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Unit Managers' Authentic Leadership, Staff Nurses' Work Attitudes and Behaviours, and Outcomes of Care: A Structural Equation Model

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Abstract

Nursing leadership is fundamental in the development of positive work attitudes and behaviours among staff nurses, and the provision of high quality patient care. Although direct empirical links were well established, there was a lack of research testing the indirect effects of leadership on nurses and patients. As such, it was proposed that the concept of authentic leadership could help explain the complex psychological processes that mediated relationships between nurse managers' leadership, staff nurses' work attitudes and behaviours, and outcomes of care.

The purpose of the present study was to test a model of authentic leadership in a sample of registered nurses, working in acute care hospitals, in Ontario (n=264). The hypothesized model was analyzed using multiple regression and latent variable path analysis. Results did not support the moderating effect of psychological safety; therefore, it was removed from subsequent analysis. Although the structural model achieved good fit in the first iteration [$\chi^2_{MLR}(182)= 295.041$, $p= <0.001$, RMSEA=.049, 90% CI= .038 and .058, SRMR=.083, CFI= .957], the direct effects of authentic leadership on professional identification, professional identification on voice behaviour, and voice behaviour on missed nursing care were non-significant ($p>.05$). Model modifications were made in a step-wise manner and all non-significant paths were deleted. The final structural model achieved good fit [$\chi^2_{MLR}(131)= 203.829$, $p= <0.001$, RMSEA=.046, 90% CI= .033 and .058, SRMR=.073, CFI= .969] and supported the direct effects of authentic leadership on voice behaviour and job satisfaction, while missed nursing care had significant direct effects on job satisfaction, nurse-assessed quality, and adverse events ($p< .001$). An alternative model was also tested which achieved good fit

[$\chi^2_{MLR}(184)= 272.249$, $p= <0.001$, RMSEA=.043, 90% CI= .031 and .053, SRMR=.078, CFI= .966] and supported the direct effect of authentic leadership on psychological safety and indirect effect of authentic leadership on voice behaviour through psychological safety ($\beta= .188$, $p< .001$).

Findings highlighted the importance of developing unit manager's authentic leadership, thereby nurturing staff nurses' psychological safety, voice behaviour, and job satisfaction. In addition, attention to the antecedents of missed nursing care may increase nurses' job satisfaction, decrease adverse events, and improve the quality of patient care.

Keywords: authentic leadership, professional identification, psychological safety, voice behaviour, missed nursing care, job satisfaction, adverse events, quality of care

Summary for Lay Audience

Nursing leadership is important as it nurtures nurses' positive work attitudes and behaviours, and promotes the delivery of high quality patient care. Despite the widely recognized significance of nursing leadership, more research was needed to explore how unit managers' leadership affects nurses and patients. A model of authentic leadership was useful in helping to understand the direct and indirect effects of leadership as it positioned social identification as an important psychological process through which unit managers influenced nurses' work attitudes and behaviors, the incidence of harmful patient events, and patient care quality.

The purpose of the present study was to test and refine a model of authentic leadership. Using quantitative research methods and information from 264 registered nurses in Ontario, unit managers' authentic leadership was found to directly affect staff nurses' job satisfaction, willingness to speak up, and perceptions of interpersonal safety at work. Furthermore, authentic leadership was found to indirectly affect nurses' speaking up behaviours through perceptions of interpersonal safety. In addition, nurses' ability to provide complete nursing care was found to increase job satisfaction, decrease the occurrence of hospital acquired infections, patient falls and medication errors, and increase the quality of patient care. Unfortunately, support was not found for the arguments that unit managers' authentic leadership would promote staff nurses' identification with the profession, identification would increase nurses' likelihood of speaking up, and speaking up would facilitate nurses' ability to provide complete patient care. Additionally, the strength of the relationship between nurses' professional

identification and speaking up did not increase as nurses' perceptions of interpersonal safety increased.

Results highlighted the importance of developing unit manager authentic leadership abilities. Unit managers who have high levels of authentic leadership may help nurses feel satisfied with their jobs and can be leveraged to create a space for nurses to speak up and voice their opinions related to improved organizational functioning and patient care. Furthermore, results demonstrated the importance of directing resources toward increasing nurses' ability to provide complete patient care, thereby improving their job satisfaction, decreasing the incidence harmful patient events, and increasing the quality of patient care.

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"It always seems impossible until it's done" (Nelson Mandela, 2001)

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Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1: Introduction

A thorough introduction of the present study is provided in the following chapter. The background and significance of nursing leadership is explored, in addition to a variety of theoretical perspectives on effective leadership and its effects on nurses and patients. An overview of authentic leadership, staff nurses' work attitudes and behaviours, and outcomes of care is also provided. This chapter concludes with an overview of the problem, a discussion of the study purpose, and a summary of the chapter.

Background and Significance

Nursing leadership is nationally and provincially recognized as fundamental in the creation of work environments that promote positive work attitudes and behaviours among staff nurses, and support the provision of high quality patient care (Canadian Nurses Association, 2009a, 2015; Registered Nurses' Association of Ontario, 2013a). Healthy work environments have been described as practice settings that maximize the health and wellbeing of the nurses, while at the same time optimizing patient outcomes (Registered Nurses' Association of Ontario, 2008, 2017). Nursing leaders contribute to the development of healthy work environments by providing the structures, systems, and policies that enable nurses to engage in the work processes and relationships essential to safe, high quality patient care (Huddleston & Gray, 2016; Kramer & Schmalenberg, 2008; Kramer, Schmalenberg, & Maguire, 2010). It has also been suggested that effective nursing leadership creates work environments in which nurses are treated fairly, thereby creating a culture of trust and safety (Kaufman & McCaughan, 2013; Shirey, 2006, 2017).

Despite the importance of leadership in creating healthy work environments, there is much debate in the literature as to what constitutes effective leadership. Hopkins and O'Neil (2015) provide an outline of trait, behavioural, and contingency theories that can be used as a framework for understanding leadership. Early research adopted a *trait,* or *Great Man* approach, in which personality traits such as extraversion, openness, agreeableness, and conscientiousness were identified as distinguishing leaders from non-leaders (Judge, Bono, Ilies, & Gerhardt, 2002). More recently, there has been a resurgence of interest in researching personality traits of leaders, specifically traits of creativity, charisma, and integrity (Hoffman, Woehr, & Lyons, 2011). The *behavioural* approach to leadership initially identified three main leadership styles of behaviour: democratic, autocratic, and laissez faire (Lewin & Lippitt, 1938). More recent research has identified the importance of distinguishing between leadership behaviours focused on goals and procedures (*task-oriented* leadership) and leadership behaviours focused on people and supportive relations (*relational* leadership) (Wong & Giallonardo, 2015). A third perspective on leadership, the *contingency* approach, takes into consideration both leader and contextual factors, thereby providing insight into the differing effects of leadership behaviour across situations (Hopkins & O'Neil, 2015).

Although the aforementioned frameworks offer a means of understanding leadership, a gap remains in understanding the mediated effects of leadership on nurses and patients. Several systematic reviews have empirically linked nursing leadership to positive work attitudes and behaviours among staff nurses (Brady Germain & Cummings, 2010; Cowden, Cummings, & Profetto-McGrath, 2011; Cummings et al., 2010, 2018), and positive patient outcomes (Sfantou et al., 2017; Wong & Cummings, 2007; Wong,

Cummings, & Ducharme, 2013); however, there is a lack of research testing the indirect (mediated) effects of nursing leadership on nurses and patients. The relationally based concept of authentic leadership may provide new insight into the complex psychological process through which nursing leadership impacts the work related attitudes and behaviours of staff nurses, ultimately affecting patient outcomes.

In addition, although factors in nurses' work environment are widely recognized as important in shaping their work attitudes and behaviours (Cicolini, Comparcini, & Simonetti, 2014; Hayes et al., 2006, 2012; Jones, Hamilton, & Murry, 2015; Lu, Barriball, Zhang, & While, 2012; Lu, Zhao, & While, 2019; Morrison, 2011; Saber, 2014; Utriainen & Kyngas, 2009), and affecting outcomes of care (S. E. Lee & Scott, 2018; Nascimento & Jesus, 2020), little research has empirically tested the moderating effect of contextual work environment factors. Psychological safety has been identified as an important aspect of nurses' work environments (Aranzamendez, James, & Toms, 2015), with research outside of nursing highlighting its moderating effects on employees' work attitudes and behaviours (Edmondson & Lei, 2014; A. Newman, Donohue, & Eva, 2017). Therefore, by considering the moderating effect of psychological safety in the relationship between staff nurses' professional identification and voice behaviour, new knowledge may be gained in understanding how contextual work environment factors strengthen the development of positive work behaviours among nurses.

Authentic Leadership

Authentic leadership refers to:

> A pattern of leader behavior that draws upon and promotes both positive psychological capacities and a positive ethical climate, to foster greater self-

> awareness, an internalized moral perspective, balanced processing of information, and relational transparency on the part of the leaders working with followers, fostering positive self-development. (Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2008, p. 94).

Authentic leadership is not a leadership style per se, but a root construct which underlies other forms of positive leadership such as transformational, charismatic, servant, and spiritual leadership (Avolio & Gardner, 2005). The roots of authentic leadership were initially derived from the Greek philosophical notions of "know thyself" and "to thine own self be true" (Avolio, Gardner, Walumbwa, Luthans, & May, 2004), while more modern conceptualizations of the construct can be traced back to positive psychology and positive organizational behaviour (Gardner, Avolio, Luthans, May, & Walumbwa, 2005).

Authentic leaders have a highly developed sense of self, making them deeply aware of who they are, what they believe, and what they value (Gardner et al., 2005). They gain the respect and trust of followers by acting in accordance with their personal values but also by soliciting diverse viewpoints from their followers, thereby leading in a manner that followers recognize as authentic (Avolio et al., 2004). In addition, authentic leaders have a strong moral perspective, which serves as the basis for moral decision making (Avolio & Gardner, 2005). By helping followers personally identify with their leader, socially identify with a group or organization, and develop an array of personal psychological resources, authentic leaders have been theorized (Avolio et al., 2004) and empirically shown (Alilyyani, Wong, & Cummings, 2018; Gardner, Cogliser, Davis, &

Dickens, 2011; Malila, Lunkka, & Suhonen, 2018) to influence followers' work attitudes and behaviours.

