondent was measured using a mean response (maximum score 5). Items were reverse scored for analysis as in the original study so that high scores reflected a perception of in-role behavior.

Exploratory factor analysis with oblique rotation demonstrated a one factor structure with five items (Eigen value 11.31) explaining 40% of the variance with four other factors accounting for 20% additional variance (Eigen values up to 2.02). All of the subscales identified by Hofmann and colleagues (Hofmann et al., 2003) (stewardship, helping, whistle blowing, voice, civic virtue and initiating safety related change) were represented in the factor loadings in the final items selected for the dependent variable in this study (Turner, et al., 2005).

Common method variance or bias is a potential limitation in studies where behaviors are self-reported (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Hoffman and colleagues determined that with the complexity of the relationships being studied (mediating and moderating effects) it was doubtful that common method variance could explain the significance found in all of the relationships. In addition, the use of supervisor ratings of observed behaviors provided an independent source of data to counteract common method variance in this study (Hofmann, et al., 2003). Turner and associates (Turner, et al., 2005) were able to limit the presence of common method variance by using latent variables for each of the study variables during fit testing. Adding the latent variables accounted for an addition 14% in variance and while improving the fit somewhat,were significantly lower than the average amount of method variance artifact identified as problematic (Williams, Cote, & Buckley, 1989). Permission to use this scale has been obtained from the author (see Appendix D).

Demographic data

Demographic data for RNs included highest education level, years of experience, type of unit, tenure on current unit, shift worked, age and gender. Hospital identification was provided in the internet survey by assigning each hospital a unique electronic link to the SurveyGizmo© study site. Following data download to PASW (18.0), an additional identifier was added to each file indicating Hospital 1, 2 or 3. Demographic data collection criteria were consistent with those identified in the Essentials of Magnetism II scale (Kramer & Schmalenberg, 2005).

Data management

A code book developed prior to data entry detailed data labeling procedures for entry into PASW (18.0) (Fink, 2003)(Appendix D). Data entered by participants into the Survey Gizmo© internet survey platform were automatically stored in a secure online format. This data were then downloaded to PASW (18.0) using the code book column headings determined in the study plan. Participant data were automatically de-identified by the survey site which assigned a unique study code affixed to the participant's response (Fink, 2003). Data for the SCRDS and ZSCB scales were downloaded from the electronic survey files to PASW (18.0) by the researcher. The data from the EOM-II, a proprietary scale, was sent to Health Science Research Associates (per contract) in an Excel file where it was cleaned and scored per established procedures. The data including coding reference and item and subscale scores for each respondent and total Professional Work Satisfaction (EOM-II) score were returned to the researcher in a PASW (18.0).

All study data were stored on a secure, password protected drive with regular back up and located at the University of Massachusetts Dartmouth campus where the PI is employed. Any printed data were kept in a locked file in the PI's office.

Scale reliability

Essentials of Magnetism – II

The Essentials of Magnetism II data were cleaned and scored by the scale author per contract for total Professional Work Satisfaction (EOM-II) scores, 58 individual item scores, eight subscales scores and two quality scores. Data were then returned to this researcher and added to the study database by participant ID code. The two quality scores were not used in this dissertation study. Returned data were reviewed to ensure that ID codes matched the original data base when the file was imported into the PASW (18.0) data file. Cronbach's alpha for the EOM II scale has been reported as .96 (Schmalenberg & Kramer, 2008) and in this study was .97.

Zohar Safety Climate Questionnaire

The Zohar Safety Climate Questionnaire (ZSCQ) revised by Johnson (Johnson, 2007) is an eleven item scale with a Cronbach's alpha of .984 . In this study the Cronbach's alpha was .919.

The ZSCQ is used as a one factor variable in this study which is consistent with the previous use of the measure (Johnson, 2007; Zohar, 1980, 2000). Total mean scores were computed for each respondent (Johnson, 2007).

Safety Citizenship Role Definition Scale

Factor analysis was conducted for the SCRDS due to its limited use in a nursing population. The author describes the scale as having six factors (initiating workplace safety, safety related helping, voice, stewardship, whistle blowing, up to date knowledge) but reported

using the scale as one factor due to high inter-correlations (average r = .97). Exploratory factor analysis was conducted on this scale using a forced 6 factor PCA with Varimax rotation was performed to replicate the six factors reported by Hofmann et al. (2003). Table 4 shows the variables loading on six factors replicating the work of Hofmann et al. (2003) and further demonstrates scale reliability. Hofmann's (2003) recommendation to use a one factor version of the SCRDS scale based on theory and use has been adopted for this study.

The SCRDS was then scored as described by Hofmann et al. (2003). First, scale items in this study were reverse scored so that higher scores indicated more in-role behaviors or those considered part of the job. Mean scores were determined for core in-role items (six items with scores ranging from 1 to 5) and non-core items (27 items with scores ranging from 1 to 5). A paired-samples t test was calculated to compare the total mean score for SCRDS core scale items to the mean scores based on the remaining 27 non-core items. The mean for the six core items was 4.85 (SD = .65) while the mean for the remaining items (27) was 4.40 (SD = .60). A significant difference between mean scores was found, t (1,26) = 10.07. p = .05. In other words, RNs in the study were able to differentiate between items that they considered a part of their job (in-role) and other items that they perceive as above and beyond their normal job duties (extra-role behaviors). Finally, the total mean response score (range 1 to 5) was calculated for each respondent (Hofmann, et al., 2003). Cronbach's alpha for this study was 0.954.

Table 4

Safety Citizenship Role Definition Scale-Factor Analysis

Variable #	Initiating	Workplace Safety	Safety helping	Voice	Steward-ship	Whistle-blowing
17	**0.881**					
16	**0.818**					
18	**0.81**					
27	**0.744**				0.316	
15	**0.743**		0.363		0.315	
19	**0.583**	0.505*				
24		**0.82**		0.328		
23		**0.782**		0.306		
21		**0.756**	0.328			
20		**0.66**			0.483	
22	0.323	**0.586**		0.436		
11			**0.772**			0.307
10			**0.742**			
14	0.443		**0.674**			
7			**0.586**		0.503*	0.399
13	0.578		**0.579**			
29		0.326		**0.807**		
31	0.308			**0.806**	0.303	
28		0.335	0.442	**0.675**		
30		0.407		**0.633**		0.39
8					**0.743**	0.305
3	0.511*				**0.677**	
5	0.437	0.344	0.413		**0.622**	
9	0.383	0.308	0.471		**0.548**	
2						**0.857**
26						**0.836**
25			0.342			**0.708**

Extraction method: Principal Component Analysis
Rotation method: Varimax with Kaiser Normalization
* factors dually loading

Original data analysis plan by aim

Frequencies were run to determine the participants who had completed all three scales and only these data were used in the data analysis for this study. Once data were cleaned, edited for missing cases, and distributions explored, the demographic data were reviewed in order to describe the sample. The demographics of age, education, hours of work, shift and work unit from the study population were compared with a Magnet database (Kramer & Schmalenberg, 2008) sample of nurses for this study to ensure that a representative sample had been obtained. Descriptive statistical methods were used to describe the demographic data.

Prior to analysis, continuous variable data were examined for normal distribution and/or skewness. Categorical data were also screened for significant outliers within each variable. For the anticipated sample size, *z* parameters were set for ± 4 and a box plot format used for visual presentation for single variable outliers (Mertler & Vannatta, 2005). Multivariate outliers were examined using the chi-square statistic. Data were analyzed for normal distribution of observations and assumptions were met prior to statistical calculations selected for the study.

Internal consistency and reliability of all measures was calculated prior to data analysis. Factor analysis of study scales was performed when sample size was sufficient or an alternative method of internal consistency computed. The only scale with a recommended response rate by work unit is the EOM-II. The authors recommend a 25% response rate per hospital unit as a guideline (Kramer & Schmalenberg, 2004). However, the study aims in this exploratory study did not focus on unit level data thus unit level responses rates were not calculated.

All computer printouts from the data management and analysis procedures were saved in chronological order by aim, stored in a study notebook and retained for 5 years.

For data meeting the necessary statistical assumptions, a data analysis plan by aim was followed.

Aim 1.

Descriptive statistics were summarized for each variable by examining frequency distributions, missing data and measures of central tendency. The Pearson correlation statistic was planned to determine the degree and strength of relationships between the variables of ZSCQ and EOM-II (Burns & Grove, 2005). Assumptions for this statistic included normal distribution of data and linear association of the variables.

Aim 2.

Descriptive statistics were summarized for each variable examining frequency. Assumptions for linear regression analysis include normally distributed residuals with constant variance, and a linear association between the outcome and each continuous predictor (Burns & Grove, 2005).

Confirmatory analysis for Aim #2 hierarchical linear modeling (HLM) was planned to conduct multilevel regressions to determine the predictive relationship of safety climate and work ownership climate (independent variables) on safety citizenship behaviors (dependant variable).

Nurse researchers have begun to adopt the use of HLM in the analysis of both patient and organizational outcomes (Cho, 2003). Its use in organizational research in other disciplines is well documented (Raudenbush & Bryk, 2002). In the proposed dissertation study, HLM was selected as the appropriate statistic to determine the amount of explained variance in the variables of interest measured at the individual and unit levels of the organization (multilevel) (Raudenbush & Bryk, 2002). HLM is more effective at correctly estimating standard errors and

thus does not inflate test statistics as would conventional statistics in a multi-level analysis (Park & Lake, 2005). This allows a more real world look at an understanding of how cross-level interactions differ from within-level interactions (Adewale, et al., 2007). Interclass correlations addressing individual score variability around the subgroup mean are labeled ICC (1). ICC (2) estimates the stability and reliability of aggregated data at the group level. Values exceeding .6 indicate justification of group level aggregation of data

In HLM, the first level of analysis is the "individual level regression equation estimated in each of multiple groups" (Adewale, et al., 2007, p. S45). An individual intercept and slope for each predictor is calculated. Next, the HLM model essentially explains the mean differences between the first level groups which explain how effectively the independent variables (safety climate and work ownership climate) predict the dependant variable (safety citizenship behaviors) (2007).

Aim 3.

Aim 3 was considered an exploratory aim in this study to explore the relationship of demographic variables with safety citizenship behaviors (DV). This study did not have sufficient power to conduct more than an exploratory analysis of the relationship of demographic variables to safety citizenship behaviors in this study.

The demographic variables of age (Schmalenberg & Kramer, 2007) and tenure (Beus, Bergman, & Payne, 2010) were explored for possible influence on safety citizenship behaviors in nurses. Age data were collected as a categorical variable in increments of 5 years starting with less than 20 years and ending with 61 plus years. Data were examined from 91 cases (1 case missing data) and then sorted by generational group (Wieck & Landrum, 2010). Group 1 was categorized as millennials (age 18-26, $n = 6$). Group 2 as generation Xers (age 27-40 years, $n =$

7), group 3 was baby boomers (age 40-60, n =54) and group 4 was 61 years of age and over (n = 24) (Table 5).

Hospital tenure data (n =92) were sorted into three groups defined as five years or less (group 1), six to 20 years (group 2) and 21 years and over (group 3). Group one sorting was supported by reports that under five years is a vulnerable tenure for turnover of RNs employed in hospitals (Coshow, et al., 2009). Delineation between groups two and three was made by assigning the remaining cases by median (Mdn = 2) or below for group two and above the median as group three (Table 5). Spearman Rho correlation statistic was selected for use with the categorical data.