Nurses' Work Attitudes and Behaviours

Nursing is experiencing a global shortage of qualified professionals in direct care roles (Drennan & Ross, 2019). In Canada, it has been estimated that 20% of nurses in the hospital sector leave their jobs annually, with costs to the hospital estimated to be between $25,000 and $60,000 per nurse (Berry & Curry, 2012; Duffield, Roche, Homer, Buchan, & Dimitrelis, 2014). Hospitals characterized by high rates of turnover and inadequate staffing experience poorer patient outcomes and lower quality of care (Aiken, 2002; Aiken, Clarke, & Sloane, 2002; Bae & Fabry, 2014; S. H. Cho, Lee, You, Song, & Hong, 2020; Dunton, Gajewski, Klaus, & Pierson, 2007; Gunnarsdottir, Clarke, Rafferty, & Nutbeam, 2009; Mitchell, Gardner, Stone, Hall, & Pogorzelska-Maziarz, 2018; Shin, Park, & Bae, 2019; Tourangeau et al., 2007; Tschannen, Kalisch, & Lee, 2010). In addition, high turnover rates and intent to leave the profession have been associated with a multitude of negative work related attitudes and behaviours (Flinkman, Leino-Kilpi, & Salanterä, 2010; Hayes et al., 2006, 2012), further highlighting the importance of identifying strategies to improve nurses work attitudes and behaviours

Professional identification has been proposed to serve as the basis for positive work attitudes and behaviours (Loi, Hang-yue, & Foley, 2004). This concept refers to "the extent to which one defines him or herself in terms of the work he or she does" (Mael & Ashforth, 1992, p. 106). Leaders are thought to influence the process of identification by role-modeling the prototypical attitudes and behaviours of a profession (Hogg, 2001). Authentic leaders are especially effective at role-modeling as they set high

moral standards to connect with a follower's self-concept (Avolio et al., 2004). Through continual observation, followers come to associate these role-modeled prototypical attitudes and behaviours with their profession, and are more likely to think and act in similar ways (Walumbwa et al., 2010). As such, employees who are strongly identified with their profession typically have positive perceptions of their work and align their behaviour with professional values.

Outcomes of Care

Outcomes of care are the direct result of the care patients receive (Canadian Institute for Health Information [CIHI], n.d.). Negative outcomes of care often refer to issues of mortality (Aiken, 2002; Aiken, Clarke, Sloane, Lake, & Cheney, 2008; Aiken et al., 2014), quality (Sochalski, 2004), and adverse events such as medication errors, falls, or nosocomial infections (Sochalski, 2001). It has been estimated that 7.5% of patients that enter the Canadian health care system will experience a negative outcome related to the care they receive, with 20% of these being associated with permanent disability or death (Baker & Norton, 2006; Baker et al., 2004). Although few studies have investigated the financial resource implications of negative patient outcomes in Canada, it has been suggested they account for approximately 1% of total hospital spending and add an additional $685 million to the county's annual healthcare expenditures in acute care settings (Chan & Cochrane, 2016).

There is a wide array of factors that contribute to negative outcomes of care. Contemporary healthcare systems are characterized by resource limitations, a critical shortage of qualified healthcare professionals, and severely ill patients, resulting in unstable and stressful work environments where adverse events and quality care issues

are more likely to occur (Canadian Nurses Association, 2009b; Canadian Nurses Association & Canadian Association of Nurses Unions, 2019). In addition, many nurses have reported heavy workloads that prevent them from providing the most complete nursing care to their patients (Ball, Murrells, Rafferty, Morrow, & Griffiths, 2013; S. H. Cho, Kim, Yeon, You, & Lee, 2015; S. H. Cho et al., 2020; Jones et al., 2015; Kalisch, 2006; Kalisch, Doumit, Lee, & Zein, 2013; Kalisch, Tschannen, & Lee, 2011; Maloney, Fend, & Hardin, 2015; Waller Dabney & Kalisch, 2015). This incomplete, or unfinished care, has been linked to an increased incidence of adverse events and lower quality of care (Kalánková et al., 2020; Kalisch, Tschannen, & Lee, 2012; Lucero, Lake, & Aiken, 2010; S. T. Nelson & Flynn, 2015; Sochalski, 2001, 2004).

The importance of leadership in creating work environments that promote patient safety and quality care has been widely recognized. Several systematic reviews highlight the importance of relational leadership (Cummings et al., 2010, 2018; Wong & Cummings, 2007; Wong et al., 2013) and patient safety culture (DiCuccio, 2015; S. E. Lee et al., 2019) in mitigating negative outcomes of care. Furthermore, it has been suggested that authentic nurse leaders nurture the development of a trusting leader-follower relationship, thereby creating conditions in the workplace where employees have the opportunity engage in voice behaviour and provide higher quality care (Wong et al., 2010).

Problem Statement

It is widely recognized that effective nursing leadership is important in creating work environments that support the development of positive work attitudes and behaviours among nurses, and promote the provision of high quality patient care. Despite

the recognized importance of nursing leadership, the concept is often conceptualized according to a variety of different philosophical perspectives making it difficult to hone in on the essence of effective leadership in the context of nursing. In addition, the literature is replete with qualitative narratives and quantitative empirics reporting negative work attitudes and behaviours among staff nurses, high incidences of adverse events and poor quality of patient care, making the negative implications of ineffective leadership hard to ignore. Finally, although psychological safety has been identified as an contextual work environment factor that plays an important role in shaping positive work attitudes and behaviours, little research has tested its moderating effects in nursing.

Study Purpose

The purpose of the present study was to test and refine a model of authentic leadership in a sample of registered nurses working in acute care hospitals in the province of Ontario. An attempt was made to better understand the direct and indirect effects of authentic leadership by examining relationships between nurse managers' authentic leadership, staff nurses' professional identification, voice behaviour, psychological safety, missed nursing care, job satisfaction, adverse events, nurse-assessed quality. Examining the direct effects of authentic leadership on professional identification, and the indirect effects of authentic leadership on voice behaviour through professional identification was important, as the identification dimension of authentic leadership remains underexplored. In addition, examining psychological safety as a moderator was important, as it was hoped this would provide insight into the boundary conditions that influences the relationship between professional identification and voice behaviour.

Summary

An introduction of the present study was provided in the preceding chapter which outlined the importance of nursing leadership in supporting the development of positive work attitudes and behaviours among staff nurses, and promoting optimal patient outcomes. Authentic leadership was presented as a relationally based leadership framework that could be used to understand the direct and indirect processes by which nursing leadership affects nurses and patients. In addition, considering the moderating effect of psychological safety was proposed to be an effective means to help explain how conditions in nurses' work environments help strengthen the development of positive work behaviours among staff nurses. An overview of the problem and discussion of the study purpose concluded the chapter.

Chapter 2: Theoretical Framework and Review of the Literature

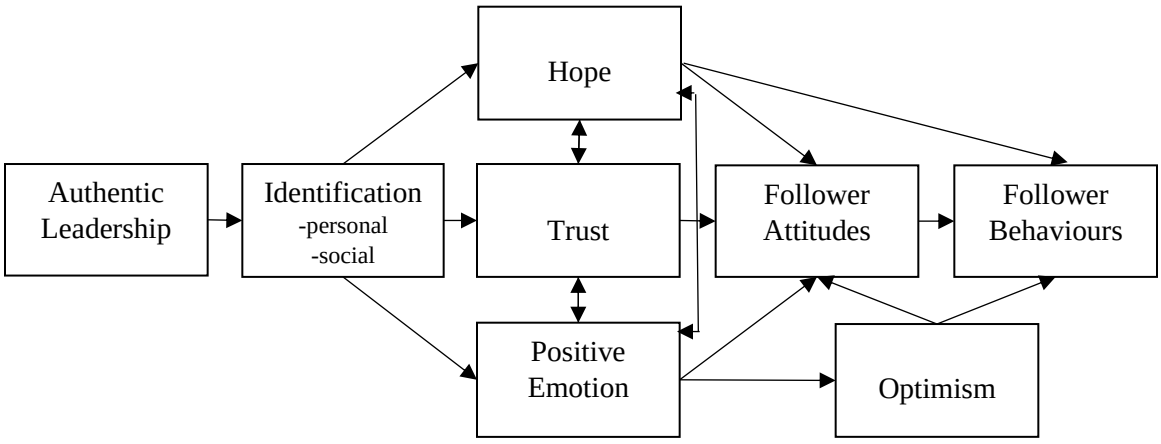
The theoretical framework guiding the present study and a thorough review of the literature is presented in the following chapter. The four dimensions of authentic leadership are described, the central concepts in the theoretical framework are defined, and the complex interrelationships between these concepts are explored. A thorough literature review is provided in relation to each study variable and is used as rationale for the eight study hypotheses. This chapter concludes with a description of the hypothesized study model and a summary of the chapter.

Theoretical Framework

Avolio et al.'s (2004) model of authentic leadership (Figure 1) was used as the theoretical framework in the present study. Avolio and colleagues conceptualize authentic leadership as a higher order construct comprised of four lower order dimensions: self-awareness, relational transparency, balanced processing, and internalized moral perspective.

Figure 1

Framework Linking Authentic Leadership to Follower Outcomes



Central to the conceptualization of authentic leadership is the notion that authentic leaders have a heightened level of self-awareness (Avolio & Gardner, 2005). *Self-awareness* is the emerging process whereby authentic leaders continually come to understand their unique values, beliefs, strengths, weakness, and motives, as well as recognizing how others view their leadership (Walumbwa, Wang, Wang, Schaubroeck, & Avolio, 2010). It involves introspective self-reflection and the constant re-assessment of one's self-concept through feedback from others (Peus, Wesche, Streicher, Braun, & Frey, 2011). By learning who they are, what they value, and how others perceive them, authentic leaders build an understanding of self that provides the basis for decisions and actions (Gardner et al., 2005).

Authentic leaders also engage in the active process of *relational transparency* whereby they openly share information, express their true feelings, and present their authentic selves to followers (Gardner et al., 2005). Authentic leaders take accountability for their actions and honestly disclose personal weaknesses and mistakes (May, Hodges, Chan, & Avolio, 2003). They work to achieve transparency and truthfulness in their relationships with followers by asking for feedback, listening to and accepting divergent viewpoints, and acting on suggestions (Wong & Cummings, 2009). It has been suggested that authentic leaders have high levels of personal integrity, leading them to approach social interactions and relationships with openness and truthfulness (Ilies, Morgeson, & Nahrgang, 2005).

In addition, authentic leaders engage in the *balanced processing* of information by soliciting views from others' that challenge their existing viewpoints (Walumbwa et al., 2010) and objectively analyzing all relevant data before coming to a decision (Gardner et

al., 2005). Authentic leaders engage in more accurate and balanced assessments, as well as social comparisons, and act on these assessments without being diverted by self-protective motives (Wong & Cummings, 2009).

The inherent ethical/moral component of authentic leadership, termed *internalized moral perspective*, is a form of self-regulated behaviour that results in decisions being guided by internal moral standards, ethics and values, rather than group, organization and societal pressures (Gardner et al., 2005). As discussed by Avolio et al. (2004), authentic leaders are guided by a set of moral values which represent an orientation toward doing "what is right and fair". When engaging in ethical decision making, authentic leaders drawn upon their reserves of moral capacity, efficacy, courage, and resiliency to address ethical issues and execute moral actions (May et al., 2003).

In addition to outlining the four components of authentic leadership, Avolio et al.'s model suggests authentic leaders are able to enhance the work attitudes and behaviours of followers through the processes of personal and social identification. *Personal identification* refers to the process whereby a follower's belief about a leader becomes self-defining (Ronit Kark, Shamir, & Chen, 2003). In contrast, *social identification* refers to the process whereby a follower's group membership elicits pride and is seen as an important aspect of their identity (Hogg, 2001). Authentic leaders facilitate personal and social identification by continually role modeling honesty and integrity in their dealings with followers (Avolio et al., 2004), which ultimately results in the leader's values and moral standards becoming associated with collective social entity (i.e. work group or profession) (Walumbwa et al., 2008). The high levels of transparency, integrity, and moral standards displayed by authentic leaders connect with followers'

self-concept, fostering value congruence, ultimately resulting in behaviour that is consistent with their shared values and evoking a deeper sense of identification with the leader and social group.