Table 5

Age and tenure demographics

Demographics:	Age by Group	#	%
Millenials	25 yrs. & less	6	6.5
Gen Xer's	26-40 yrs.	7	7.6
Baby Boomers	41-60 yrs.	54	58.7
Beyond Baby Boomers	61+ yrs.	24	26.1
N		91	100
Missing		1	
Total		**92**	

Demographics:	Hospital by Tenure		
	Tenure in yrs.	#	%
	5 yrs. & less	55	59.8
	6-20 years	16	17.4
	21 + years	21	22.8
N		92	100
Missing		0	
Total		**92**	

Sample size

An available population of staff nurses for this study was estimated at 1153 for the three hospital sites. A priori power calculations indicated that a study sample of 172 was needed to perform regression analysis for Aim #2 to achieve a small effect size with a power of .80 at a .05 level of significance. A total of 386 responses were downloaded from the study survey site. The term responses was labeled by the internet survey platform SurveyGizmo© in three ways. First as subjects who opened the link but did not enter the study (abandoned), subjects who entered the study and partially completed data (partial completion) and finally, subjects who answered questions completely or nearly completely. An analysis of responses from the study site is found in Table 6. A single usable response was defined as having scores from each of three study scales as well as demographic information. Because the EOM-II was scored by the author, the number of usable responses was determine after EOM-II scores were returned and matched to participant code, demographics and scores from the ZSCQ and SCRDS scales. The usability of EOM-II data was determined by the scale authors consistent with methods consistently used in handling missing data and the scoring of data. The final study sample was determined to be 92 usable responses for an 8% response rate overall. (see Table 6)

Table 6

Response rate analysis of registered nurse available sample (N= 1153)

Hospital	**Hosp 1**	**(%[*])**	**Hosp 2**	**(%[*])**	**Hosp 3**	**(%[*])**	**Total**	**(%[a])**
Estimated available sample by site	235		530		388		1153	
Responses with data	68	(29)	21	(4)	115	(39)	204	(18)
# individual scales with data entered[a]								
Demographics	52		21		58		131	
SCRDS	49		21		44		118	
EOM-II	45		20		48		114	
ZSCQ	45		19		39		108	
Complete survey set (3 surveys)[d]	**38**	(16)	**15**	(3)	**39**	(10)	**92**	(8)

[a]percentage of available sample
[b]in order presented in study
[c]subject completed three parts of survey, scales able to be scored

Data Analysis Plan Revised

The initial data analysis plan included the use of two Magnet hospital study sites however a lower than expected response rate (Hospital #1, *n* = 129; Hospital #2, *n =42*) required the addition of a third Magnet hospital site. The original data analysis plan was focused on data combined at the unit and hospital levels using a hierarchical linear modeling statistical analysis. The apriori power calculation (.80) planned for this study required a sample size of 264 for the hierarchical linear modeling and correlation analyses to be performed. Sample size goals were not reached so alternative statistical methods were utilized in this study.

Aim One.

The original data analysis plan using correlation statistics was followed.

Aim Two.

The smaller than anticipated study sample ($N = 92$) changed the data analysis plan for Aim 2 from hierarchical linear modeling to analysis of covariance (ANCOVA) to explain the association of safety climate and work ownership climate on safety citizenship behavior. ANCOVA explores the differences between groups while controlling for influencing variables or covariates that are thought to have in influence on the dependent variable. PASW (18.0) uses regression procedures to remove the influence of the covariate then uses the adjusted scores to perform the analysis of variance procedures. These procedures allow ANCOVA to increase the power of the *F*-test, thus reducing bias and increasing the likelihood of detecting differences between groups. ANCOVA is also useful with a small sample size and in non-randomized groups which are common in social science research (Pallant, 2007) and thus appropriate for this study. Results need to be interpreted with caution when randomization is not possible (Burns & Grove, 2005).

The covariates in this study were safety climate (ZSCQ scores), work ownership climate (EOM-II scores) and the interaction of the two covariates. The dependent variable (DV) was safety citizenship (SCRDS scores). The ANCOVA statistic was also able to account for the hierarchical nature of the data by handling within-hospital clustering as a random effect variable.

Assumptions that were met prior to running the ANCOVA statistic included the use of valid and reliable measures administered prior to intervention, linear relationships among the variables, moderate correlation among covariates so as not to cause colinearity, and homogeneity

of regression slopes. Post hoc power analysis was conducted in order to report the strength of the *F* test to determine differences between groups.

The ANCOVA statistic is a powerful statistic able to adjust for confounders in the analysis. Therefore, any associations among the variables are not due to variables that were omitted from the model but instead related to both the outcome and the predictor. By using regression procedures, ANCOVA is able to increase the sensitivity of the *F* test and power while controlling for an additional continuous variable or covariate (Burns & Grove, 2005; Pallant, 2007). Post-hoc power analysis is reported with each regression statistic. Confirmatory analysis for Aim #2 used the analysis of co-variance (ANCOVA) statistic to determine if the association of safety climate and work ownership climate (independent variables) was associated with safety citizenship behaviors (dependant variable) in staff nurses. Post hoc power analyses were performed for each ANCOVA analysis.

Aim Three.

Aim #3 was planned as an exploratory aim using demographic data for age and tenure. These variables were entered into the ANCOVA analysis to explore any confounding effects of these variables in the association of safety climate or work ownership climate with safety citizenship behaviors.

Human subjects‘ protection

Institutional Review Board (IRB) approval was obtained from the each hospital study sites according to their procedures prior to beginning the study. Copies of the IRB approval documents from the hospitals were then sent to the University of Massachusetts Medical Center, Worcester to inform the IRB of the study and that no data were to be collected in that institution.

This information fulfilled the requirements for the principal investigator role in this dissertation study for the Graduate School of Nursing and University of Massachusetts, Worcester.

Minimal demographic information was collected to ensure that individual identity was protected and the individual codes are known only to the PI and advisor. No record of email addresses was kept by the PI as part of the study data. A hospital employee from each study hospital site served as study champion. The study champion had access to employee email addresses and sent all communications from the PI to prospective study participants via the hospital email system. The information included in these participant recruitment messages was be written by the PI and approved by the respective hospital IRB. Each email included contact information for the PI for the participants.

The incentive offered was of low value, was not be perceived as coercive to study participants and approved by each IRB. Demographic information regarding unit name provided by each participant was protected by a unique identifier assigned by the SurveyGizmo© survey process. A count of the number of times a specific unit was identified was done separately from data analysis and compared to the total RN count on that unit provided by hospital administration.

The informed consent indicated the purpose of the study, the minimal risk to the participant, the confidentiality of the information and that the participant is free to withdraw from the study at any time. No signature was collected on the consent due to the use of an internet survey platform. Participants were instructed to click on a button at the end of the consent indicating their willingness to proceed to the study thus indicating their consent. Continued participation in the study was also an indication of consent. Participants could exit the study at any point in the survey process. Their data were then excluded from the study if it was

incomplete. Data were downloaded from the survey site and stored in electronic files on a secure, firewall protected server located at the University of Massachusetts Dartmouth and accessible only to the PI. Data will be saved for a period of five years and then destroyed to allow adequate time for publication of results before data is destroyed.

The use of an internet based survey adds an additional level of security to the management of data. SurveyGizmo© is a web based survey software product that supports the individual user in creating a study specific survey structure and using an email service to distribute the survey. Data entered and stored in SurveyGizmo© is one hundred percent private and owned by the researcher. Email addresses are never sold or distributed and data is stored in a secure data center with backups and redundancy. Security on the individual survey site is provided with daily scanning by McAfee Secure. SurveyGizmo© also has HIPAA (personal information privacy in U.S.) and Safe Harbor (European Union privacy laws) certifications and provides the labels to post on individual survey sites ("SurveyGizmo, web based survey software tool," 2009).

Additional data protection was provided by backing up data on an external secure drive which will be kept locked in the PI's office files.

Pilot study

A pilot study was conducted to test the planned steps in the data collection and retrieval process prior to beginning the dissertation study. Pilot study participants were asked to participate in the study to assist in identifying study related operational concerns prior to conducting the dissertation study. A pilot study is important to identify and resolve any problems with the visual appearance of the study measures to participants across a variety of computer

operating systems and internet providers prior to the dissertation study. Problems with readability and the ability to open files could negatively impact data collection (Gordon & McNew, 2008).

Pilot study sample

Using purposive sampling, ten registered nurses familiar with acute care practice and with access to the internet were included in the pilot study. Participants were asked to field test the study by reviewing the study instructions for clarity, completing the three measures and the demographic information and submitting their responses via the internet based survey process (Gordon & McNew, 2008). The sample include nurses who use different operating systems and different internet providers (Internet Explorer and Firefox) (Dillman, 2007). At least one participant from each study site was recruited to test access to the study via the hospital's email system and determine if the firewall presents any problems with downloading the internet based survey.

Pilot Study Procedures

Approval for the pilot study was received as a part of the IRB process for Hospital I. Upon receipt of IRB approval, the pilot study was conducted.

The tailored design method of survey procedures was modified for the pilot study (Dillman, 2007). As individuals were recruited, they were sent an initial email indicating that the study will be sent to them shortly, confirming their interest in participation. A second email was sent three to five days later with instructions on access to the study via the internet based provider. One reminder email was sent at two weeks with the four week reminder omitted. The pilot study included the same study materials planned for the dissertation study including consent, demographic questionnaire and the three study measures. In addition, a brief five-item

questionnaire allowing open text response was included so that participants could comment on the format of the measures, the amount of time to complete the study and any difficulties they experienced in accessing and completing the study. Participants were asked to provide any other comments regarding the study that they felt were important. The average time to complete the survey was 15 minutes. Minor adjustments to the survey instructions were made based on the pilot results.

Any data entered in the pilot study was kept confidential. However, pilot study participants were known to the researcher and selected based on their knowledge of the research process to optimize the feedback for this phase of the research. Data collected in the pilot study are not included in the dissertation study.

After the data collection process was completed, a successful test of the steps to download the data from the internet survey platform into PASW (18.0) was performed. The pilot sample (n = 10) consisted of registered nurses in a variety of roles in several healthcare settings in New England. Data analysis was not performed for the pilot study as the purpose was to test the ease of use of the internet survey platform and the ability to download data for analysis into PASW for the main study. Minor changes to wording in the formatting of the survey on the study site were made based on recommendations from pilot study participants. The pilot study demonstrated that the length of time to complete the study was 20 minutes on average.

Dissertation Study Data Collection

Following IRB approval at each of the three study hospitals, data collection was done from November 2009 through July 2010. The survey methods for this study used an internet survey platform accessed via an electronic link imbedded in an email and delivered to potential

participants through their work email address. The data collection period for each hospital was four weeks and reminders were sent three times using the Dillman method (Dillman, 2007). Participants were asked to provide minimal demographic information and to complete the survey about their perceptions of safety in their organization, the characteristics of their work environment and the degree to which they viewed safety behaviors to be a part of their usual job description.

Data were downloaded from the internet survey platform, SurveyGizmo©, into PASW (18.0) analysis. A total of 204 responses were downloaded from the survey site (Hospital #1= 68, Hospital #2 = 21, Hospital #3 =115). Study sample criteria indicated that all three surveys needed to be completed for inclusion in the study. Data were reviewed for missing cases which resulted in 92 usable cases where all three scales plus demographic information were complete.

Summary

This dissertation study explored the relationship between safety climate and work ownership climate in registered nurses and then examines the association of these variables on the perception of safety citizenship behaviors in the same population. While multiple studies have reported on either safety climate scores or work environment factors, there has been little published on the presence or relationship of co-existing climates in health care organizations. Little is known about how nurses perceive safety citizenship behaviors in their role as nurses. Much of the safety research in healthcare organizations has been focused on interventions to change practice in order to reduce errors and improve safety. The recognition that multiple climates in organizations interact differently in different work groups stimulated Zohar (2008) to propose a framework that suggesting that multiple climates do interact. In the case of safety and

work ownership climate, the strength each of these climates enhances their interaction and their influence on individual behaviors outside the job description to promote safety. In nursing practice, these safety behaviors may be critical to ensure a safe environment beyond what policies and procedures alone can accomplish. In addition, an understanding of the relationships of multiple climates and their relationship to performance will better inform leaders about strategies for successful implementation of interventions.

An a priori power calculation indicated that the total estimated available population sample of 1153 and a study sample of 266 as adequate to power the study at .80 with an effect size of .17, and a .05 level of significance. Due to a lower than expected response rate, the final study sample size was 92.

This study utilized previously developed reliable and valid scales to measure registered nurse perceptions of work ownership climate, safety climate and safety citizenship behaviors. To answer the question of the relationship of safety climate and work ownership climate, a Pearson product- moment correlation statistic was planned. In order to demonstrate the relationships in Zohar's Multi Climate Framework for Safety (Zohar, 2008), hierarchical linear modeling (HLM) using multiple regressions was selected for data analysis. Sample size indicated a more appropriate selection of the ANCOVA statistic for analysis in this study.