In conjunction with the identification processes, Avolio et al.'s model posits that authentic leaders draw from their personal positive psychological resources of hope, trust, positive emotion, and optimism to model and promote the development of these in others. *Hope* is defined as a positive motivational state that is based on an interactivity of goal directed energy and planning to meet goals (Synder, 1995). Authentic leaders facilitate the development of hope by including positive comments in their interactions with followers, helping to nurture motivation and determination, and supporting the belief that successful plans can be formulated to attain goals (Avolio et al., 2004). *Trust* is defined as a "psychological state comprising the intention to accept vulnerability based upon positive expectations" (Rousseau, Sitkin, Burt, & Camerer, 1998, p.395). Trust is developed in the authentic leader-follower relationship when authentic leaders act in accordance with their personal values and do what they say they will do (Avolio et al., 2004). *Positive emotion,* defined as a positive response to an event or person (Weiss & Cropanzano, 1996) and *optimism,* defined as cognition including positive outcome expectancies (Seligman, 1998), are evoked when authentic leaders interpret information and interactions with followers from a positive perspective (Avolio & Gardner, 2005). It is through modeling of desired positive emotions, that realistic optimism is created.

Avolio and colleagues draw from the theoretical and empirical literature to provide support for their argument that the positive psychological states of hope, trust, positive emotion, and optimism support the development of positive work attitudes and

behaviours among followers. For example, hopeful employees are suggested to have a more positive outlook on the future, leading them to be more engaged in achieving organizational goals, satisfied by their work, and intending to stay at their organization (Snyder, 2000). In addition, employees who trust their leader are more likely to adopt positive attitudes towards their work and engage in positive behaviour which contributes to sustained organizational performance (Avolio et al., 2004). Finally, positive emotions and optimism elicit positive feelings from follows, thereby encouraging people to discover new ideas and ways of achieving goals (Fredrickson & Joiner, 2002) and nurturing positively-orientated attitudes and behaviours.

Review of the Literature

Authentic leadership in nursing. The past decade has seen a proliferation of studies testing Avolio et al.'s (2004) model of authentic leadership in the business literature (Gardner et al., 2011), and to a lesser extent, in the nursing literature. Within the nursing research, several scholars have empirically linked the concept to staff nurses' work attitudes and behaviours, and outcomes of care.

In a study of 280 registered nurses working in acute care hospitals in the province of Ontario, nurse managers' authentic leadership was found to predict trust in the manager, work engagement, voice behaviour and perceptions of unit care quality (Wong et al., 2010). Secondary analyses of this dataset also found: (1) nurse manager authentic leadership influenced staff nurses' structural empowerment which in turn increased job satisfaction and self-rated performance (Wong & Laschinger, 2013); (2) nurse manager authentic leadership decreased adverse patient outcomes through trust in the manager and congruence in areas of worklife (Wong & Giallonardo, 2013); and (3) controlling for the

effect of years of experience, person-job match in areas of worklife fully mediated the relationship between authentic leadership and work engagement (Bamford, Wong, & Laschinger, 2013). A more recent provincial study of registered nurses working in direct care roles in Ontario (*n*= 723) found authentic leadership positively influenced structural empowerment, which had a positive effect on perceived support for professional practice inadequate staffing, which in turn predicted nurse-assessed quality of care and job satisfaction (Laschinger & Fida, 2015). In their study of 220 registered nurses with more than five years of work experience, Regan et al. (2016) found authentic leadership was significantly associated with interprofessional collaboration, with the combined effects of structural empowerment, authentic leadership, and professional practice environment explaining 45% of the variance in interprofessional collaboration. In addition a time-lagged study of 406 nurses in the provinces of Ontario and Quebec found authentic leadership impacts nurses' work climate in a positive manner, thereby increasing nurses' psychological well-being at work (Nelson et al., 2014).

In addition to the ever growing body of research which has linked authentic leadership to staff nurse' work attitudes and behaviours, there is interest in understanding the effects of authentic leadership in the context of new graduate nurses. In a study of 170 nurses with less than three years of work experience, authentic leadership was found to be positively associated with both work engagement and job satisfaction (Giallonardo, Wong, & Iwasiw, 2010). Furthermore, work engagement was found to partially mediate the relationship between preceptor authentic leadership and new graduate nurse job satisfaction. Authentic leadership has also been found to be negatively related to new graduates' experience of workplace bullying, which in turn had a direct positive influence

on emotional exhaustion, and an indirect influence on job satisfaction through emotional exhaustion (Laschinger, Wong, & Grau, 2012). Authentic leadership, workplace bullying and emotional exhaustion all had a direct effect on job satisfaction, which in turn was related to lower turnover intentions. In a large scale national scale of 1009 nurses with less than 3 years of work experience, authentic leadership has been shown to have a positive effect on areas of worklife, which in turn had a positive effect on occupational coping and self-efficacy, resulting in lower burnout and self-reported depressive symptoms (Laschinger, Borgogni, Consiglio, & Read, 2015). A longitudinal study testing the effects of authentic leadership over one year of practice found structural empowerment mediated the relationship between authentic leadership and social capital, which in turn had a positive effect on job satisfaction and negative effect on mental health (Read & Laschinger, 2015). Finally, Laschinger et al. (2013) used multi-group path analysis and found nurse managers' authentic leadership negatively influenced emotional exhaustion and cynicism through workplace empowerment in both new graduate and experienced nurses; however, the negative effect of authentic leadership on cynicism and the path from emotional exhaustion to cynicism was significantly stronger for new graduates.

Professional identification. Identification with ones' profession, termed *professional identification* denotes the degree to which an individual defines him/herself according to the work he/she performs and the typical characteristics of the profession which they practice (Mael & Ashforth, 1992). Professional identification is the result of deep rooted cognitive and emotional appraisals, and is often reflected one's answer to the question "who are you?" (Russo, 1998). Although professional identification is

fundamental, research on it has been sporadic compared to other targets of identification, such as the organization or workgroup (Ashforth, Harrison, & Corley, 2008).

The study of professional identification is rooted in social identification theory (SIT) (Tajfel & Turner, 1979) and self-categorization theory (SCT) (Turner, 1985). According to the core assumptions of these theories, professional identification is a form of social identification whereby one comes to view him or herself as a member of a particular social category. It occurs through cognitive self-categorization of professional membership based on social comparisons whereby one comes to view non-groups members as less trustworthy, less positively, and dissimilar. The process of identification is driven by an individual's self-enhancement and motivation to reduce uncertainty (Ashforth et al., 2008; Hogg & Terry, 2000) and can be enhanced by prototypical leaders (Hogg, 2001).

In one of the first published works analyzing social identification based on SIT and SCT, Ashforth and Mael (1989) provide an overview of four antecedents necessary for the process to occur: self- categorization; group distinctiveness and prestige, out-group salience, and group formation factors. First, professional identification requires one to psychologically *self- categorize* themselves as part of a group (i.e. profession of nursing), and as such, define themselves in terms of the same social category membership. Second, the *distinctiveness* of a group's values and practices serve to separate the group from others, thus providing a unique target for identification. In addition, the perceived *prestige* of the group is proposed to serve as the basis for social-comparison, affecting self –esteem. Third, identification is associated with the *salience of the out-groups*, thereby reinforcing awareness of the in-group. Finally, group formation

factors (interpersonal interaction, similarity, liking, proximity, shared goals, common history, etc.) affect the extent to which individuals identify with a group; these factors influence group formation, and thus act as the basis for categorization. In addition to this seminal work, other research has identified effective horizontal communication (task-related and informal communication that occurs between people on an equal footing in the hierarchy) as an antecedent of professional identification (Bartels, Peters, de Jong, Pruyn, & van der Molen, 2009).

Although the concept of professional identification has been present in psychology, sociology and business literature for decades, the concept rarely appears in nursing literature. Of that which has explored professional identification within nursing, much of the research has been qualitative in nature and focused on the identification processes of novice nurses. Within this research, it has been suggested that the process of professional identification occurs over time, often beginning when one is socialized into the profession of nursing during educational experiences and orientation to a unit of employment (Adams, Hean, Sturgis, & Macleod Clark, 2006; Coster et al., 2008). However, recent research suggests that accelerated post-graduate nursing students, although characterized by high academic achievement, often do not experience a sense of professional identification at the time of registration (Mccrae, Askey-Jones, & Laker, 2014). This research highlights the importance of time in developing professional identification and the need for ongoing initiatives to enhance professional identification in the workplace. As such, Sabancıogullari and Dogan's (2015) finding that a professional identity development program focused on eight main topics (perception of nursing, personal image, professional image, professional identity, professional look, attitudes and

communication, assertive behaviour, professional knowledge, professional satisfaction), and administered over six months, had a significant positive impact on the professional identification of nurses is meaningful.

The role that work environments play in facilitating nurses' professional identification has been explored by several scholars. Narratives provided in qualitative work have identified work environments that allow for time for caring to be central in facilitating nurses' professional identification (Bosco et al., 2005). Apker and Fox (2002) also found that professional identification was predicted by the information nurses received about managed care changes in their organization, thereby highlighting the importance of nursing leaders' communication in enhancing staff nurses' professional identification. In addition, a study of 190 staff nurses found professional autonomy, followed by support from colleagues and duties focused on traditional nursing roles, to be the strongest predictor of nurses' professional identification (Apker, Ford, & Fox, 2003). These findings complement research conducted in non-nursing related fields which indicate autonomy is an essential factor in fostering professional identification (Russo, 1998).

Linking the importance of leadership in facilitating the identification process, Adams et al. (2006) suggest role models exert influence on the cognitive stages of socialization, allowing for the process of professional identification. Although a few studies have explored the effects of nurse manager authentic leadership on staff nurses' social identification (Giallonardo, 2013; Wong et al., 2010), the relationship between authentic leadership and nurses' professional identification remains largely unexplored. In addition, inconsistent relationships between authentic leadership and social

identification have been reported. In a study of 170 new graduate nurses, Giallonardo (2013) found social identification (identification with the organization) partially mediated the relationship between authentic leadership and work engagement, while in contrast, Wong et al. (2010) reported a non-significant relationship between authentic leadership and social identification (identification with the work group) in their study of 280 staff nurses. This difference may be attributed to several factors, including differences in the source of authentic leadership (preceptor vs. nurse manager), the target of identification (organization vs. work group), and nurses' work experience. Given the less than robust empirical support for the authentic leadership-social identification relationship and the distinct lack of research exploring professional identification in nursing, there is an ever growing need for research to address these issues.