The SurveyGizmo© internet based survey platform was used to deliver the surveys to participants via their workplace email system. The utilization of internet surveys has become an increasingly reliable method of collecting research data when a tailored follow up method is utilized (Dillman, 2007). Security of data and respondent privacy is assured using an internet survey program and data can be easily be downloaded to PASW (18.0) for statistical analysis. A

small pilot study was successfully conducted to minimize procedural problems with the internet based survey platform, the use of the survey instruments or transfer of data to PASW (18.0). Limitations and potential difficulties that could have been encountered in this study have been discussed. The reporting of results will include the impact of limitations on the results.

The ethical impact of this study on participants was minimal. Efforts were made to provide easy access to the study without the use of personal identifiers. Demographic data collection was kept to a minimum to further reduce the potential of an individual being identifiable. Little or no risk was incurred in participating in the study and participants could easily remove themselves from the study by not submitting their data or submitting incomplete data.

Chapter IV

Results

Introduction

The purpose of this study was to examine the effects of work ownership climate and safety climate on perceived safety citizenship behaviors of registered nurses in the acute care setting. Results are presented in this chapter by study aim.

Study Aims

Aim 1: Examine the relationship of unit work-ownership climate and unit safety climate as perceived by staff nurses in the acute care setting

Aim 2: Explore the association of work-ownership climate and safety climate on the perception of safety citizenship behaviors in staff nurses.

Aim 3: Explore the presence of demographic moderators within the variables of work-ownership climate and safety climate that influence the presence of safety citizenship behaviors in staff nurses.

Data Analysis

Demographics

Demographic information about the study population; gender, age, unit type, tenure on unit, tenure in hospital, education, and shift, is found in Table 7. The items selected were based on the demographics reported by the authors of the EOM-II scale used in this study as the measure of work environment (Kramer & Schmalenberg, 2005). The accessible population of Registered Nurses (RNs) in three Magnet designated community hospitals in New England was estimated to be 1153. The study sample (N = 92) was primarily female (97.7%, n = 89), over forty years of age (75.1%, n = 70) with the majority having a bachelor's degree (54.3%, n = 52)

or higher (13.2 %, *n* = 16). The tenure at the current hospital showed that a majority (61.1%, *n* = 54) had been working at the same hospital over five years. Unit tenure was about equal for those on the unit five years or less (51.7%, *n* = 48) and over five years (48.3%, *n* = 44).

Table 7

Study Sample Demographics

		N	(%)
Gender			
	Female	89	(96.7)
	Male	2	(2.2)
	No response	1	(1.1)
	Total	**92**	**(100)**
Age(years)			
	21-25	6	(6.5)
	26-30	3	(3.3)
	31-35	4	(4.3)
	36-40	8	(8.7)
	41-45	12	(13)
	45-50	15	(16.3)
	51-55	19	(20.7)
	56-60	13	(14.1)
	61+	11	(12)
	No response	1	(1.1)
	Total	**92**	**(100)**
Highest Education	Diploma	9	(9.8)
	Associate	14	(15.2)
	BS.BA	52	(56.5)
	Masters +	14	(15.2)
	Other	2	(2.2)
	No response	1	(1.1)
	Total	**92**	**(100)**

		N	(%)
Unit type			
	Med/surg	29	(31.5)
	ICU	4	(4.3)
	Rehab	7	(7.6)
	Psych	8	(8.7)
	Pediatrics	2	(2.2)
	Obstetrics	11	(12)
	Periop	10	(10.8)
	Emergency	7	(7.6)
	Outpatient	2	(2.2)
	Homecare	1	(1.1)
	Float/perdiem	7	(7.6)
	Other	3	(3.3)
	No response	1	(1.1)
	Total	**92**	**(100)**
Unit tenure			
	> 3 months	20	(21.7)
	3mos. to 5yrs.	28	(30.4)
	6-10 yrs.	18	(19.6)
	11-15 yrs.	10	(10.9)
	16-20 yrs.	6	(6.5)
	21-25 yrs.	4	(4.3)
	26+ yrs.	4	(4.3)
	No response	2	(2.2)
	Total	**92**	**(100)**
Hosp. tenure			
	> 3 months	16	(17.4)
	3mos. to 5yrs.	22	(23.9)
	6-10 yrs.	17	(18.5)
	11-15 yrs.	8	(8.7)
	16-20 yrs.	8	(8.7)
	21-25 yrs.	7	(7.6)
	26+ yrs.	14	(15.2)
	No response	0	(0)
	Total	**92**	**(100)**

Shift worked		*N*	(%)
	Days	23	(35.9)
	Evenings	13	(14.1)
	Nights	21	(22.9)
	Other	5	(5.4)
	No response	20	(21.9)
	Total	**92**	**(100)**
Hours worked/ week	>16/week	15	(16.3)
	16-24 hours/wk	27	(29.3)
	25-36 hours/wk	39	(42.4)
	37-40 hours/wk	8	(8.7)
	No response	3	(3.3)
	Total	**92**	**(100)**

Scale Reliability

The three measures used in this study were analyzed for reliability and compared to previously published results. Cronbach's alpha for the EOM II scale has been reported as .96 (Schmalenberg & Kramer, 2008) and in this study was .97 so data analysis proceeded.

The Zohar Safety Climate Questionnaire (ZSCQ) revised by Johnson (Johnson, 2007) is an eleven item scale with a Cronbach's alpha of .98. In this study the Cronbach's alpha was .92.

The Safety Citizenship Role Definitions Scale (SCRDS) (Hofmann, et al., 2003) is a 27-item scale with a Cronbach's alpha of .98 and in this study was .95.

Specific Aim One

Specific aim 1: Examine the relationship of unit work-ownership climate and unit safety climate as perceived by staff nurses in the acute care setting. Total scores for EOM-II

(*M*= 312.47*; Mdn* = 318.00*; SD* =41.20) were used to indicate work-ownership climate. The highest possible EOM-II score is 456. The total mean score of the ZSCQ (range 1 to 7; *M*= 5.35; *Mdn* = 5.64; *SD* = 1.16) was used for safety climate.

Preliminary analyses were performed to check the assumptions of normality, linearity and homoscedasticity. The ZSCQ data violated the assumption for normality due to a negative skew (long left tail) so the ZSCQ measure was squared. This transformation lengthened the right tail proportionately more than the left tail is lengthened.

Pearson product-moment correlation coefficient was selected to analyze the relationship between work ownership climate (EOM-II) and safety climate (ZSCQ) Results indicated a significant positive correlation between EOM-II and ZSCQ scores, $r_{(90)} = .542$, $n = 92$, $p = <.001$ (2-tailed). This result indicates a 27% shared variance or overlap between ZSCQ and EOM-II scores. The Spearman Rho correlation statistic was also calculated for the relationship between EOM-II and ZSCQ. This was done as the non-transformed ZSCQ scores initially violated the assumption of normality and then were transformed. Results again showed a significant positive correlation between work ownership climate and safety climate; $r_s = .492$, $n = 92$, $p = <.000$ (2-tailed).

Specific Aim Two

Specific Aim 2: Explore the association of work-ownership climate and safety climate on the perception of safety citizenship behaviors in staff nurses. Data were analyzed using PASW (18.0) for a one-way between group's analysis of covariance (ANCOVA) controlling for the effects of the covariates of EOM-II and ZSCQ while examining the association of EOM-II and ZSCQ on safety citizenship behaviors. The independent variable was the interaction of EOM-II and ZSCQ scores on the dependent variable of SCRDS scores (total mean scores ranging 1 to 5).

This interaction, as proposed in Zohar's framework (2009), would be evidenced by high work environment (EOM-II scores) and high safety climate (ZSCS scores). The independent variables used in the analysis were EOM-II scores and ZSCQ scores and hospital site was used as a random factor. Data from the three sites were pooled for this study however variation by hospital site was an important factor to note as sample size varied across sites.

Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of regression slopes and reliable measurement of the variables. Transformed scores (means squared) were used for both the ZSCQ and SCRDS to achieve the assumption of normally distributed residuals and linear associations between continuous predictors and the outcome.

Results indicated a significant result only for the effect of work environment (EOM-II) on safety citizenship, F (1,86)=8.425, p = .005. This result indicated that EOM-II scores had a moderate effect on safety citizenship behaviors (partial η^2 =.089) with a post-hoc observed power of 0.82. Hospital as a random effect was also significant, F (1,86) = 7.287, p = .001, partial η^2 = .145 indicating SCRDS scores varied across hospitals.Neither the interaction of work environment and safety climate on safety citizenship behaviors (F (1,86)=2.181, p = 0.14) nor that of safety climate on safety citizenship behaviors (F (1,86) = 2.462, p = .089 were found to be significant. (Table 8)

With the interaction term of ZSCQ and EOM-II non-significant, the ANCOVA statistic was re-estimated with the interaction term removed. This allowed the ANCOVA statistic to determine whether or not ZSCQ (transformed) was significantly related to SCRDS after adjusting for EOM-II. Again, ZSCQ was not found to be significantly related to SCRDS while EOM-II was again significant (F(1,86) = 7.514, p =.003, partial η^2 =.10) (Table 9).

Table 8

Association of EOM-II & ZSCQ with SCRDS-Aim #2

Source	Sum of Squares	df	*MS*	*F*	*p*	η^2	Power[a]
Intercept	2.146	1	2.146	.123	.727	.001	.064
Hospital	247.65	2	123.842	7.287	**.001**	.145	.929
ZSCQ[b]	41.843	1	41.843	2.462	.120	.028	.342
EOM-II	143.15	1	143.185	8.425	**.005**	.089	.819
ZSCQ[b] *EOM-II	37.068	1	37.068	2.181	.143	.025	.309

a. Observed power computed using alpha = .05
b. Means squared ZSCQ

Table 9

Association of EOM-II and ZSCQ with SCRDS –interaction term removed

Source	Sum of Squares	df	*MS*	*F*	*p*	η^2	Power[a]
Hospital	258.87	2	129.43	7.566	**.000**	.147	.94
ZSCQ[b]	7.81	1	7.813	.454	.502	.005	.10
EOM-II	166.65	1	166.65	9.674	**.003**	.100	.87

[a] Observed power computed using alpha = .05

[b] Means squared ZSCQ

Further analysis to explore whether high EOM-II and ZSCQ scores were associated with safety citizenship behaviors was performed using ANCOVA. Zohar's framework suggests that only high work ownership climate (EOM-II scores) and high safety climate (ZSCQ scores) are associated with safety citizenship behaviors (high SCRDS scores). The model differentiates safety citizenship behaviors from safety defiance (high EOM-II, low ZSCQ), safety compliance (low EOM-II, high ZSCQ) and safety minimization (low EOM-II, low ZSCQ) (Zohar, 2008).

To perform additional comparisons, EOM-II and ZSCQ scores were dichotomized into high and low score categories using the median score as the cut point to determine the label high or low. These cut points were used to create four groups of EOM-IILo/ZSCQLo, EOM-IIHi/ZSCQLo, EOM-IILo/ZSCQHi and EOM-IIHi/SCSQHi reflecting the definitions in Zohar's framework (2008). The four groups were found to be significantly different (χ^2 (1,n = 92) = 14.07, p = .000). Box plots were used to compare the distribution of the four groups defined using dichotomized EOM-II and ZSCQ against the continuous dependent variable SCRDS scores. Transformed SCRDS mean squared scores were used in this analysis.

The resulting box plots in Figure 4 show that EOM-IILo/ ZSCQLo scores result in lower SCRDS scores suggesting that low satisfaction with work environment and low safety climate were not associated with safety citizenship behaviors. The remaining plots do not differ regarding SCRDS scores which is not consistent with Zohar's framework (2008). The box plot results were consistent with ANCOVA results indicating a non-significant interaction of overall EOM-II and ZSCQ scores on SCRDS scores (Figure 4).