Avolio et al.'s (2004) model of authentic leadership can be used as a framework for linking authentic leadership to staff nurses' professional identification. This framework suggests authentic leaders may increase the professional identification of nurses by emphasizing the collective identity of nurses and emulating the values and vison of the profession of nursing. This is achieved by expressing high levels of honesty, integrity, and a commitment to the success of followers, making the needs of a group entity (i.e. a professional group) meaningful to employees (Ilies et al., 2005). Consequently, employees are likely to see themselves as a member of a collective and connect their self-concept with the group identity. In addition, as authentic leaders enact attitudes and behaviours that are reflective of the nursing's mission, vision, and values, staff nurses will come to identify these attitudes and behaviours as prototypical of the profession (Gardner et al., 2005). Based on the tenants of SIT and SCT, nurses will then

partake in a process of self-categorization and comparison in which they categorize themselves as a member of the profession of nursing, resulting in professional identification (Tajfel & Turner, 1979; Turner, 1985).

Hypothesis 1: Staff nurses' perceptions of nurse managers' authentic leadership will be positively associated with professional identification.

Voice behaviour. *Voice behaviour* refers to active efforts by employees to speak up and challenge the status quo (Van Dyne & LePine, 1998). It encompasses discretionary verbal communication of ideas, suggestions or opinions, where the intent is to improve organizational functioning (LePine & Van Dyne, 1998). Although terms such as dissent, whistle-blowing, taking charge, breaking silence and help-seeking are often used interchangeably with voice (Morrison & Milliken, 2000), voice behaviour is unique construct characterized by employees' communication on issues of production and efficiency within the confines of their organization (Tangirala & Ramanujam, 2008). Voice behaviour requires individuals to be actively involved in supporting organizational goals, take initiative in developing/expressing suggestions, and view change as a potential way of coping with situational demands (LePine & Van Dyne, 2001). To be considered voice, the expression must be (a) openly communicated, (b) organizationally relevant, (c) focused on influencing the work environment, and (d) received by someone inside the organization.

Literature on voice can be traced by to Hirschman's (1970) seminal work in which he proposed employees respond to job dissatisfaction in one of two ways: exit or voice. Contemporary research on voice conceptualizes the construct as an extra-role, organizational citizenship behaviour, characterized by employees who are willing to "go

the extramile" for the organization (Detert & Burris, 2007; LePine & Van Dyne, 1998; Van Dyne, Ang, & Botero, 2003).

Within organizational behaviour literature, there is much debate as to whether voice is an independent construct or simply exists on the opposite end of a continuum from silence. Several scholars suggest that when an individual has potentially important information, he or she can either choose voice or silence (Morrison, 2011; Morrison, 2014; Morrison & Milliken, 2000; Tangirala & Ramanujam, 2008); thereby suggesting that high level of voice implies a low level of silence and factors that predict voice also predict silence in the opposite direction. In contrast to this perspective, Van Dyne, Ang and Botero (2003) suggest that silence and voice are two independent constructs that can coexist. They argue that the key feature that differentiates silence and voice is not the presence or absence of speaking up, but one's motivations to withhold verses express ideas, information and opinions about work related improvements. Furthermore, it has been argued that unlike voice, which is a deliberate choice, silence can be an automatic withdrawal behaviour in response to an unsafe or unsupportive work environment (Detert & Edmondson, 2011; Edmondson & Lei, 2014; Kish-Gephart, Detert, Trevino, & Edmondson, 2009).

Several types of voice behaviour dominate the literature. The majority of literature on voice positions it as a positively intended, constructive behaviour, termed *prosocial voice* (Van Dyne, Ang, & Botero, 2003). This type of voice is a not considered a requirement of one's position, but stems from an employees' willingness to offer constructive suggestions about organizational processes, policies and objectives (Detert & Trevino, 2010). In contrast *defensive voice* is "the expression of work-related ideas,

information or opinions—based on fear—with the goal of protecting self" (Van Dyne et al., 2003, p. 1372). Van Dyne and colleagues suggest a variety of techniques such as half-truths, diversionary responses, distortion and exaggeration are intentional techniques people use to provide information in a manner that protects oneself. The third type of voice present in the literature, termed *acquiescent voice*, is the intentional expression of work related ideas, information and opinions; however it is based on the resignation of an employee to affect any meaningful change (Van Dyne et al., 2003). Examples may include expressing support for a project despite personal doubt or offering opinions despite believing that suggestions for change will be ignored. Most recently, Liang, Farh, and Farh (2012) differentiated between a fourth and fifth type of voice. *Promotive voice* refers to expression of new ideas, suggestion, or innovations to improve organizational functioning, whereas *prohibitive voice* entails the expression of concerns regarding practices, incidents, or behaviours that are harmful to the organization. These two forms of voice are similar in that they both challenge the status quo, but differ in target of action (long term vs. immediate) and direction of discussion (future vs. past) (Wang, Weng, McElroy, Ashkanasy, & Lievens, 2014).

Research aimed at understanding the antecedents of employee voice has consistently identified personal characteristics as predictors of voice behaviour. In one of the first studies exploring the role of individual personality differences in the expression of voice, LePine and Van Dyne (2001) found conscientiousness and extraversion to be positively related to employee voice behaviour. A decade later, Crant, Kim, and Wang (2011) replicated the positive associations between conscientiousness, extraversion, and voice. In addition, proactive personality (Crant et al., 2011; Kanten & Ulker, 2012;

Parker & Collins, 2010; Xie, Chu, Zhang, & Huang, 2014), self-esteem (LePine & Van Dyne, 1998), and emotional stability (Nikolaou, Vakola, & Bourantas, 2008) have repeatedly been identified as important personal characteristics among employees who engage in voice behaviour. In contrast to the aforementioned antecedents, personal dispositional factors such as neuroticism, agreeableness, and negative affect has been found to be negatively related to employee voice (LePine & Van Dyne, 2001; Venkataramani & Tangirala, 2010).

In addition to personal factors, work related attitudes have been identified as an important antecedent to voice behaviour. Several scholars report positive associations between perceived organizational support and voice (Loi, Ao, & Xu, 2014; Ng & Feldman, 2012), while Kanten and Ulker (2012) found perceived organizational support explained 10% of the variance in voice behaviour. The positive association between organizational commitment and voice (Wang et al., 2014), work engagement and voice (Cheng, Chang, Kuo, & Cheung, 2014; Koyuncu, Burke, & Yasemin, 2013; Rees, Alfes, & Gatenby, 2013), and job satisfaction and voice have also been reported (Koyuncu et al., 2013; LePine & Van Dyne, 1998; X. Zhang, Hu, & Qiu, 2014). Interestingly, a curvilineal relationship between emotional exhaustion and voice have been found (Qin, Direnzo, Xu, & Duan, 2014), suggesting employees are more likely to engage in voice behaviour during times of very high or very low emotional exhaustion. Finally, Ng and Feldman (2012) report negative associations between voice and lack of job autonomy, lack of job challenge, job dissatisfaction, dissatisfaction with work conditions, dissatisfaction with pay, and dissatisfaction with promotion.

The role of effective leadership in facilitating employee voice has been has been highlight by scholars who have linked transformational leadership (Detert & Burris, 2007; Hu, Zhang, & Wang, 2015; Li & Wu, 2015; Liu & Liao, 2013; Liu et al., 2010), ethical leadership (Avey, Wernsing, & Palanski, 2012; Chen & Hou, 2016; Cheng et al., 2014; Qi & Ming-Xia, 2014; Walumbwa & Schaubroeck, 2009), and authentic leadership (Hsiung, 2012; Wong et al., 2010) to employee voice. In contrast, authoritarian leadership has been found to be negatively related to voice (Li & Sun, 2015). Several scholars have also linked the quality of the supervisor-employee relationship (leader-member exchange; LMX) to employee voice (Botero & Van Dyne, 2009; Hsiung, 2012), while other research has shown that trust (Rees et al., 2013) and leader openness can facilitate employee voice (Detert & Trevino, 2010; Detert & Burris, 2007; Edmondson, 2003; Ng & Feldman, 2012). These findings suggest that effective leaders create work environments where employees have the opportunity engage in voice by expressing their ideas, opinions, and information related to work improvements.

Work groups and employees' positions within their work groups can influence voice behaviour. LePine and Van Dyne (1998) found that being part of a smaller work group and having the ability to self-manage group leadership were important factors in determining when employees engage in voice behaviour. More recently, personal influence (the extent to which employees' impact decisions of their workgroup) was found to fully mediate the relationship between work-flow centrality (the extent to which employees impact the task related network of their workgroup) and voice behaviour (Venkataramani & Tangirala, 2010). In addition, this study found the positive relationship between personal influence and voice was moderated by workgroup

identification. This study contributes to the existing literature on voice and identification (Liu, Zhu, & Yang, 2010; Ng & Feldman, 2012; Qi & Ming-Xia, 2014; Tangirala & Ramanujam, 2008; Wu, Tang, Dong, & Liu, 2014) and highlights the importance of considering the psychological processes of social identification when attempting to predict employee voice behaviour.

Although no research has identified professional identification as an antecedent to voice behaviour, the other targets of social identification (i.e. the organization and work group) have been found to predict voice (Tangirala & Ramanujam, 2008; Venkataramani & Tangirala, 2010). Organization identification has also been found to predict organizational citizenship behaviours, of which voice behaviour is a type (Callea, Urbini, & Chirumbolo, 2016; Campbell, 2015; Chen, Yu, Lin, & Lou, 2013; Feather & Rauter, 2004; Humphrey, 2012; Kane, Magnusen, & Perrewe, 2012; Newman, Miao, Hofman, & Jiuhua, 2016; Van Dick, Grojean, Christ, & Wieseke, 2006; Van Dick, Hirst, Grojean, & Wieseke, 2007; Zhang & Chen, 2013). In addition, Trybou, Gemmel, Pauwels, Henninck, and Clays (2014) found professional identification moderated the relationship between perceived organizational support and extra role behaviour, suggesting professional identification plays an important role in fostering extra-role behaviours. Tenets of SIT and SCT also suggest that employees who base their identity on a particular group membership, such as a profession, use this membership to satisfy the need for belonging and have a propensity to engage in prosocial work behaviours that align with the values of the group (Ashforth & Mael, 1989). As such, employees who possess high levels of professional identification will likely engage in work behaviours, such as speaking up, that uphold their professional values.

Hypothesis 2: Staff nurses' professional identification will be positively associated with voice behaviour.

Despite the great strides made in the business literature to understand the concept of voice behaviour, very little research has explored the concept in the context of nursing. In addition, little is known about how nursing leadership, specifically authentic nursing leadership, contributes to nurses' voice behaviour. Wong et al. (2010) has been the only scholar to explore the effects of authentic leadership on staff nurses' voice behaviour. In their study of 280 staff nurses, authentic leadership was found to significantly influence nurses' personal identification with their manager and trust in their manager. Trust then influenced nurses' work engagement, which in which in turn predicted voice behaviour and perceived quality of care. More recently, Tangirala and Ramanujam (2012) found that extent to which nurse managers were perceived to solicit and listen to nurses' suggestions/concerns on work related issues to be an important mediating mechanism in the relationship between perceived influence and employee voice. This research is particularly important considering behaviours such as openness and solicitation of other' opinions are conceptually similar to two of the defining attributes of authentic leaders (relational transparency and balanced processing).

Psychological safety. *Psychological safety* is defined as an individual's appraisal of the interpersonal risk associated with asking a question, seeking feedback, reporting a mistake, or proposing a new idea (Edmondson, 1999). It is a psychological condition in which an individual feels able to "show and employ one's self without fear of negative consequences to self-image, status, or career" (Kahn, 1990, p. 708). A psychologically

safe work environment is characterized by feelings of safety, trust, and mutual respect (Baer & Frese, 2003; Edmondson, 2003).

The concept of psychological safety has its roots in organizational change research. From this perspective, it has been argued that psychological safety is essential for making employees feel secure and capable of changing their behaviour in response to shifting organizational demands (Edmondson & Lei, 2014). In addition, contemporary research on psychological safety has conceptualized the construct from the individual (Kahn, 1990), group (Edmondson, 1999), and organizational level of analysis (Carmeli, 2007). For the purposes of this study, psychological safety is conceptualized as an individual level construct. It is likely that the unique and complex nature of health care teams may lead to inherent differences in individual nurses' perceptions of psychological safety, thus preventing perceptions of psychological safety from converging at the group or organizational level and making it appropriate to analyze the construct from the individual level.

Several personal factors have been associated with psychological safety. Personal influence has been found to predict psychological safety (Halbesleben & Rathert, 2008). In addition, May, Gilson and Harter (2004) found that employees who constantly worried about what others thought of them (i.e. highly self-consciousness) experienced significantly less psychological safety in their workplace. May and colleagues suggest that self-consciousness may have its strongest effect on psychological safety in jobs that require high levels of employee interaction. Nursing is a profession that is dependent on nurse to nurse interaction, therefore, it is likely that the negative effects of employee self-consciousness on psychological safety would hold constant in this context.

Research exploring the antecedents of psychological safety has consistently shown that management and leadership play an important role in shaping employee perceptions of psychological safety. Psychological safety has been empirically linked to ethical leadership (Walumbwa & Schaubroeck, 2009), change-oriented leadership (Detert & Burris, 2007), improvement oriented management (Halbesleben & Rathert, 2008), and supervisor support (Kruzich, Mienko, & Courtney, 2014; May et al., 2004). Furthermore, specific leadership behaviours such as inclusiveness (Nembhard & Edmondson, 2006), agreeableness and conscientiousness (Walumbwa & Schaubroeck, 2009) have been shown to significantly effect on employees' psychological safety. In contrast, behaviours such as inconsistency in reward, evaluation, and organizational values have been shown to predict lower psychological safety (F. Lee, Edmondson, Thomke, & Worline, 2004).

Several characteristics of positive co-worker relationships have also been found to predict psychological safety. May et al. (2004) found rewarding co-worker relationships to be positively related to psychological safety, while in contrast, adherence to co-worker norms were negatively associated. In addition, formal mentoring has been found to predict psychological safety in a sample of 208 mentor-protégé dyads across 15 different firms in central China (Chen, Liao, & Wen, 2014).

The important mediating role that psychological safety plays in predicting positive work attitudes has been presented by several scholars. Chen et al. (2014) found psychological safety partially mediated the relationship between mentoring and affective commitment, and fully mediated the relationship between mentoring and turnover intentions. Furthermore, psychological safety has been found to partially mediate the relationship between continuous quality improvement climate and organizational

commitment (Rathert, Ishqaidef, & May, 2009), and work engagement and organizational citizenship behaviour (Kirk-Brown & Van Dijk, 2011). The finding that psychological safety significantly predicts organizational citizenship behaviour (OCB) is especially important in this study given that voice behaviour (a main study variable in this study) is an example of an OCB.

Outcomes of psychological safety speak to the importance of the construct in creating positive work and safe patient care environments. Psychological safety has been found to predict engagement in quality work improvements (Nembhard & Edmondson, 2006) and vitality (Kark & Carmeli, 2009). In addition, psychological safety was found to partially mediate the relationship between continuous quality improvement climate and patient safety (Rathert et al., 2009). Perhaps the most well researched outcome of psychological safety is employee voice (Nembhard & Edmondson, 2006; Svendsen, Jonsson, & Unterrainer, 2016; Walumbwa & Schaubroeck, 2009). LePine and Van Dyne (2001) suggest that engaging in voice behaviours may reflect an element of social risk that naturally corresponds with pointing out organizational problems and challenging others to facilitate proactive change. The association between voice behavior and damaged interpersonal relationships (Adler & Kwon, 2002), discomfort, and negative public image (Milliken et al., 2003) support the assertion that speaking up at work is risky (Hsiung, 2012; Liu et al., 2010). Therefore, in an attempt to mitigate this risk, employees often engage in a cost-benefit analysis, weight the potential risks and benefits of speaking up before engaging in voice behaviour (Detert & Burris, 2007).

Psychological safety as a contextual moderator. Despite the numerous studies that have identified psychological safety as a mediator in the relationship between

antecedent variables and employee voice behaviour, the present study positions psychological safety as a moderator in the relationship between nurses professional identification and voice. The appropriateness of this can be extrapolated from the group level finding that justice climate (conceptually similar to safety climate) moderates the relationship between positive mood and employee voice (Hsiung, 2012), LMX quality and employee voice (Hsiung, 2012); and emotional exhaustion and voice (Qin et al., 2014). Based on the group level-finding that the expression of voice differs based on group perceptions of justice, it is plausible to hypothesize that the expression of voice will vary based on individual perceptions of safety in the work environment (psychological safety). Furthermore, Detert and Edmondson (2011) found that psychological safety supplements, but does not mediate the effect of voice theories on employee voice. Therefore, psychological safety is appropriately conceptualized as an independent contextual factor that may exert an independent effect on voice behaviour (Edmondson & Lei, 2014).

As a contextual moderator, psychological safety represents a critical element in work environments that may affect the dynamics of the professional identification-voice behaviour relationship. Support for this proposition is presented by Edmondson (2003) who argued that individuals engage in a cognitive process in which they weigh their decision whether to take a potential action (i.e. engage in voice behaviour) by assessing the interpersonal risk associated with that given action. If people believe there is a chance they might be embarrassed, criticized or ridiculed, they may choose to refrain from acting regardless of their level of professional identification. For example, staff nurses may be unwilling to engage in prosocial voice because they are concerned about potential

negative personal or professional consequences. This leads to nurses being silent in order to avoid negativity. In contrast, if staff nurses feel supported and respected, the benefits of speaking up are likely to outweigh the risks they are more likely to engage in prosocial voice. Therefore, nurses with low levels of psychological safety would likely deem the risk of speaking up too great regardless of their level of professional identification. Based on these assertions, it was proposed that psychological safety is a critical element in the work environment that may affect the relationship between nurses' professional identification and voice behaviour. Thus, it was hypothesized that:

> *Hypothesis 3:* Staff nurses' perceptions of psychological safety will moderate the relationship between professional identification and voice behaviour, such that the strength of the relationship between professional identification and voice behaviour will increase as the level of psychological safety increases.

Missed nursing care. *Missed nursing care* is defined as any aspect of required patient care that is omitted, either in part or in full, or delayed (Kalisch, 2006). It is important to note that since the first quantitative report of missed care was published using the term *care left undone* (Aiken et al., 2001), terms such as *unfinished care, implicit rationed care, task incompletion,* and *unmet care needs* have been used interchangeably with the term missed care (Jones et al., 2015). Rather than focusing on erroneous acts (acts of commission), missed care focuses on the failure to act (acts of omission) (Kalisch & Williams, 2009). While acts of commission are often easily identifiable, acts of omission are often overlooked and likely represent a more widespread problem affecting patient safety (Blackman et al., 2015; Waller Dabney & Kalisch, 2015).

Despite often being overlooked, missed care is rampant, with 50-95% of nurses missing a least one nursing care activity during their last shift (Jones et al., 2015; Nelson & Flynn, 2015). Seminal qualitative work identified nine commonly missed elements of patient care: ambulation, turning, feeding, patient education, discharge planning, emotional support, hygiene, documentation of input and output, and general patient surveillance (Kalisch, 2006). This research noted that care is most likely to be missed if it is infrequently audited, indirect, requires more time to complete, and addresses patients' psychological needs. Follow up descriptive quantitative research has shown a significant amount of missed care occurring in 459 nurses across three acute care hospitals, with the six most frequently cited missed care items being: ambulation (84%), assessing of the effectiveness of medications (83%), turning (82%), mouth care (82%), patient teaching (80%), and the timeliness of medication administration (80%) (Kalisch, Landstrom, & Williams, 2009). More recent findings echo the frequency of the preceding missed care elements, with ambulation occurring far more often than other elements of patient care (Kalisch et al., 2011; Maloney et al., 2015).

Missed care is a complex concept dependent on hospital, unit, patient, and nurse characteristics. Qualitative research has highlighted the varied reasons for missed care, including: inadequate staffing, poor use of existing staff, insufficient time, poor teamwork, ineffective delegation, habit, and denial (Kalisch, 2006). These qualitative findings have been further substantiated by quantitative research. In a study of 459 staff nurses across 3 acute care hospitals, Kalisch et al. (2009) found commonly cited reasons for missed care to include inadequate labor resources, material resources, and communication. More specifically, an unexpected rise in patient volume and/or acuity on

the unit, inadequate number of staff, inadequate number of assistive and/or clerical personnel, and heavy admission and discharge activity have been identified as the top reasons for missed care by nurses across 3 acute care hospitals (Maloney et al., 2015). Furthermore, a study of 110 patient care units across 10 acute care hospitals found missed care to be positively associated with turnover rates, skill mix, and absenteeism and negatively associated with hours per patient day (total number of direct nursing care hours compared to the number of patients in the hospital or nurse-patient ratio), case mix index (care intensity) and work experience (Tschannen et al., 2010). Finally, the importance of nurse-patient ratios has been repeatedly demonstrated by findings that nurses working in high-staffing units have a significantly lower mean score of missed care than those in low-staffing units (Ball et al., 2013; Cho et al., 2015; Kalisch et al., 2011; Waller Dabney & Kalisch, 2015).

Several recent studies highlight the importance of work unit dynamics in decreasing missed care. Kalisch (2009) first linked the concepts of teamwork and missed care in her mixed methods study of registered nurses, licensed practical nurses, and nurses attendants. This study found that lack of teamwork, specifically referred to a lack of closed-looped communication, mutual trust, leadership, team orientation, and shared mental models were reasons for missed care. In contrast, Kalisch, Gosselin, and Choi (2012) grounded theory study found nurses employed in units with low levels of missed care described how they modified their practice to be more reflective of a team oriented approach during times of inadequate staffing, increases in patient volume, and increases in patient acuity. In contrast, a team-oriented approach to patient care was not found in nurses from units with high levels of missed care. Furthermore, Kalisch, Xie, and Ronis

(2013) found a train-the-trainer intervention aimed at increasing nurses teamwork behaviours (leadership, team orientation, backup, performance monitoring) and awareness of missed care, significantly increased teamwork and significantly decreased missed care in nurses across 3 hospitals. Further reinforcing the importance of teamwork are the findings that teamwork and missed care are negatively correlated and that teamwork accounts for 11% of the variance in missed care (Kalisch & Lee, 2010).