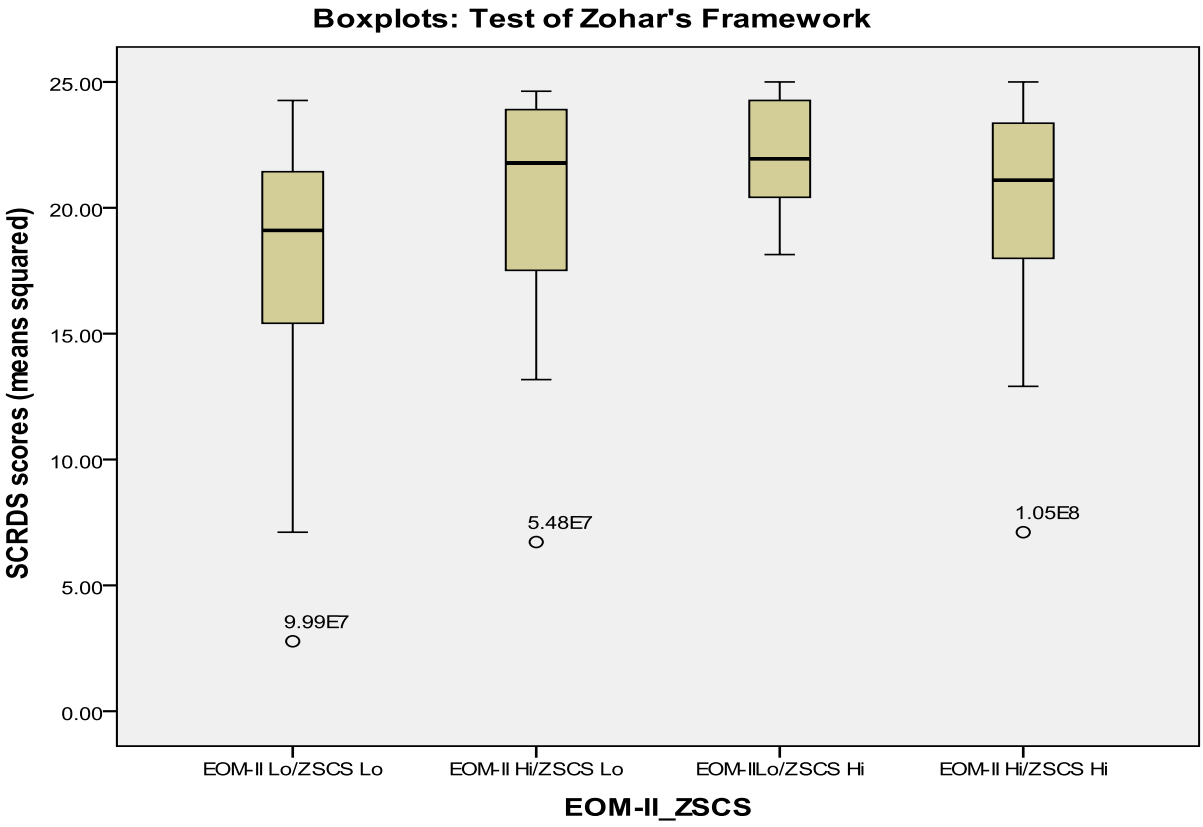
Non-parametric testing using the Kruskal-Wallis as an alternative statistic for ANOVA was performed to re-explore the interaction of higher scores in work environment and safety climate on safety citizenship behavior scores. Kruskal-Wallis is useful when data are categorized

and measured on the nominal scale and with smaller samples. In this study, Kruskal-Wallis was useful as the ANCOVA residuals were somewhat skewed even after transforming data. Kruskal-Wallis does not require a normally distributed outcome and was useful in this study as a double check on the ANCOVA results. Results are reported as Chi-square results. The influence of EOM-II scores on SCRDS scores were again significant, χ^2 (1, N=92) = 4.132, p =.042. Safety climate scores did not show a significant influence on SCRDS (χ^2 (1, N = 92) = 1.259, p = .262).

Further analysis using Chi-square was done to determine the relationship between SCRDS scores and EOM-II and ZSCQ scores grouped by quartile (EOM-II low/ZSCQ low; EOM-II low/ZSCQ high; EOM-II high/ZSCQ low; EOM-II high/ZSCQ high). Results indicated there was no significant association between the variables: χ^2 (9, N = 92) = 14.954, p = .092, Cramer's V = .092. Data were further analyzed using only categorized EOM-II scores (high/low) with SCRDS scores (high/low) using Chi-square test for independence (with Yates Continuity Correction). These results also indicated a lack of significance between the variables; χ^2 (1, n=92) = .167, p = .683, phi = .06. Only the EOM-II low/ZSCQ low pairing had a significant effect on SCRDS scores resulting in lower scores than the rest of the sample Differentiation within the remaining pairings lacked significance in this study. In other words, the analysis was not able to demonstrate the differences in the relationships of safety climate and work ownership climate on safety citizenship behaviors except in the presence of low scores for both safety climate and work ownership climate. There was some variance noted with the low safety climate and low work ownership climate plot (Figure 4), however there was still significant overlap among all box plots.

Figure 4

Box plots of relationship of dichotomized IV's to DV



By running ANCOVA using parametric and non-parametric methods (Kruskal-Wallis), the interpretation of the results was protected against non-linear associations and non-linear associations of the variables PWS and SCRDS. However, the Kruskal-Wallis nonparametric analyses does not account for within-hospital clustering, so the p-value may be a somewhat small or liberal.

Specific Aim Three

Aim 3: Explore the relationship of demographic variables of age and tenure on the perceptions of safety citizenship behaviors in staff nurses.

Non-parametric correlation statistics (Spearman's Rho) were used to determine relationships among the categorized variables of age and tenure and the continuous variable SCRDS.

Significant positive correlations were found between age and SCRDS, $r_s(91) = .409$, $n = 91$, $p = .000$ with a shared variance of 17 percent. Tenure and SCRDS were also significantly and positively correlated, $r = .376$, $n = 92$, $p = .000$, sharing 14 percent of the variance (Table 10).

Further exploration of the relationships of age, tenure and safety citizenship (SCRDS) was done using the ANCOVA statistic (Table 11). Significant associations were found with age ($F(1,86) = 11.95$, $p = .001$, partial $\eta^2 = .12$, but not tenure ($F(1,86) = 41.97$, $p = .112$). The degree of the relationships again varied across hospitals ($F(2,86) = 4.99$, $p = .009$, partial $\eta^2 = .10$). Post hoc power analysis confirmed the significance of the relationship of age and SCRDS (.93) and hospital variation in this relationship (.80).

Table 10

Correlation: Age, Tenure and SCRDS

Spearman's Rho			SCRDS[a]	Age[b]	Hosp. Tenure[b]
	Age[b]	Correlation Coefficient	.409**	--	.453**
		Sig.	.000	--	.000
	N = 91				
	Hosp. tenure[b]	Correlation Coefficient	.376**	.453**	--
		Sig	.000	.000	--
	N = 92				

[a] transformed scores (means squared)
[b] age & tenure grouped by category
** correlation is significant at the 0.01 level, 2-tailed

Table 11

Association of age and tenure with SCRDS

Variable	Sum of Squares	df	*MS*	*F*	*p*	*η2*	Power[c]
Intercept	1024.66	1	1024.662	47.529	0.000	0.712	1.000
Tenure[a]	41.968	1	41.968	2.572	0.112	0.029	0.354
Age[b]	194.926	1	194.926	11.947	**0.001**	0.122	0.928
Hospital	162.682	2	81.341	4.986	0.009	0.104	0.800

[a] tenure grouped by 5years & under, 6-20 years, 21+ years
[b] age grouped by 25 years & under, 26-40 years, 41-60 years, 61+ years.
[c] Power computed using alpha = .05

Summary

This chapter has reported results for the association of study variables in a population of registered nurses in Magnet hospitals. All three scales employed in the study were found to be reliable in the study population.

Interactions between EOM-II and ZSCQ were significantly and positively correlated ($r(90) = .542$, $n = 92$, $p = <.001$ (2-tailed)). Next, after controlling for hospital site, the association of independent variables EOM-II and ZSCQ with the dependent variable SCRDS was explored. Only EOM-II showed a significant association with SCRDS (F (1,86)=8.425, p = .005). This result indicated that work environment (EOM-II scores) had a moderate effect on safety citizenship behaviors (partial η^2 =.089). It was noted that there was a significant variation in the relationship of the Ivs to the DV by the random effect of hospital sites (F (1,86) = 7.287, p = .001).

Zohar's framework was not supported in this study. The framework proposes that higher SCRDS scores, indicating safety citizenship behaviors, should be associated with high work environment (EOM-II) and safety climate (ZSCQ) scores.

Finally the demographic variables of age and tenure were explored to determine their relationships with SCRDS. Age was collected in five year increments and further categorized to Millenials (25 years and under), Gen X'ers (26 – 40 years), Baby Boomers (41-60 years) and Beyond Boomers (61+ years). Correlations between age and SCRDS and tenure and SCRDS were significant (positive). However, only age was significantly associated with SCRDS (F (1,86) = 11.95, p =.001).

Chapter V

Discussion and Implications

Introduction

The purpose of this study was to examine the effects of safety climate and work ownership climate on safety citizenship behaviors as perceived by registered nurses in the acute care setting. The study was guided by Zohar's Multiclimate Framework for Occupational Safety (Zohar, 2008). There were no other published studies demonstrating the use of this framework to explain the interaction of the study variables of multiple organizational climates sharing an effect on safety citizenship behaviors.

There is a growing body of evidence focusing on the relationship of nursing practice environments and outcomes (Kazanjian, Green, Wong, & Reid, 2005). However, there is little in the organizational behavior literature to assist nurse leaders to better understand how staff nurses perceive and operationalize safety at the individual and unit levels. This knowledge will help guide nursing leaders to assess the work environment and then develop appropriate interventions to improve and sustain the nursing work environments and practices necessary to achieve patient safety outcomes.

Findings supported the concept of multi-climates within organizations (Zohar, 2008). The proposed interaction of safety and work ownership climates on safety citizenship behaviors was not supported in this study. Implications and future directions based on these results are presented in this chapter.

Discussion of Findings

Awareness of the existence of multiple climates or sub-climates in organizations is important to address in organizational research as well as in nursing practice. An appreciation of the complexity, multidimensionality and multi-level attributes of climates in organizations is needed for research relating to organizational behavior as well as interventions that may be effective in changing behaviors (Lundmark, 2008; Zohar, 2010). Organizational climate research focuses on aspects of the environment consciously perceived by individuals in the organization. The organization's characteristics as perceived by its members and the influencing factors on member behaviors on a variety of organizational outcomes are of interest to researchers (Denison, 1996). The process of forming and changing organizational climates is not well described in existing research.

Measurement of safety climate has been a major focus in U.S. hospitals since the IOM report was initially released (Kohn, Corrigan, & Donaldson, 2000). Much of the research to date has been on the development of reliable measurement scales for safety climate in healthcare and there is little longitudinal research to support its effect on outcomes (Clarke, 2006). This area of research lacks applicable frameworks that can provide guidance for building a body of significant findings.

Zohar (2008) proposed a multi-climate framework for occupational safety that suggested that a strong safety climate and a strong work ownership climate should be associated with safety participation or safety citizenship behaviors. There have been no published reports testing these associations.

The relationship of safety climate and work ownership climate were significantly and positively correlated indicating that the more positive the work ownership climate (higher EOM-II scores), the more positively nursing staff perceive that safety is important on their unit (higher ZSCQ scores). Similar results have been noted in other healthcare related studies (Armstrong, Laschinger, & Wong, 2009; Hughes, Chang, & Mark, 2009; Stone, Du, & Gershon, 2007; Zohar & Luria, 2005). The existence of multiple climates in organizations is also supported by other research both within healthcare and in other industries (DeJoy, Schaffer, Wilson,Vandenberg, & Butts, 2004; Lundmark, 2008; Zohar & Luria, 2005).

Work ownership climate has previously been linked to turnover, intent to leave, burnout and quality of care (Aiken, et al., 2002; Bogaert, Meulemans, Clarke, Vermeyen, & Van de Heyning, 2009; Cortelyou-Ward, Unruh, & Fottler, 2010). Although safety climate and work ownership climate were significantly and positively correlated, their interaction with safety citizenship behaviors (SCB) was not demonstrated in the manner described in Zohar's framework (2008). Only work ownership climate was able to influence safety citizenship behaviors (higher SCRDS scores). This result is consistent with other research on the effects of a strong work ownership climate and suggests an even greater importance of this organizational sub-climate than has already been reported. Results demonstrated in this study continue to support the importance of the nursing work environment in additional ways.

The findings of age and tenure appear to be linked to perceptions of safety citizenship behaviors. This suggests older nurses and those with longer organizational tenure may positively influence staff nurse attitudes about exercising safety behaviors which in turn will influence other nurses to practice safely. Further exploration of these demographic variables in a larger sample size is indicated by these results.

While safety climate may be useful as a diagnostic tool, other factors such as knowledge about safety may prove to have a greater impact on safety behaviors rather than perceptions about safety in the organization (Cooper & Phillips, 2004). Griffin and Neal (2000) found that participation motivation based on management's value for safety was predictive of safety participation or safety citizenship behaviors. These findings suggest that the path from climate to behavior to accidents or errors is still not clearly mapped.

Results of a meta-analytic review of safety climate and safety performance research (N = 30) demonstrated a lack of significance between safety climate and accidents and injuries but a positive correlation between safety climate and safety participation. Only 20% of the variance was explained leaving 80% of the variance unaccounted for suggesting that "the effect of safety climate on safety performance is not consistent across occupational settings and that moderators are present" (Clarke 2006, pp. 322). Clarke (2006) also reported that prospective studies analyzed in her study were more likely to demonstrate a valid consistent effect of safety climate on safety performance suggesting that future research is needed using a prospective design. The effect of safety climate on performance may also occur due to increased safety knowledge which is usually part of an intervention can enhance the perception of a supportive safety climate and the individual is more likely to engage in safety behaviors rather than just follow procedures (safety compliance) (Christian, Bradley, Wallace, & Burke, 2009).

Conclusions from Clarke's study suggest that the degree of routinization of work also has a significant effect on safety participation (SCB). When the nature of the work is non-routinized (such as acute care nursing) and individuals have more discretion in making decisions about their work (autonomy), safety climate may have more of an influence on safety behavior (Clarke, 2006).

Christian (Christian et al., 2009) expanded the work of Clarke (2006) using an integrative model of workplace safety as a framework for organizing a meta-analysis of 90 workplace safety studies. Five of the ninety studies were based on healthcare workers and only one focused directly on nurses. The authors conceptualized safety performance as individual behaviors (safety compliance and safety participation) rather than safety outcomes adding clarity to their model of workplace safety.

The model proposes that certain situation-related and person-related factors jointly influence safety motivation and knowledge which in turn drive the choice between safety compliance and safety participation resulting in the safety outcomes in the organization. Situation related factors or antecedents are leadership and safety climate, including attributes of the work environment such as safety systems, the degree of management commitment to safety, job risk, work pressure, supervisor support, and group processes. Person-related antecedents include personality characteristics (conscientiousness, locus of control, propensity for risk taking, neuroticism and extraversion) and attitudes towards the job (satisfaction and organizational commitment) and safety on the job (Christian, et al., 2009, p. 1104). Findings from this meta-analysis suggest that both person and situational factors are important in workplace safety. Key findings suggest person-specific attributes such as conscientiousness are important in safety motivation which then influence behaviors of seeking and using safety knowledge. Key intervention points in the model relating to enhanced safety suggest increasing management commitment to safety to enhance safety performance and safety outcomes. The authors caution that their findings were limited by findings in the primary studies and that only 12 of 90 studies were longitudinal further limiting any causal findings (Christian et al., 2009).

The model suggested by Christian and colleagues is a more complex model with multiple moderators influencing safety behavior (Christian et al., 2009) than Zohar's framework. In this framework, only safety climate and work ownership climate are proposed as influencing factors in safety citizenship behaviors. Zohar was suggesting that multiple climates exist in the workplace and the framework was suggested based on an analysis of the organizational literature related to safety climate (Zohar, 2008). This study supports the framework in its conceptualization of multiple climates in organizations. However, the influencing elements that make up these climates need to be explored further to determine how they influence behaviors such as safety citizenship. The nursing work environment is a complex environment and a complex model that is open to multiple antecedents and moderators is likely a better fit for future research.

A "lack of theoretical frameworks about organization factors" (Mick & Mark, 2005, p. 317) currently exists related to the nursing work environment. Mick and Mark (2005) suggest that current theoretical frameworks and the methods to employ them are only beginning to address the both the complexity of organizational and unit level work processes and their relationship to patient and organizational outcomes.

Sample size

An available population of staff nurses for this study was estimated at 1153 for the three hospital sites. A priori power calculations indicated that a study sample of 172 was needed to perform regression analysis for Aim #2 to achieve a small effect size with a power of .80 at a .05 level of significance. A total of 204 responses were downloaded from the study survey site. Usable responses were defined as available data from all three study scales and demographic

information which resulted in a final study sample of 92 usable responses or 45% of the downloaded responses but only an 8% response rate overall.

The lower than anticipated response rated required a change in the data analysis plan from hierarchical linear modeling (HLM) to analysis of covariance (ANCOVA). The sample size was not adequate to measure responses at the unit level which was a needed step in performing (HLM) to explore variation within groups prior to examining results at the organizational level. The ANCOVA statistic was used which uses regression procedures to control for additional continuous variables or covariates in the equation. ANCOVA was also a powerful statistic and appropriate for exploring Zohar's framework (2008). Post hoc analysis of power and effect within each analysis met the study criteria of a small effect size a study power of .80 at a .05 level of significance.

Sample Demographics

When compared to a database of Magnet hospital RN characteristics (Schmalenberg & Kramer, 2008), the sample was similar in education (BS/BA: 56.5% vs. Magnet 47.7%; Masters or higher: 15.2% vs. Magnet 12.5%) and percent of nurses reporting days as their primary shift (35.9% vs. Magnet 55.1%) or nights (22.9% vs. Magnet 24.4%). The type of unit worked in the study population was also similar to the Magnet data reported for medical/surgical (32.5% vs. Magnet 40.4%) with slightly more variation in the specialty unit population (2008). The study population differed from the Magnet sample with a higher percentage of nurses with five years or less of experience in the study sample (52.1%) compared to the Magnet sample (25.9%) (2008) The Magnet database included nurses in both community and teaching hospitals (N =

6,950). The study demographics overall demonstrated a sample representative of Magnet hospitals across the country (Table 12).

The study sample was also found to be similar to other Magnet hospital RNs in their responses to the EOM-II. Table 13 provides a comparison of EOM-II subscale scores from the current study sample and a large database (N = 10,514) of RNs from Magnet hospitals reported by Schmalenberg and Kramer (2008). The database includes both Magnet and non-Magnet hospital EOM-II subscale scores as well as total Professional Work Satisfaction scores (PWS), labeled as EOM-II scores in this study. Nurses in the current study sample had mean scores as high as or higher than RNs in the Magnet database in all of the subscales except nurse- physician relationships. Nurse-physician relationships for the study sample (M = 42.05, SD = 10.34) were lower than those in the Magnet sample (M = 45.18, SD = 1.49) or the non-Magnet sample (M = 43.21, SD = 1.53). Overall, there was more variation within the study sample as evidenced by a range of standard deviations (SD = 2.01 to 15.20) higher than in the Magnet sample (SD = 0.42 to 9.17) or the non-Magnet sample (SD = 0.63 to 9.34). This was likely due small sample size variation effects (Table 13). These results suggest that the study sample is representative of Magnet nurses across the country in their responses to the EOM-II.

Another concern with usable study sample was whether this sample (n = 92) differed from the sample entering partial data and thus not included in the data analysis (n = 39). An analysis of demographic variables categorized by age, education, tenure, shift and hours worked was conducted comparing these two samples with nonparametric statistical analysis. Using the independent samples Kruskal-Wallis test, results indicated that the distribution of all the demographic variables were the same across the two samples.

Table 12

Demographic Comparison: Study & Magnet Sample

		Study Sample *n* (%)	Magnet Sample[a] *n* (%)
Education			
	Diploma	9 (9.8)	873 (12.5)
	Associate	14 (15.2)	1,888 (27.1)
	BS/BA	52 (56.5)	3,321 (47.7)
	Masters & above	14 (15.2)	862 (12.5)
Experience			
	5 years or less	48 (52.1)	1,689 (25.9)
	5-10 years	18 (19.6)	1,246 (18.0)
	10-15 years	10 (10.9)	952 (13.8)
	15-20 years	6 (6.5)	812 (11.8)
	20+ years	8 10.8)	2,111(30.5)
Shift Worked			
	Days	23 (35.9)	3,841 (55.1)
	Evenings	13 (14.1	657 (9.4)
	Nights	21 (22.9)	1,703 (24.4)
Type of Unit			
	Med/Surg	29 (32.5)	2,898 (40.4)
	Intensive Care	4 (4.3)	1,331 (18.6)
	Pediatrics	2 (2.2)	126 (1.8)
	Obstetrics	11 (12.0)	468 (6.5)
	Psychiatric	8 (8.7)	126 (1.8)
	Outpatient	2 (2.2)	1,397 (19.1)
	Perioperative	10 (10.8)	724 (10.1)
	Emergency Department	7 (7.6)	83 (1.2)

[a] Schmalenberg & Kramer, (2008)

Table 13

Comparison of EOM-II subscale scores: Study sample and Magnet database[a]

	Study Sample (n = 3 hosp.)	Magnet[b] Sample (n = 18 hosp.)	Non-Magnet[b] Sample (n = 16 hosp.)
Subscales:	***M* (SD)**	***M* (SD)**	***M* (SD)**
Clinically Comp. Peers	12.70 (2.01)	11.97 (0.46)	11.03 (0.75)
Support for Education	11.76 (2.00)	11.82 (0.42)	11.02 (0.63)
RN/MD relationships	42.05 (10.34)	45.18 (1.49)	43.20 (1.53)
Autonomy	81.94 (12.23)	76.38 (3.09)	70.68 (3.21)
Control over Practice	75.96 (15.20)	70.56 (2.65)	63.37 (3.04)
Nurse Mgr. Support	36.32 (6.28)	23.13 (0.97)	22.12 (0.92)
Patient Centered Values	44.00 (5.34)	31.75 (1.15)	29.33 (1.11)
Staffing	17.72 (3.30)	16.23 (1.04)	14.55 (0.88)
Prof. Work Satisfaction (PWS)	312.47 (41.19)	286.51 (9.17)	264.68 (9.34)

[a] Schmalenberg & Kramer (2008)
[b] Magnet and non-Magnet nurse sample N = 10,514

Summary

In the present study, work ownership climate and not safety climate (or the interaction of the two) had a positive effect on safety behaviors (SCB). Work ownership climate was measured using the EOMII scale (Kramer & Schmalenberg, 2005) which provides an overall professional work satisfaction score based on eight subscales. These subscales include autonomy, competency of peers, educational support, nurse-physician relationships, values, control over practice, staffing and nurse manager support. Exploring these subscales further as situation-related variables distal to safety motivation and knowledge in future research may derive different findings related to the path to safety behaviors.

Sample size was a limiting factor in this exploratory study. Original data analysis plans included analysis at the unit level using HLM statistical analysis. The lower than anticipated

sample size did reveal similar characteristics to other published Magnet hospital samples thus strengthening the usefulness of the results in this study. Post hoc power analysis was reported as significant lending further support to the study conclusions and recommendations for further study.

Implications for Practice and Policy

Understanding and measuring the impact of a nursing work ownership climate in relation to organizational outcomes of safety and quality should be a priority research agenda. Nurses practice in complex, chaotic organizations that rely on nursing clinical judgment and safety behaviors for good patient care outcomes. Current patient safety initiatives do not always address the underlying organizational behavior factors in the nursing work environment and their influence on safety participation versus safety compliance. Safety compliance describes core safety practices carried out in the workplace to maintain safety such as wearing personal safety protection according to organizational policy. Safety participation includes activities that generate a safe environment such as attendance at safety meetings and helping others with safety-related issues such as reminders about safety (Neal & Griffin, 2002). The importance of engaging the workforce in safety participation has been demonstrated in other industries but only to a limited extent in healthcare (Neal & Griffin, 2006)

Successful interventions yielding safety patient outcomes are also important to continue to explore in the practice setting. Both the individual and the environment are important contributors to safety outcomes. Nursing leaders lack effective data to evaluate how nurses view their practice environment, how those views interact with individual perceptions of safety climate and ultimately the resulting safety behaviors. The tools to measure these person and situational antecedents of safety behaviors are essential to then implement appropriate

interventions. Organizational activities directed towards safety education, leadership education and teamwork training can then be tailored to achieve the desired patient safety outcomes.