Only one study has explored the concept of missed care in the context of nursing staff *and* nursing leaders. In a study of 4415 nursing staff (registered nurses, licensed practical nurses, and nursing assistants), nurse leaders (nurse managers and clinical nurse specialists) across 11 hospitals, Kalisch and Lee (2012) used the leader member exchange model as a framework to determine congruence between perceptions of missed care and teamwork. Findings suggested nursing staff reported less missed care and lower teamwork than nursing leaders. Furthermore, nursing staff cited more problems with labour and material resources than nursing leaders. The significance of these findings stem from the consistently demonstrated negative effects of incongruence in relation to nurses' work attitudes and behaviours. Kalisch and Lee also suggest that distrust and disrespect between nursing staff and their leaders is likely to fester when incongruence between perceptions of missed care and the reasons for missed care exist. This may lead to ineffective working relationship, and ultimately poor patient outcomes and negative work related attitudes and behaviours.

Voice behaviour, although not yet identified as an antecedent of missed care, has been empirically liked to employee performance (Ng & Feldman, 2012). Employee voice has also been found to be directly related to employee performance evaluations (Burris,

Detert, & Romney, 2013; Maynes & Podsakoff, 2014; Van Dyne & LePine, 1998; Whiting, Podsakoff, & Pierce, 2008). Maynes and Podsakoff (2014) argued that employees who engage in voice are more likely to be evaluated as having favorable performance because they have expended extra effort in solving an organizational problem, and therefore viewed as being more committed to the organization and contributing to improved performance of the work unit. In addition, Ng and Feldman argue the positive association between voice and performance can be explained using the resource acquisition argument, whereby voice helps facilitate job performance because it helps employees acquire additional tangible and intangible resources, which in turn can facilitate performance. Missed care, or aspects of required nursing care that are not completed, is considered an aspect of nurses' work performance (Jones et al., 2015). Therefore, it was argued that nurses who engage in voice behaviour (i.e. speak up to challenge the status quo on their unit) will have more resources available to them to provide complete nursing care, resulting in the formation of hypothesis 4.

> *Hypothesis 4:* Staff nurses' voice behaviour will be negatively associated with missed nursing care.

Job satisfaction. Job satisfaction is a widely researched job attitude among staff nurses, making the research on the subject vast and varied. Although many definitions of *job satisfaction* exist, the concept is broadly defined as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experience" (Locke, 1976, p. 1304). More recently, results of a comprehensive concept analysis in nursing suggest the concept is appropriately defined as a nurse's positive feeling in response to the work

conditions that meet his or her desired needs and are the result of their evaluation of the value or equity in their work experience (Liu, Aungsuroch, & Yunibhand, 2016).

The importance of understanding nursing job satisfaction is reflected in research which suggests nurses who are satisfied in their jobs are more likely to stay in their current positions and the profession, experience less burnout and exhaustion, and have better overall performance (Aiken et al., 2008; Chen et al., 2016; Lu, Barriball, Zhang, & While, 2012). Despite the abundance of research aimed at understanding and improving nurses' job satisfaction, there continues to be reports of widespread dissatisfaction among staff nurses both in Canada and internationally (Aiken et al., 2001; Alameddine, Bauer, Richter, & Sousa-Poza, 2016; Ingersoll, Olsan, Drew-cates, & Devinney, 2002; Lucero et al., 2010; Park, Lee, & Cho, 2012). As such, continued research focused on identifying antecedents of nurses' job satisfaction is needed.

Several nurse characteristics have been identified as important in predicating job satisfaction. For example, education has consistently been shown to predict job satisfaction. In a study of 512 nurses working in two teaching hospital in Beijing, Lu, While and Barriball (2007) found nurses with a bachelor degree reported lower levels of job satisfaction compared to those with an associate degree or diploma. Similarly, Ingersoll et al. (2002) found masters prepared nurses were significantly more satisfied that baccalaureate prepared nurses and nurses prepared at less than the baccalaureate level. This study also found that age, employment status, employment setting, and nursing role were significant predictors of job satisfaction, with nurses over the age of 50 and employed fulltime as educators reporting the highest levels of job satisfaction. Work experience has also been identified as an important predictor of job satisfaction (Cheng &

Liou, 2015), while positive associations have been reported between nurses' personal dignity and job satisfaction, and nurses' self-esteem and job satisfaction (Sturm & Dellert, 2016).

In addition to individual nurse characteristics, nurses' work environments have been identified as important antecedents to nurses' job satisfaction (Aiken et al., 2008; Aiken et al., 2014; Kramer & Schmalenberg, 2008; Saber, 2014; Van Bogaert, Meulemans, Clarke, Vermeyen, & Van De Heyning, 2009). Utilizing a revised version of the Nursing Worklife Index, Fallatah and Laschinger (2016) found supportive professional environments, as measured by autonomy, control, and collaborative relationships, were positively related to job satisfaction in a sample of new graduate nurses (n=93). Similarly, Han, Trinkoff and Gurses (2015) found four elements of nurses' work environments (psychological demands, autonomy, support, work schedule) were positively associated with job satisfaction in a sample of large staff nurses in Illinois and North Caroline (n=5000). In a large multi-site study of 706 nurses from 28 intensive care units (ICUs), job satisfaction was found to fully mediate the relationship between healthy work environments (as measured by autonomy, nurse-physician relationships, competent peers, support for education, adequate staffing, nurse manager support, control of nursing practice, and clinically cultural values) and nurse-assessed quality of care in medical-surgical, surgical, and neonatal/pediatric ICUs, and partially mediate the relationship in medical ICUs (Bai, 2015). These findings suggest that factors in nurses' work environments play an important role in contributing to job satisfaction among staff nurses.

One particular aspect of nurses' work environments, interpersonal relationships, has been repeatedly identified as an important antecedent to job satisfaction. In a literature review of studies published between 1997 and 2006, Utriainen and Kyngas (2009) report job satisfaction to be strongly predicted by social and professional relationships in the workplace. More recent research has further substantiated this finding. For example, physician-nurse collaboration has been found to be positively related to job satisfaction (Van Bogaert et al., 2014; L. Zhang & Huang, 2016), while negative behaviours such as horizontal violence and verbal abuse has been found to negatively related to job satisfaction (Budin, Brewer, Chao, & Kover, 2013; Laschinger, Leiter, & Gilin, 2009; Purpora & Blegen, 2015).

Workplace empowerment has repeatedly been identified as an important antecedent of staff nurses' job satisfaction. In a meta-analysis of data from 1980-2009, empowerment was found to have a large effect on job satisfaction (Saber, 2014), while a systematic review of studies published between 1998 and 2012 found significant positive relationships between empowerment and nurses' job satisfaction (Cicolini et al., 2014). Structural empowerment has also been found to be directly related to staff nurses' nurses job satisfaction in both Canada (Wong & Laschinger, 2013) and internationally (Ning, Zhong, Libo, & Qiuijie, 2009). Furthermore, empowerment has been found to explain 26% of the variance in job satisfaction among new graduates working in the province of Ontario (n=205) (Pineau Stam, Laschinger, Regan, & Wong, 2015). In addition, Bawafaa et al. (2015) found structural empowerment partially mediated the relationship between resonant leadership and job satisfaction, with resonant leadership and structural

empowerment explaining 36% of the variance in nurses job satisfaction (controlling for age, education, and work setting).

Nursing leadership has consistently been identified as an important factor in predicting job satisfaction among staff nurses. In a large systemic review of studies published between 1985 and 2009, Cummings et al. (2010) report nursing job satisfaction to be the most frequently examined outcome of nursing leadership, with a large proportion of studies reporting positive associations between relationally based leadership and job satisfaction. Specific forms of relational leadership, such as authentic, resonant, and transformational leadership, have also been empirically linked to nurses' job satisfaction. In a study of 170 new graduate nurses working in the province of Ontario, preceptor authentic leadership was found to predict new gradate nurse job satisfaction (Giallonardo et al., 2010), while several other studies have linked nurse manager authentic leadership to new graduate nurse job satisfaction (Fallatah & Laschinger, 2016) and staff nurse job satisfaction (Wong & Laschinger, 2013). In a longitudinal analysis of new graduate nurses, Read and Laschinger (2015) found nurse manager authentic leadership is positively related to structural empowerment, which in turn positively influences relational social capital, ultimately leading to high job satisfaction 1 year later. Secondary analysis of data from a large national study of 1216 registered nurses also found resonant leadership to be significantly related to job satisfaction (Bawafaa et al., 2015). Utilizing the Multi-factor Leadership Questionnaire, nurse manager transformational and transactional leadership have also been found to be positively related to job satisfaction, while passive-avoidant leadership has been found to be negatively related to job satisfaction in a study of 200 staff nurses across six hospitals

in Jordan (Abdelhafiz, Alloubani, & Almatari, 2016). Although these studies conceptualize and measure leadership according to different philosophical approaches, they share commonality of being relationally oriented. This highlighted the importance of relationally based leadership in contributing to job satisfaction among staff nurses and served as the basis for hypothesis 5.

Hypothesis 5: Staff nurses' perceptions of nurse managers' authentic leadership will be positively associated with job satisfaction.

The ability to provide high-quality complete care to patients has been identified as an important antecedent of job satisfaction among staff nurses. In several large national studies, nurse-assessed quality of care has been found to predict job satisfaction (Aiken et al., 2008; Laschinger & Fida, 2015; Laschinger, Zhu, & Read, 2016). Qualitative work by Kalisch et al. (2006) report nurses consistently expressed frustration and feelings of despair when they could not provide all the nursing care that patients requires. Furthermore, the negative relationship between missed care and job satisfaction has been empirically supported (Kalisch, Tschanen, Lee & Salsgiver, 2011). In a large multi-level (individual and unit) study of nurses (n=1166 individuals; n=55 units) in South Africa, tasks left undone most strongly correlated with job satisfaction (Bekker, Coetzee, Klopper, & Ellis, 2015). This research suggested nurses derive satisfaction from the ability to provide complete nursing care to their patients, and as such, staff nurses who are unable to provide complete nursing care to patients experience lower levels of job satisfaction; therefore, was used as the basis in the formulation of hypothesis 6:

Hypothesis 6: Missed nursing care will be negatively associated with staff nurses' job satisfaction.

Adverse events. *Adverse events* are defined as unintended complications caused by healthcare management, leading to death, disability or prolonged hospital length of stay (Baker et al., 2004). Adverse events differ from errors, in that errors do not necessarily harm patients, whereas adverse events imply harm (Thomas & Peterson, 2003). Adverse events refer to changes in health status upon which nursing care has had a direct influence; therefore, are considered a nursing sensitive outcome (International Council of Nurses, 2009). Adverse events can either be objectively measured using organizational data or subjectively measured using nurses' perceptions of the incidence and prevalence of adverse events. Commonly cited adverse events include mortality, medication errors, nosocomial infections, and patient falls with injury (Aiken et al., 2014, 2008; 2002; Sochalski, 2004). Since the Institute of Medicine first published their report, *"To Err is Human. Building a Safer Health System"* (Kohn, Corrigan, & Donaldson, 2000), in which the widespread issue and devastating consequences of adverse events were highlighted, there has been an ever growing body of research focused on identifying the antecedents of adverse patient events.