Leadership as a strong influence on individual employee behavior has been well documented in healthcare and nursing practice in extensive literature reviews (Cummings, et al., 2010; Kunzle, Kolbe, & Grote, 2010; Richardson & Storr, 2010). Nurses look to their leaders at the unit organizational levels to help them interpret the safety priority in the organization (Valentine, 2004). Leadership is only one facet of a multi-dimensional framework of situational and person related antecedents that influence safety behaviors in nurses and the resulting patient outcomes. The evidence pointing to the influence of leadership in developing and sustaining work ownership climates is clear as reported in a systematic review on this topic (Pearson, et al., 2007). Implications for practice and policy include the educational preparation of nurse leaders with a focus on organizational behavior content and the tools needed to evaluate the key attributes in a nursing work environment that contribute to work ownership and patient safety.

Implications for Research

Provonost outlined a future agenda for patient safety research which includes further examination of the association of organizational characteristics and safety (Provonost, et al., 2009). Also in the agenda are themes of leadership, quality improvement, assessment of unit level activities, sustainability of interventions, team effectiveness, and motivation (Pronovost et al., 2009). This agenda seems well developed and appropriate for nursing and other healthcare disciplines to address in planning future research.

As noted previously under the discussion of findings, the current use of applicable theoretical frameworks used in nursing organizational research is limited. Nursing researchers

have adopted existing organizational theory to study nursing and patient outcomes related to professional work environment (Clarke, 2006; Mark, Salyer, & Wan, 2003)]. However, according to Mick and Mark (2005), a future research needs to rely less on cross-sectional design and self-reporting methods. Measurement scales specific to the nursing work environment also need to adequately address the variable of interest being studied.

Measurement of organizational climate has moved from an all inclusive analysis to facet-specific measures such as those identified for this study of safety and work ownership climate (Zohar & Luria, 2005). A review of organizational climate research and measurement scales related to nursing work environments finds only two scales specific to the nursing work environment and both were developed over 20 years ago (Tregunno, 2005). The Nursing Assessment Survey, developed in 1986, was shown to relate to professionalism in nursing (Manojlovich & Ketefian, 2002) and nurse satisfaction (Tzeng, Ketefian, & Redman, 2002). The Nursing Unit Cultural Assessment Tool (NUCAT – 2) was developed in response to nurse administrator concerns over the lack of assessment tools for nursing units to evaluate change (Coeling & Simms, 1993). It was never the author's intent that the tool be used to measure climate or culture and there were reliability data were published. The NUCAT – 2, according to its author, needs to be updated and reliability testing completed before the scale is used for research (Coeling, 2007)

Measures currently used in nursing work environment research include the Nursing Work Index – Revised (NWI-R) (Aiken & Patrician, 2000), the Practice Environment Scale of the Nursing Work Index (Lake, 2002) and the Essentials of Magnetism (EOM-II) (Kramer & Schmalenberg, 2005). All have roots in the original Nursing Work Index (Kramer & Hafner, 1989). There continue to be reports of inconsistent internal consistency in the subscales of the

NWI-R (Bonneterre, Liaudy, Chatellier, Lang, & de Gaudermaris, 2008; Cummings, Hayduk, & Estabrooks, 2006). This dissertation study is the first reported use of the EOM II as a measure of organizational climate in addition to its previously reported use to measure a healthy work environment (Schmalenberg & Kramer, 2008). Future research should further address validation of these measures of nursing climate as they apply to safety behavior development in nurses.

Limitations

The major study limitations include the use of a non-random and convenience sample, a cross-sectional design, use of only Magnet hospitals, self-report issues and the potential for a lower than anticipated survey response rate.

A cross-sectional design can adequately explain the predictive nature of variables but cannot determine causal relationships. Organizational behavior studies are often challenged to determine causation due to the complexity of organizational factors impacting outcomes (Schein, 2004).

Survey burden may have been experienced by some participants. The study required the completion of three measures totaling 104 rank order type questions plus eight multiple choice demographic questions. The estimated time of completion for the study was twenty minutes which minimized survey burden. Having the ability to start and stop the survey with all data being saved accommodated a break during data collection designed to enhance study retention rates.

The decision to use only Magnet hospitals was made because Magnet hospitals have structures in place that engage staff in decision making relative to their practice. This created a study sample where one might expect to find less variation in the strength of work ownership

climate scores than in the general population. However, there was enough variation within the study population to demonstrate the relationship (correlation) of the variables with safety citizenship behaviors as represented in Zohar's framework (Zohar,2008).

Community hospitals and teaching hospitals have access to different resources and are different work climates (McGillas Hall, Doran, Sidani, & Pink, 2006). The reason for limiting the study to community hospitals rather than teaching or a mixed group was based on the desire for similar populations for this early phase in exploration of the framework (Wieck & Landrum, 2010).

The use of a survey study design has the potential for response bias related to issues of social desirability and common method variance. Social desirability can influence responses to survey questions addressing social issues and in particular self-reports of personal behaviors (Waltz, Strickland, & Lenz, 2005). Participants may be influenced to choose the answer to a sensitive topic that they feel puts them in the best light versus their true perspective on the topic (2005). However in the case of internet based survey use, it has been reported that social desirability bias in responses is minimized (Taylor, 1999).

Common method variance can also be a limitation in survey research as data for all the variables in the study are collected at the same time using one method (Friedrich, Byrne, & Mumford, 2009). If common method is not addressed, any variance observed in the data may be due the method of collection and not the measure itself, thus altering the findings by common method variance rather than reflecting the actual relationship among the variable (Podsakoff, et al., 2003). Common method variance can be addressed by examining the issue a priori by the use of alternative forms of data collection such as adding additional scales to control for method bias (Podsakoff et al., 2003). In this study, the Safety Citizenship Behavior Scale was subject to

common method bias as it asks the respondent to report on their own behavior in the clinical setting. The scale author added six additional questions to control for bias (Hofmann, et al., 2003) which were included in the administration of the survey in this study. The remaining two scales (EOM-II and ZSCQ) were examined a priori for the potential for common method bias and felt to be at lower risk as both include several components measuring the variable of interest.

Sample bias due to the use of an internet based survey methodology may also occur. While hospital nurses are increasingly expected to use a computer and mouse to access patient data, it cannot be assumed that every nurse is comfortable using a computer. When a choice is offered, such as participation in a research study, nurses less comfortable with computer use may opt to not participate. This creates a potential sample bias. Ease of access to the study, clear instructions on completion of study measures, interest of the study to staff and study procedures that allow the nurse to stop the survey and restart with all data saved are strategies to reduce sample bias (Kramer, Schmalenberg, & Keller-Unger, 2009)

Finally, an adequate response rate is an important consideration in any study involving human participants. Adequate procedures for conducting the study were addressed including the use of internet survey methods. The idea of saving paper could be considered appealing to environmentally conscious nurses. The topics of safety and work environment are also generally of interest to nurses and nurses tend to participate in research when it has meaning for them (McFall & Milke, 2007).

Some nurses may not wish to complete the study at their workplace. If they did not have computer access to the internet at home, they would have been unable to participate. The number of nurses that will be impacted by this is unknown and could have affected the number of nurses responding to the study.

Recruitment and retention of subjects

A detailed recruitment plan was followed for this study and previously used methods were followed for survey methods (Bourque & Fielder, 2003; Dillman, 2007). Procedures were developed to allow respondents to start and stop the survey allowing them to save their results and return to the study at a later time. This feature was felt to be important as data collection was done while staff nurses were at work.

Potential barriers to successful recruitment of subjects in this study may have included a lack of interest in the study topic and work pressures that did not allow completion of the surveys. Both of these possibilities have been reported in other electronic surveys in nursing samples (Kramer, Schmalenberg & Keller-Unger, 2009). The primary investigator in this dissertation study was not known at any of the three study sites and chose to not involve the chief nursing officer (CNO) other than for approval of the study to avoid potential bias. In hindsight, this was potentially a flaw in the study plan. Involving the CNO and other nursing leaders may have generated a greater sample size as that support may have communicated additional value of participation to the nursing staff.

Survey burden may have also been a factor in subjects failing to complete the three scales. There were a total of 102 questions in the study which may have been longer than participants felt they could answer. In Hospital #2, staff nurses were not able to access the internet via their work email system. An alternative method of linking to the internet had been planned however technical problems prevented this link from being developed. This resulted in a significant drop in responses from Hospital #2 as nurses had to type the study address into their web browser.

All of these limitations reduced the generalizability of the study findings. However, a description of the sample has been included to allow readers the opportunity to evaluate the findings themselves.

Conclusions

While organizations need to measure safety outcomes, little is known about the processes used to form and change an organizational climate to one focused on safety. Thus, organizational leaders lack well developed frameworks for managing organizational change that takes into account organizational climate, relationships, structure and leadership (Tregunno, 2005).

This study found that work ownership climate and safety citizenship behaviors are positively associated. Safety climate and work ownership climate were positively linked however their predicted interaction did not influence safety citizenship behaviors. Age and tenure may also impact safety citizenship behaviors. Further exploration of safety citizenship in staff nurses is needed to understand its impact on safety outcomes. Additional work is also needed to develop models that account for the multiple sub-climates and potential moderators on the path to safety citizenship behaviors and safety outcomes in the nursing work environment.

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Appendix A1

Health Sciences Research

ESSENTIALS OF A HEALTHY, MAGNETIC WORK ENVIRONMENT

(EOM-II) ©

		True for most MDs, most of the time	True for some MDs, some of the time	True for 1 or 2 MDs on occasion	Not true for any MDs
1	Nurse-physician relationships on my unit are that of a „student-teacher" with physicians willing to explain and teach the nurses.				
2	Nurse-physician relationships consist of willing cooperation based on *mutual* power, trust, and respect.				
3	Relationships between nurses and physicians are frustrating, hostile and characterized by „power plays," antagonism or resentment.				
4	Relationships with MDs are that of „student-teacher" with RNs influencing MDs in their prescribing care for patients.				
5	Our nurse-physician relationships are rather formal and characterized mainly by the nurse responding to the physician"s questions.				
6	Physicians treat nurses on this unit as *equals.* MDs need RNs" assessments/observations and RNs need MDs medical knowledge if together we are going to help the pt.				
		Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
7	Other professionals (therapists, physicians) indicate they value nurses pursuing their education, extending their knowledge, and increasing their competence				
8	Our nurse manager makes it possible for nurses on the unit to attend continuing education, outside courses and/or degree completion programs.				
9	In this organization, there are few rewards such as salary increases or promotion for pursuing one"s education.				
10	This organization provides financial assistance and/or paid time off for nurses to attend educational programs.				
11	Nurses here fear „getting into trouble" or „taking big risks" if they make independent, autonomous decisions.				

12	Autonomous nursing practice is facilitated because nurses „feel" or know that nurse managers will support them.				
13	Staff nurses must obtain orders or consent from an authority source before making independent or interdependent decisions.				
		Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
14	On this unit, nurses make independent decisions within the nursing sphere of practice and interdependent decisions in those spheres where nursing overlaps with other disciplines.				
15	Our evidence-based practice activities provide us with the knowledge base needed to make sound clinical decisions.				
16	This organization has many rules and regulations that prevent nurses from making independent or interdependent decisions.				
17	In this hospital, nurses have to do things that, in our professional judgment, may not be in the best interests of the patient.				
18	Nurses are held accountable in a positive, constructive, learning way for the outcomes of autonomous clinical nursing practice.				
19	There is a general understanding among nurses on my unit that nursing administration wants us to function autonomously.				
20	We have a Council or committee structure through which nurses on our unit and in this hospital control nursing practice.				
21	Staff nurses have input and make decisions with respect to *practice* issues and policies such as selection of equipment, how frequently to change IV line dressings, etc.				
22	Physicians, administrators, nurses and other professionals (ex. physical therapists) recognize that nursing in this hospital controls its own practice.				
23	Shared decision-making is more talk than action here. We can offer suggestions and alternative solutions to an identified problem but we don"t make the final decision.				
24	Representatives from other departments and disciplines such as transportation, pharmacy, respiratory therapy, participate in our shared decision-making activities on a regular basis.				
25	Nurses in this organization have input and make decisions related to *personnel* issues and policies that directly affect them such as floating, schedules, care delivery system.				
26	Nurses on my unit can describe decisions made and outcomes achieved as a result of our shared decision-making process.				