Several factors in nurses' work environments have been identified as antecedents of adverse events. For example, inadequate staffing has been repeatedly been associated with adverse patient events and is by far the most extensively researched work environment factor in relation to adverse events. In a study of over 10,000 staff nurses, seminal work completed by Aiken and colleagues (2002) found inadequate staffing predicted failure to rescue and patient mortality. The association between staffing and adverse events such as failure to rescue, mortality, patient falls, nosocomial infections, and medication errors have been continually echoed in more recent research findings

(Aiken et al., 2008; Al-Kandari & Thomas, 2009; Friese, Lake, Aiken, Silber, & Sochalski, 2008; Hinno, Partanen, & Vehviläinen-Julkunen, 2012; Laschinger & Leiter, 2006; Tourangeau et al., 2007). Furthermore, a one patient increase in the nurses' workload has been reported to result in a 7% increase in the likelihood of patient mortality within 30 days of admission (Aiken et al., 2014, 2002), a 1% increase in administering the wrong mediation, a 1% increase in pressure ulcer formation, and a 2% increase in falls with injury (Cho, Chin, Kim, & Hong, 2016). In addition, the amount of time nurses spend providing direct patient care during a shift has been significantly related to adverse events, with a decrease of 1 hour per shift resulting in an 15% to 51% incidence of falls depending on unit type (Patrician et al., 2011). Kunaviktikul et al. (2015) also found nurses who had extended work hours of more than 16 hours per week were significantly more likely to perceive adverse events than nurses working a less than 8 hour extended work week. A recent systematic review as reports repeated evidence supporting the positive relationship between working long hours and adverse outcomes (Bae & Fabry, 2014).

The importance of leadership in mitigating adverse events has also been recognized. Two systematic review of studies examining the relationship between nursing leadership and patient outcomes found repeated evidence of a positive association between relational leadership and reduced adverse events (Wong & Cummings, 2007; Wong et al., 2013). In addition, Wong and Giallonardo (2013) found trust in the manager and the six areas of work life (workload, control, reward, community, fairness, values) mediated the relationship between authentic leadership decreased adverse events. The association between resonant leadership and lower patient

mortality has also been reported (Cummings et al., 2010). Duffield, Roche, Dimitrelis, Homer and Buchan (2015) highlighted the importance of having strong nursing leaders that can manage unit complexity in their finding that patient instability results in higher rates of falls, medication errors, and other adverse patient outcomes regardless of nurse stability (greater experienced and permanent staff, fewer casuals).

Positive interpersonal relationships has also been highlighted as important in preventing adverse patient events. Bullying and incivility form nurses, physicians, and supervisors were found to have significant direct effects on adverse events, and indirect effects on adverse events through the mediating mechanism of patient safety risk (Laschinger, 2014). These results suggest that workplace mistreatment may hinder effective communication about patient care, thereby contributing to the incidence of adverse events. In addition, after controlling for the effect of nurse staffing and the severity of patient illness, group processes have been found to be negatively associated with falls and nurse assessed risk (as measured by the occurrence of adverse events) (Purdy, Laschinger, Finegan, Kerr, & Olivera, 2010).

The importance of patient safety culture also been identified as an important contributing factor to adverse events among patients. In a large scale study of 179 hospitals and 56,480 staff across the United States, patient safety culture was found to be negatively associated with rates of in-hospital complications or adverse events (Mardon, Khanna, Sorra, Dyer, & Famolaro, 2010). Wang et al. (2014) reported similar results in their finding that patient safety culture was significantly associated with adverse events as indicated by pressures ulcers, prolonged physical restraint and complications, and medication errors. More specifically, 20% of the variance in patient falls has been

attributed to safety culture in a unit-level study of 37 units across 9 hospitals (Brown & Wolosin, 2013). In addition, Squires, Tourangeau, Spence Laschinger, and Doran (2010) found patient safety climate was directly negatively related to the adverse event of medication errors in a sample of 600 Registered Nurses working in acute care.

Several individual nurse characteristics have been associated with adverse events. In a multi-level study of 1108 nurses across 96 units found social capital was negatively associated to adverse patient events (patient falls, medication errors, patient/family complains) (Van Bogaert et al., 2014). Furthermore, this study found depersonalization and emotional exhaustion predicted the occurrence of adverse events. Nurses' work experience has also been found to contribute to the incidence of adverse events with Dunton et al. (2007) reporting a decrease of 1% in the fall rate for every one year increase in nurse work experience. Similarly, Patrician et al. (2011) reported a decrease in the percentage of experienced nurses was associated with a 33% to 48% increased likelihood of falls and as much as a 67% increased chance of medication errors.

Of particular interest in the present study is research which reports a link between missed care, or conceptually similar concepts, and adverse events. In a secondary analysis of over 10,000 staff nurses, Lucero et al. (2010) found an increase in unmet nursing care needs was associated with an increase in the proportion of nurses' reports of medication errors, nosocomial infection, and patient falls. Furthermore, the significant relationship between unmet nursing care needs and nurse-reported adverse events persisted even after accounting for patient factors and the care environment. Kalisch, Tschannen, et al. (2012) also report an association between missed care and patient falls, while Kalisch, Xie, and Dabney (2014) found that patients who experienced adverse

events reported significantly more missed nursing care. Recent group level findings also show that missed care activities, specifically timely medication administration and patient surveillance, explained 40% of the variance in the incidence of urinary tract infections in patients across 63 nursing homes (Nelson & Flynn, 2015). These findings suggests that as nursing required nursing care is missed, the likelihood of adverse events increase. These findings provided insight into the important relationship between the missed nursing care and the incidence of adverse patient events, and served as the basis for hypothesis 7:

Hypothesis 7: Missed nursing care will be positively associated with adverse patient events.

Nurse-assessed quality. The provision of high quality nursing care is the essence of nursing (Laschinger & Fida, 2015). A large body of research exists in which adequate staffing has been directly linked to patient care quality (Aiken, 2002; Aiken et al., 2002; Gunnarsdottir et al., 2009; Hinno, Partanen, & Vehvilainen-Julkunen, 2011; Laschinger, 2008). More specifically, it has been reported that nurses in poorly staffed hospitals are 75% more likely to report poor to fair quality care than nurses in better staffed hospitals (Kanai-Pak, Aiken, Sloane, & Poghosyan, 2008). In addition, nurse-assessed quality has been reported to decrease an average of .004 points for each additional patient assigned during shift (Faller, Gates, Georges, & Connelly, 2011).

In addition to adequate staffing, the importance of leadership in creating work environments which support nurses' in providing high quality patient care has been highlighted. Most recently, Laschinger and Fida (2015) have demonstrated the mediated effect of staff nurses' structural empowerment and contextual work factors (support for professional practice and short-staffing) on the relationship between authentic leadership

and nurse-assessed quality of care. Furthermore, direct associations between supportive nurse management and nurse-assessed quality of care have also been found (Gunnarsdottir et al., 2009; Hinno et al., 2011a; 2011b; Van Bogaert, Clarke, Roelant, Meulemans, & Van de Heyning, 2010; Van Bogaert, Kowalski, Weeks, Van heusden, & Clarke, 2013; Van Bogaert et al., 2009).

The important role collegial nursing relationships play in supporting nurses' ability to provide quality patient care has been repeatedly demonstrated. Rafferty, Ball and Aiken (2001) found high levels of nurse teamwork were associated with higher perceptions of quality of care. Furthermore, after controlling for the effect of nurse staffing and the severity of patient illness, group processes were positively associated with nurse assessed quality of care (Purdy et al., 2010). These scholars also found group processes fully mediated the positive relationship between structural empowerment and nurse-assessed quality at the unit level.

The complex relationship between nurses' work attitudes and nurse-assessed quality of care has been of great interest. In a study of 280 registered nurses working in the province of Ontario, Wong et al. (2010) found nurses work engagement, as characterized by vigor, dedication, and absorption, was significantly related to nurse-assessed quality of care. Furthermore, negative associations between burnout, emotional exhaustion and nurse-assessed quality of care have been reported (Van Bogaert et al., 2010, 2013, 2009).

Although no research has explored the relationship between missed care and nurse assessed quality of care, several scholars have reported links between care left undone (conceptually similar to missed care) and nurse assessed quality of care.

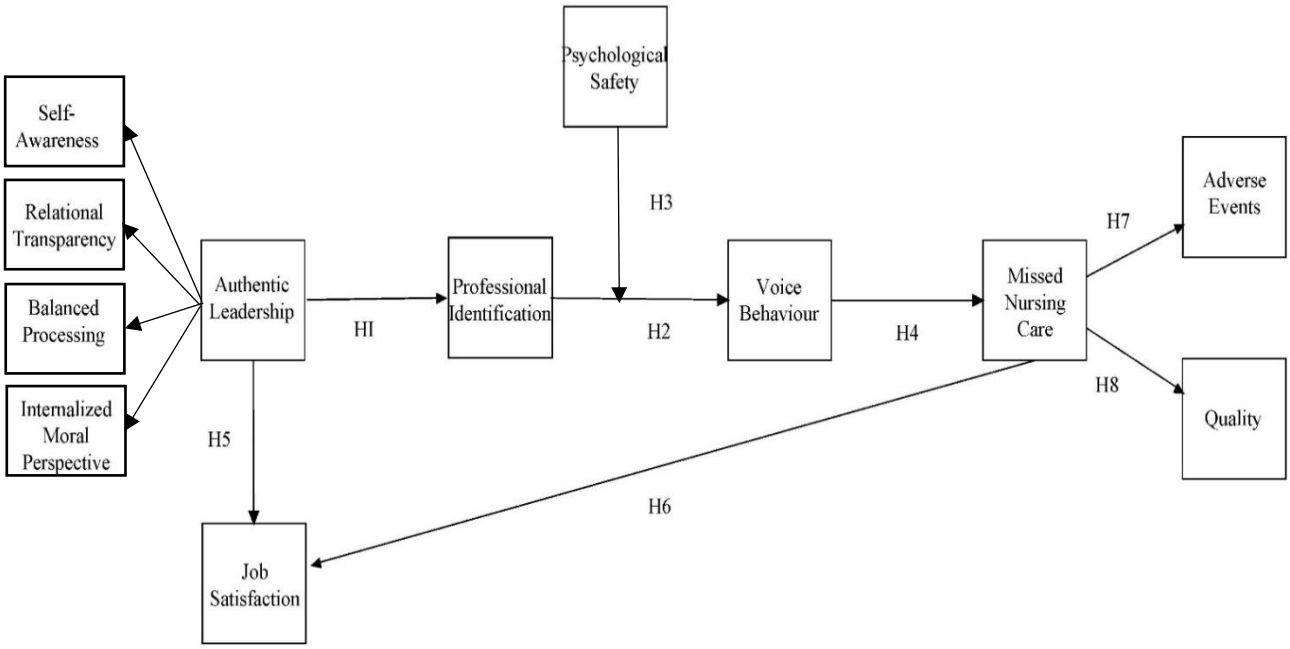
Sochalski (2001) was among the first to report an association between care left undone and nurse assessed quality of care. These findings were later supported by Sochalski (2004) who reported unfinished care has a pounced effect on quality of care ratings, in which 40% of the variance in quality rating were explained by nursing task left undone. In addition, a study of 2917 nurses working in 401 medical-surgical units across 46 acute care hospitals found that as more patient care was missed, the more nurses perceived the quality of care to decrease (Ball et al., 2013). The preceding research provided insight into the important relationship between the missed nursing care and patient care quality, and served as the basis for hypothesis 8:

> *Hypothesis 8:* Missed nursing care will be negatively associated with nurse-assessed quality of care.