27	Nursing practice, policies, issues and standards are determined by nursing management, administration or people outside of nursing. Staff nurses do not have control.				
28	The nurses on my unit judge that, most of the time, we are adequately staffed to give *quality patient care*.				
29	We don"t have enough competent and experienced nurses who „know" the unit, patients and physicians to provide *safe* care.				
30	We modify our patient care delivery system (Ex. team, primary) on the basis of the number and experience of RNs available.				
31	We work as a team on our unit. We need one another and need to work together if patients are to receive high quality care.				
32	Our group cohesiveness enables us to give quality care with our current level of staffing.				
33	Our unit is not consistently budgeted sufficient RNs positions for the acuity of our patients. This makes if difficult to give quality patient care even when all budgeted positions are filled.				
34	Nurses on my unit demonstrate competent performance.				
35	Nurses" competent performances are recognized and rewarded both on my unit and in this organization.				
36	Continuing education toward a nursing degree is recognized as a way in which nurses can increase their nursing competence.				
37	National certification is recognized as evidence of proficient clinical competence.				
		Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
38	Our nurse manager represents the positions and interests of the staff and of our unit to other departments and to administration. He/she "watches our back".				
39	If we need resources such as equipment or supplies, our nurse manager sees to it that we get these.				
40	Our manager is diplomatic, fair and honest in resolving conflicts between nurses, physicians or other departments.				
41	Our nurse manager supports and encourages interdisciplinary— physicians, nurses, and other disciplines—planning and action.				
42	The nurse manager on our unit sees to it that we have adequate numbers of competent staff to get the job done.				
43	Our nurse manager cites specific examples, both positive and negative, when he/she provides us feedback.				

44	The nurse manager of our unit promotes staff cohesion and is a positive force in getting us to work together.				
45	Our manager is visible, available, approachable and „safe".				
46	Our manager instills & "lives" the organization"s values regarding patient care. He/she "walks the talk".				
47	Our manager fosters sound decision-making by asking for „best practice" evidence for the decisions we are making				
48	This hospital is willing to try new things.				
49	Concern for the patient is paramount on my unit and in this hospital.				
50	Problems are solved by swift action; people are not afraid to take risks.				
51	People on my unit are enthusiastic about their work				
52	High performance and productivity are expected of everyone.				
53	We work together as a team, both within nursing and with medicine and other disciplines.				
54	Cost (money) is important, but quality patient care comes first in this organization.				
55	The contributions of all members of the staff (RNs, nurse assistants, techs) are important and are valued.				
56	Our administration anticipates organizational changes that need to be made because of changes in the health care system, and sees to it that we are out in front.				
57	This is a value driven organization. Values are known, understood, shared, and frequently talked about.				
58	We make a conscious effort to transmit our cultural values to in-coming nurses, physicians, techs and assistants.				

OVERALL JOB SATISFACTION

Considering all aspects of your job as well as your own values, ideals and goals, how **satisfied** are you with **your current nursing job?**

0 1 2 3 4 **5** 6 7 8 9 **10**

It's terrible **I'm satisfied** **I love it!**

NURSE-ASSESSED QUALITY OF PATIENT CARE ON UNIT

Select a number that indicates the **usual quality of care provided to patients** on your unit?

0 1 2 3 4 **5** 6 7 8 9 **10**

Dangerously Low **Safe, but not much more** **Very high quality**

Appendix A2

Permission to use EOM-II from author

Health Sciences Research

Nursing Administration and Research Consultation
P.O. Box 7667 Tahoe City, CA. 96145 (Summer)
3285 N. Prospector, Apache Junction, AZ. 85219 (Winter)
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EOMII© Conditions of Use

THE ESSENTIALS OF MAGNETISMII (EOMII©) is a 58-item instrument based on Donabedian's conceptual paradigm and on grounded theories for each of the 8 essentials of a magnetic work environment generated from 10 years of interviews and participant observations of staff nurses in 96 magnet and 40 magnet-aspiring hospitals. In Donabedian's theory, *structures* (physical layout, staffing patterns, systems, standards) enable performance of *work processes* (the 8 essentials of magnetism, Baldrige performance standards) that lead to desired *outcomes* (fewer complications, lower mortality, increased nurse retention and professional job satisfaction). *Structures* alone do not produce *outcomes*; only clinical nurses at the front line can confirm whether the *structures* are effective in enabling work processes/relationships leading to desired patient, nurse, organizational *outcomes*.

The ESSENTIALS OF MAGNETISM are characteristics that staff nurses in magnet hospitals judge to be essential to a healthy work environment, the latter defined as an environment that promotes professional job satisfaction by enabling nurses to provide quality care to patients. These attributes are:

Clinical Autonomy
Working with other nurses who are clinically competent
Collegial/collaborative RN/MD relationships
Perceived support for education
Control of nursing practice
Supportive nurse manager relationships
Perceived Adequacy of staffing
Culture in which concern for the patient is paramount

The 8 essential processes/relationships were originally identified by nurses in 14 Magnet Hospitals, subsequently confirmed by staff nurses in 81 additional hospitals and in 9 home health care agencies in 8 states. Steps or components that constitute the 8 essential work processes/relationships are measured by separate sub-scales on the Essentials of Magnetism (EOMII©) instrument.

Each essential is measured by a sub-scale. Sub-scale items are weighted on the basis of an independent study with almost 400 nurses in 7 magnet hospitals who weighted the items based on degree of importance to the patient care process. Total EOM score (sum of weighted subscales) is termed Professional Job Satisfaction and is a measure of the extent to which staff nurses report/confirm a healthy, productive work environment that enables them to give quality patient care. All 8 attributes are essential for an excellent work environment; none is optional. Two outcome measures—Organizational Job

Satisfaction and a Nurse-assessed Quality of Patient Care rating scale are also provided. Their use is optional. They are not an inherent part of the EOMII©.

Changes made in the EOMII© were prompted by extensions of grounded theories resulting from the interviews and observations in the Structure-Identification studies. The main difference between the EOM© and EOMII© is the addition of new items that clinical nurses identify as indicative of a Supportive Nurse Manager Relationship. What clinical nurses consider to be ‗supportive' NM role behaviors were identified through two nationwide studies; results are published in the *Nursing Administration Quarterly* (2007*).* Direct comparisons between results of the EOM© and EOMII© can be made for all subscales except NM Support. Comparison on this subscale can be made by omitting the new items from the scoring, or by insertion of values for dummy variables. Reliability and construct validity of the EOM© are published in the July-Aug issue of *JONA*; for the EOMII©, in the January, 2008 issue of *Nursing Research*.

Results of the construct validation study in Magnet, Magnet-aspiring and non-Magnet hospitals are published in the June to September issues of *Nursing2004.* Results of the ―Structure Identification" studies utilizing the EOM© are reported in the Oct/Nov, 2005 issue of *JONA* (RNMD relationships), the Oct, 2006 and Jan, 2007 issues of *JONA* (Clinical Autonomy), in a 2004 and a 2008 issue of the *Western Journal of Nursing Research* (CNP), in the 2007 issue (Vol 31 (4)) of *NAQ* (Nurse Manager Support), in a Sept. 2007 issue of *American Journal of Critical Care*, and in a series of 8 articles published in *Critical Care Nurse.*

The EOM© and EOMII© are copyrighted. HSRA will grant permission for use of the instrument under the following conditions:

For entering, cleaning, weighting, and scoring the data . . . . $2.00 per survey
The data file in EXCEL or SPSS will then be returned to contractee for analyses, or HSRA will conduct analyses as described below. If data are entered by contractee according to a HSRA Data Entry Protocol, cost is . . $1.00 per survey

For analysis, interpretation, and preparation of individualized reports, charges are as follows. Contractee may elect any, all, or no reports.

Analysis and comparison of data by unit/clinic for each hospital . . $200.00
Comparison of study hospital with National Magnet Hospital Profile . . 200.00
Analysis of all demographic variables and comparison
with National Profiles. 300.00
Item analysis (Gap analysis) and comparison of study hospital with
range and mean item data for Magnet Hospitals 300.00
Analysis of differences in data at two time periods (Benchmarking) . . . 100.00

There is no charge to a hospital for EOMII© survey, analyses, and reports when testing is conducted as part of an HSRA research study.

The EOMII© was designed for analysis and interpretation at the group level (unit and hospital). For valid, reliable aggregation of individual data to the unit level, a 40% response rate on the EOMII is required (See article in *RINAH*).

Health Science Research Associates (HSRA) 7/1/09

Appendix B1

Original

Zohar Safety Climate Questionnaire (ZSCQ)

My direct supervisor……

1. Discusses how to improve safety with us
2. Uses explanations (not just compliance) to get us to act safely
3. Frequently tells us about the hazards in our work
4. Refuses to ignore safety rules when work falls behind schedule
5. Is strict about working safely when we are tired or stressed
6. Makes sure we follow *all* the safety rules (not just the most important ones)
7. Insists that we obey safety rules when fixing equipment or machines
8. Says a "good word" to staff who pay special attention to safety
9. Is strict about safety at the end of the shift, when we want to go home
10. Spends time helping us learn to see problems *before* they arise
11. Frequently talks about safety issues throughout the work week

(Zohar, 1980; Zohar and Luria, 2005; Johnson, 2007)

All statements rated on a scale from 1 (strongly disagree) to 7 (strongly agree)

Appendix B2

Adapted for nursing study use

Zohar Safety Climate Questionnaire (ZSCQ)

My direct supervisor……

1. Discusses how to improve safety with us
2. Uses explanations (not just compliance) to get us to act safely
3. Frequently tells us about the hazards in our work
4. Refuses to ignore safety rules when work falls behind schedule
5. Is strict about working safely when we are tired or stressed
6. Makes sure we follow *all* the safety rules (not just the most important ones)
7. **Insists that we obey safety rules when using equipment or machines**
8. Says a "good word" to staff who pay special attention to safety
9. Is strict about safety at the end of the shift, when we want to go home
10. Spends time helping us learn to see problems *before* they arise
11. Frequently talks about safety issues throughout the work week

All statements rated on a scale from 1 (strongly disagree) to 7 (strongly agree)

Appendix B3

Permission to use ZSCQ from author

March 14, 2009 12:31 PM

From: Dov Zohar

To: Barbara Weatherford

Barbara

You are welcome to use my scale. Please inform me of the outcomes of your study, as I have started to work in healthcare organizations.

I am currently at the Safety Research Institute in Hopkinton, which is 25 miles west of Boston. Perhaps we can meetto discuss possible collaboration.

Dov

On Tue, Mar 10, 2009 at 12:45 AM, <bweatherford@umassd.edu> wrote:
Greetings,

I am currently working on my PhD in nursing and my dissertation proposal is very much influenced by your excellent work. I hope to use your multi-level multi-climate framework (2008) to explore the effects of safety climate and work-ownership climate on safety citizenship behaviors in acute care nurses.
I have found your work and particularly this article very applicable to nursing practice based on my 20+ years as a senior nursing administrator in the US.

I am requesting permission to use your Safety Climate Scale with revisions by Stephen Johnson (2007)for the study.

Thank you for your consideration and your excellent work in this field.

Barbara Weatherford MS, RN
College of Nursing
University of Massachusetts Dartmouth
508-910-6290

Appendix C1

Safety Citizenship Role Definitions Scale (original)

PART I

In the following section, we would like to know whether you feel certain activities are an expected part of your official job responsibilities or if you consider them above and beyond what is expected in your job.

	Expected Part of My Job	Somewhat Above and Beyond What is Expected for my Job		Definitely Above and Beyond what is Expected for my job	
1. Volunteering for safety committees	1	2	3	4	5
2. Helping teach safety procedures to new crew members	1	2	3	4	5
3. Assisting others to make sure they perform their work safely	1	2	3	4	5
4. Getting involved in safety activities to help my crew work more safely	1	2	3	4	5
5. Helping other crew members learn about safe work practices	1	2	3	4	5
6. Helping others with safety related responsibilities	1	2	3	4	5
7. Making safety-related recommendations about work activities	1	2	3	4	5
8. Speaking up and encouraging others to get involved in safety issues	1	2	3	4	5
9. Expressing opinions on safety matters even if others disagree	1	2	3	4	5
10. Raising safety concerns during planning sessions	1	2	3	4	5
11. Protecting fellow crew members from safety hazards	1	2	3	4	5
12. Going out of my way to look out for the safety of other crew members	1	2	3	4	5
13. Taking action to protect other crew members from risky situations	1	2	3	4	5
14. Trying to prevent other crew members from being injured on the job	1	2	3	4	5
15. Taking action to stop safety violations in order to protect the well-being of other crew members	1	2	3	4	5
16. Explaining to other crew members that I will report safety violations	1	2	3	4	5
17. Telling other crew members to follow safe working procedures	1	2	3	4	5
18. Monitoring new crew members to ensure they are performing safely	1	2	3	4	5
19. Reporting crew members that violate safety procedures	1	2	3	4	5
20. Telling new crew members that violations of safety procedures will not be tolerated	1	2	3	4	5
21. Attending safety meetings	1	2	3	4	5
22. Attending non-mandatory safety oriented meetings	1	2	3	4	5
23. Keeping informed of changes in safety policies and procedures	1	2	3	4	5
24. Trying to improve safety procedures	1	2	3	4	5
25. Trying to change the way the job is done to make it safer	1	2	3	4	5
26. Trying to change policies and procedures to make them safer	1	2	3	4	5
27. Making suggestions to improve the safety of a mission	1	2	3	4	5

Items with labels (labels not included in participant surveys)

SAFETY AND ROLE DEFINITIONS: HELPING

28. Volunteering for safety committees	1	2	3	4	5
29. Helping to teach safety procedures to new crew members	1	2	3	4	5
30. Assisting others to make sure they perform their work safely	1	2	3	4	5
31. Getting involved in safety activities to help my crew work more safely	1	2	3	4	5
32. Helping other crew members learn about safe work practices	1	2	3	4	5
33. Helping others with safety related responsibilities	1	2	3	4	5

SAFETY AND ROLE DEFINITIONS: VOICE

1. Making safety-related recommendations concerning work activities	1	2	3	4	5
2. Speaking up and encouraging others to get involved in safety issues	1	2	3	4	5
3. Expressing opinions on safety matters even if others disagree	1	2	3	4	5
4. Raising safety concerns within the group during planning sessions	1	2	3	4	5

SAFETY AND ROLE DEFINITIONS: STEWARDSHIP

1. Protecting fellow crew members from safety hazards	1	2	3	4	5
2. Going out of my way to look out for the safety of other crew members	1	2	3	4	5
3. Taking action to protect other crew members from risky situations	1	2	3	4	5
4. Trying to prevent other crew members from being injured on the job	1	2	3	4	5
5. Taking action to stop safety violations in order to protect the well-being of other crew members	1	2	3	4	5

SAFETY AND ROLE DEFINITIONS: WHISTLEBLOWING

1. Explaining to other crew members that I will report safety violations	1	2	3	4	5
2. Telling other crew members to follow safe working procedures	1	2	3	4	5
3. Monitoring new crew members to ensure they are performing safely	1	2	3	4	5
4. Reporting crew members that violate safety procedures	1	2	3	4	5
5. Telling new crew members that violations of safety procedures will not be tolerated	1	2	3	4	5

SAFETY AND ROLE DEFINITIONS: SAFETY CIVIC VIRTUE (INFORMED)

1. Attending safety meetings	1	2	3	4	5
2. Attending non-mandatory safety oriented meetings	1	2	3	4	5
3. Keeping informed of changes in safety policies and procedures	1	2	3	4	5

SAFETY AND ROLE DEFINITIONS: IMPROVING SAFETY (Morrison AMJ)

1. Trying to improve safety procedures	1	2	3	4	5
2. Trying to change the way the job is done to make it safer	1	2	3	4	5
3. Trying to change policies and procedures to make them safer	1	2	3	4	5
4. Making suggestions to improve the safety of a mission	1	2	3	4	5

Six general safety items

34. Using appropriate personal protection equipment as indicated by safety policies and procedures
35. Using personal protective equipment correctly
36. Properly using lock-out and tag-out procedures
37. Using appropriate lifting techniques
38. Applying appropriate work practices to reduce exposure to potential hazards and injury
39. Generally following safety policies and procedures

Appendix C2

Safety Citizenship Role Definition Scale- Study version

In the following section, we would like to know whether you feel certain activities are an expected part of your official job responsibilities or if you consider them above and beyond what is expected in your job.

	Expected Part of My Job	Somewhat Above and Beyond What is Expected for		Definitely Above Beyond what is Expected for my job	
1. Volunteering for safety committees	1	2	3	4	5
2. Helping teach safety procedures to new crew members	1	2	3	4	5
3. Assisting others to make sure they perform their work safely	1	2	3	4	5
4. Getting involved in safety activities to help my crew work more safely	1	2	3	4	5
5. Helping other crew members learn about safe work practices	1	2	3	4	5
6. Helping others with safety related responsibilities	1	2	3	4	5
7. Making safety-related recommendations about work activities	1	2	3	4	5
8. Speaking up and encouraging others to get involved in safety issues	1	2	3	4	5
9. Expressing opinions on safety matters even if others disagree	1	2	3	4	5
10. Raising safety concerns during planning sessions	1	2	3	4	5
11. Protecting fellow crew members from safety hazards	1	2	3	4	5
12. Going out of my way to look out for the safety of other crew members	1	2	3	4	5
13. Taking action to protect other crew members from risky situations	1	2	3	4	5
14. Trying to prevent other crew members from being injured on the job	1	2	3	4	5
15. Taking action to stop safety violations in order to protect the well-being of other crew members	1	2	3	4	5
16. Explaining to other crew members that I will report safety violations	1	2	3	4	5
17. Telling other crew members to follow safe working procedures	1	2	3	4	5
18. Monitoring new crew members to ensure they are performing safely	1	2	3	4	5
19. Reporting crew members that violate safety procedures	1	2	3	4	5
20. Telling new crew members that violations of safety procedures will not be tolerated	1	2	3	4	5
21. Attending safety meetings	1	2	3	4	5
22. Attending non-mandatory safety oriented meetings	1	2	3	4	5
23. Keeping informed of changes in safety policies and procedures	1	2	3	4	5
24. Trying to improve safety procedures	1	2	3	4	5
25. Trying to change the way the job is done to make it safer	1	2	3	4	5
26. Trying to change policies and procedures to make them safer	1	2	3	4	5
27. Making suggestions to improve the safety of a mission	1	2	3	4	5

SCALE #3

28. Using appropriate personal protection equipment as indicated by safety policies and procedures	1	2	3	4	5
29. Using personal protective equipment correctly.....	1	2	3	4	5
30. Properly using lock-out and tag-out procedures	1	2	3	4	5
31. Using appropriate lifting techniques	1	2	3	4	5
32. Applying appropriate work practices to reduce exposure to potential hazards and injury…….	1	2	3	4	5
33. Generally following safety policies and procedures……	1	2	3	4	5

Appendix C3

Permission to use SCRDS from author

RE: Safety Citizenship Role Definitions

March 11, 2009 4:57 PM

From: "Dave Hofmann" <dhofmann@unc.edu>

To: Barbara Weatherford

Hi Barbara -- Thanks for getting in touch. I am glad to know that you have found my work relevant to your dissertation.

In response to your questions:

1. Please feel free to use the measure any way you see fit and to edit it to make it more applicable to the health care context.
2. I have attached the actual measure as we used it in the study.
3. I would recommend using the general items. This may help you differentiate unarguably "in-role" behaviors from behaviors that have a broader range in terms of discretion. There may be other ways that these items might provide a useful contrast to the citizenship items after the data are collected. So, yes, I would recommend using these items as well.

I hope this answers your questions. By the way, I have also attached a nursing-focused paper that is current under review. Just FYI in case it is helpful ...

Best of luck with the dissertation!
Dave

-----Original Message-----
From: bweatherford@umassd.edu [mailto:bweatherford@umassd.edu]
Sent: Monday, March 09, 2009 6:37 PM
To: Hofmann, Dave
Subject: Safety Citizenship Role Definitions

Greetings,

I am currently working on my PhD in nursing at the University of Massachusetts Worcester and teaching at UMass Dartmouth. My dissertation interest comes from my 20+ years in senior nursing administration in hospitals and patient safety. My interest in organizational behavior brings me to a topic that is addressing the multiclimate aspect of safety culture and I plan to use Zohar's framework (2008) to guide my work.

I read with interest your 2003 publication, "Climate as a Moderator of the Relationship Between Leader-Member Exchange and Content Specific

Citizenship. The idea of safety citizenship behaviors fits what I believe transpires in acute care nursing when nurses make specific decisions about care and their work environment.

I am requesting permission to use the Safety Citizenship Role Definitions scale you reported in your 2003 article. I would need to modify the language to fit healthcare but feel that could be done without changing the content validity of the scale.

Two questions (besides will you grant permission!):

1. Did you define in the scale what rankings #2 and #4 would be? The article provided descriptors for responses #1 (expected part of my job), #3 (somewhat above and beyond what is expected for my job) and #5 (definately above and beyond what is expected for my job)?

2. Would you recommend that I use the supplemental, 6-item measure of core safety activities to provide additional construct validity? If yes, could you provide me with what you used and I can adjust for the healthcare setting.

I have also read the work you published with Barbara Mark and have been in communication with her as well. I feel the Safety Citizenship Role Definition scale is more suited for my study.

Thank you for your consideration and time in reading this request.

Barbara Weatherford MS, RN
College of Nursing
University of Massachusetts Dartmouth

Appendix D

Code Book

Variable Name	**Variable label**	**Values:Labels and Codes**	**Type of Data**	**Statistic**
responseID	Project code	ID # random determination from SurveyGizmo site	n/a	n/a
HOSP	Hosp. name	0= no response 1= Winchester Hospital 2= Newport Hospital 3=Middlesex Hospital	Categorical	Descriptive: Percent/Frequency Aim #2 & #3: Random variable, ANCOVA
GENDER Var137	Gender	0= no response 1= female 2= male 3= other	Categorical	Descriptive: Percent/Frequency
AGE Var138	Age	0= no response 1= under 20 2= 21-25 3= 26- 30 4= 31-35 5= 36-40 6 = 41-45 7= 46-50 8= 51-55 9= 56-60 10= 61+	Categorical	Descriptive Percent/Frequency Aim #3: Correlation, ANCOVA
EDUCLEV Var139	Educ. Level type	0= no data 1 = AD 2 = BS/BA 3= Masters or higher	Categorical	Descriptive: Percent/Frequency

Variable Name	Variable label	Values:Labels and Codes	Type of Data	Statistic
UNIT Var 141	Type of unit	0= no data 1= medical 2= surgical 3= medical/surgical 4= critical care 5= step-down unit 6= pediatrics 7= obstetrics 8= nursery on 9= labor & del. only 10= OR 11= PACU 12= ED 13= ambulatory 14= psychiatry 15= oncology 16= homecare 17= rehabilitation 18=other	Categorical	Descriptive: Percent/Frequency
TENUREU Var142	Tenure unit	0= no resp 1= less than 3 mos 2=4mos-5yrs 3=6-10 yrs 4=11-15 yrs 5=16-20 yrs 6= 21-25 yrs 7= 26+ yrs	Categorical	Descriptive: Percent/Frequency
TENUREH 143	Tenure hosp.	0= no resp 1= less than 3 mos 2=4mos-5yrs 3=6-10 yrs 4=11-15 yrs 5=16-20 yrs 6= 21-25 yrs 7= 26+ yrs	Categorical	Descriptive: Percent/Frequency Aim #3: Correlation, ANCOVA
SHIFT Var144	Shift worked	0= no resp 1= days, 8hrs 2=days 12 hours 3=evenings 8 hours 4=nights 8 hours 5=nights, 12 hours 6= other	Categorical	Descriptive: Percent/Frequency

Variable Name	Variable label	Values:Labels and Codes	Type of Data	Statistic
WKHOURS Var145	Regular hours worked per week	0= no resp 1= less than 16 2=16-24 hrs 3= 25-36 hrs 4= 37-40	Numerical	Descriptive: Percent/Frequency
EOM EOM-II – total score	Essentials of Magnetism II Scale	EOMQ1 thru EOMQ60	Ordinal	Descriptive: Mean, median Aim #1 Correlation EOM-II & SCQ Aim #2- HLM Level 1- indiv. Level II- unit Level III-hosp
ZSCQ	Safety Climate Questionnaire	SCQ1 thru SCQ11	Ordinal	Descriptive: Mean, median, SD Aim #1 Correlation EOM-II & SCQ Aim #2- ANCOVA
TSCBS-total score	Safety Citizenship Behavior Scale	SCBS1 thru SCBS33	Ordinal	Descriptive: Mean, median, SD Aim #2- ANCOVA