Hypothesized Study Model

Based on Avolio et al.'s (2004) model of authentic leadership and a review of the literature, the hypothesized model presented in Figure 2 was tested. Identified gaps in the literature were addressed by including indirect effects of authentic on staff nurses' work attitudes and behaviours, and outcomes of care. Specifically, the psychological process of professional identification was proposed to mediate the relationship between authentic leadership and staff nurses' voice behavior. In addition, psychological safety was proposed as a moderator in hopes it could explain boundary conditions in the relationship between professional identification and voice behaviour.

Figure 2
Hypothesized Study Model



Summary

The use of Avolio et al.'s (2004) model as the theoretical framework guiding the present study was described in the preceding chapter. The four dimensions of authentic leadership were thoroughly explained: self-awareness, relational transparency, balanced processing, internalized moral perspective, while the central concepts within the model were defined, and the interrelationships between these concepts were explored. An in-depth literature review was presented in which what was currently known and not known about each variable was summarized; this literature was also used to support the study hypotheses. A description of the hypothesized study model concluded the chapter.

Chapter 3: Research Methods

The research methods utilized in the present study are outlined in the following chapter. A brief overview of the research design is provided, followed by a robust discussion of the study sample, including sample size considerations and calculation techniques. Specific data collection procedures are explained and details pertaining to each instrument tool are outlined. Thorough explanations of value screening techniques and data analysis procedures are given. The chapter concludes with a summary of how study participant's rights were protected according to the principles of beneficence, autonomy, and justice.

Research Design

A descriptive, non-experimental research design was used in the present. Data were collected from participants at one point in time (cross-sectional) using a mailed self-report survey.

Sample

Registered nurses are often inundated with requests to participate in surveys, which commonly results in less than ideal response rates for researchers (Corner & Lemonde, 2019). Although online data collection methods typically yield the lowest response rates (Cooper & Brown, 2017), response rates found for mailed surveys are often much lower when compared to face-to-face data collection methods (Polit & Beck, 2008). Commonly cited response rates among healthcare professionals is approximately 50% (Y. I. Cho, Johnson, & VanGeest, 2013), which is similar to rates reported in nursing specific studies (Corner & Lemonde, 2019), but much lower than Dillman's (2000) suggested ideal response rate of 70%.

In order to overcome the obstacles related to obtaining an adequate sample using mailed survey and to compensate for the potential loss of participants to due to errors in the College of Nurses of Ontario (CNO) registry, permission was sought to obtain a random sample of 1000 registered nurses. Inclusion criteria included: (1) registration with the CNO as a registered nurse; (2) employment in an acute care hospital in the province of Ontario and; (3) having a direct patient care role. Nurses who did not meet the inclusion criteria at the time of data collection were excluded from the study.

Sample size calculations. Although a sample size of 200 is often considered adequate for structural equation modeling (SEM) (Kelloway, 2015), this number may not always be sufficient. The importance of determining minimum sample size requirements stems from the increased likelihood of Type II error when a sample size is too small (Kline, 2016). *Type II error* refers to a researcher's failure to reject the null hypothesis (i.e. stating no relationship is present), when in fact it should be rejected (i.e. stating a relationship is present) (Meyers, Gamst, & Guarino, 2013). This is a serious consequence of inadequate sample sizes and results in reporting erroneous findings. Therefore, several sample size calculation techniques were employed in order to decrease the likelihood of Type II error occurring.

***Rule of thumb*.** The *rule of thumb* sample size calculation technique, also termed the *N:q* rule, takes into consideration the ratio of participants to free parameters (Kenny, 2015). *Parameters* are defined as hypothesized effects that require statistical estimation based on data--these include all path coefficients, controls, parameter estimates, error terms, and disturbance terms (Kline, 2016). Although the rule of thumb technique is commonly cited in the literature, there is no universally agreed participant-parameter

ratio. Researchers using Bayesian estimation suggest SEM models can be run with a 3:1 participant-to-parameter ratio (Wang & Wang, 2020), while the use of maximum likelihood (ML) estimation often requires larger samples to achieve accuracy and power. Using ML, justification for sample sizes range from ratios of five and ten participants per parameter (Kelloway, 2015), all the way up to twenty participants per parameter (Kline, 2016); although many agree twenty participants per parameter is an unrealistic goal. Applying commonly cited ratio of 5:1 to the hypothesized study model, a minimum of 300 participants were desired (5 participants x 60 free parameters [7 path coefficients, 2 controls, 22 parameter estimates, 22 error terms, 7 disturbance terms]).

Power analysis. *Power analysis* refers to the estimation of the minimum sample size required to attain power that is equal to, or exceeds, a desired level (Kline, 2016). This technique takes into consideration the anticipated effect size, number of observed and latent variables, and desired power. Power analysis is a sophisticated alternative to the rule of thumb technique when determining the required sample size for structural equation models (Kelloway, 2015). Utilizing Soper's (2020) online calculator, 177 participants were suggested to detect a moderate effect, while 241 participants were suggested for model structure (anticipated effect size=0.3; desired statistical power level=0.8; number of latent variables=8; number of indicators=22; probability level=0.05).

Sample size considerations. Although it is widely accepted that large sample sizes are required for SEM, what constitutes ‘large enough’ is dependent on a variety of considerations beyond the N:q rule and power analysis. These considerations include, but are not limited to, model complexity, characteristics of the data, and measurement error.

Model complexity. Complexity of a structural model is dependent on the number of parameters that require estimation. Models with many parameters are considered more complex than models with few parameters (Kelloway, 2015). Statistical analysis programs require larger samples to accurately estimate the additional parameters in complex models, compared to smaller samples that are required to estimate fewer parameters in simpler models (Kline, 2016). In the preset study, the hypothesized model contained x 60 parameters (7 path coefficients, 2 controls, 22 parameter estimates, 22 error terms, 7 disturbance terms). Although there are no guidelines to outline what number of parameters constitute simple verses complex models, 60 parameters were deemed reflective of a moderately complex model.

Characteristics of the data. Large amounts of missing data require larger sample sizes to compensate for loss of information, while large deviations from normality increase size requirements due to the required use of alternative estimation techniques (Kline, 2016). Given missing data and non-normal data distributions are common occurrences in studies where counterproductive work behaviors (i.e. missed nursing care) are measured (Nye & Drasgow, 2011), a priori sample size requirements were adjusted accordingly. The importance of recognizing the influence of missing data and violations of normality on sample size requirements was later confirmed when results of data screening procedure revealed questionable normality and a variety of missing data mechanism (i.e. missing completely at random [MCAR], missing at random, [MAR], and/or missing not at [MNAR]).

The typical sample size suggestion of 200 is based on the use of ML estimation (Kline, 2016). ML can provide accurate estimates when data is MCAR and MAR, but not

in the context of non-normal data distributions (Kelloway, 2015). Although bootstrapping in ML and Bayesian estimation can be used with non-normal data and require significantly smaller sample sizes (Muthen & Muthen, 2017b), it has been argued that rescaling-robust estimators are more efficient ways of managing non-normal data (Wang & Wang, 2020).

The mean-adjusted maximum likelihood (MLM) and robust maximum likelihood (MLR) are versions of ML that provide a rescaled chi-squared statistic (χ^2) adjusted for conditions of non-normality (Wang & Wang, 2020). MLM provides the values which are robust to the violation of multivariate non-normality, but does not allow for missing data (Kelloway, 2015). In contrast, MLR is an extension of MLM which can provide accurate estimates with non-normal and missing data (Muthen & Muthen, 2017b); therefore MLR was deemed the more appropriate robust estimator of choice. When using MLR, some scholars recommend sample sizes be upwards of 400 (Savalei & Bentler, 2005), while others have shown MLR can be used with sample sizes of approximately 250 (Kelloway, 2015; Wang & Wang, 2020). Given the variability in these recommendations, the most recent suggestion of 250 was used.

Measurement error. Error is inherent in all measurement (Polit & Beck, 2008). Kline (2016) suggests that instruments with low reliability coefficients (indicating a large amount of measurement error) require larger samples to offset the potential distorting effects of measurement error. In addition, observed variable models require larger sample sizes, as these model control measurement error less effectively than latent variable models (Kline, 2016). As instruments in the present study demonstrated Cronbach's alpha coefficients within acceptable ranges (or reasonably close) and the structural model

was analyzed using latent variables, it was determined that low instrument reliability and the presence of observed variables did not inflate sample size requirements. However, it is important to note that two errors in survey construction and the printing process resulted in systematic error affecting this study (see Chapter 5 for a full discussion). Therefore, confirmation of sample size requirements were adjusted accordingly.

Summary of sample size calculations and considerations. Determining an adequate sample size in SEM is complicated (Wang & Wang, 2020). Rather than relying on one method, several a priori and confirmatory techniques were employed. A priori techniques included the N:q rule, power analysis, and assessment of model complexity. These methods helped guide the number of registrants requested from the CNO and indicated a moderate sample of approximately 260 would be sufficient. Confirmatory techniques were employed once data were screened (see below for a complete discussion) and included assessment of study data and measurement error. These confirmatory assessments suggested that due to violations of normality, the presence of missing data, and disorienting effects of measurement error, the commonly suggested sample of 200 may not have been sufficient. Based on a culmination of a priori and confirmatory sample size calculations and considerations, it was determined a sample of or greater 260 would be/was acceptable.

Data Collection Procedures

Western University Research Ethics Board granted approval for the present study on August 30, 2017. Following approval, survey package construction commenced and data collection was initiated. Although survey distribution began in October 2017 and

was completed in December 2017, data collection continued until the last participant's survey package was received in April 2018.

Each CNO registrant was mailed a survey package containing study instruments (Appendix A), a letter of information (Appendix B), a self-addressed stamped envelope, and a raffle ticket. Each raffle ticket had a perforated line dividing the ticket in two. Registrants were asked to divide the raffle ticket, keeping one-half for themselves and returning one-half with their completed survey. Returned raffle tickets were deposited in a secure box and were used to draw the winner of an iPad mini.

Each survey was stamped with a unique numerical code corresponding to a raffle ticket and linked to a participant on the CNO registry list. The letter of information explained that participation was entirely voluntary and that completion of the survey package would take approximately 15 minutes. Participants were ensured that individual responses would be kept confidential through strict data security procedures, and that numerical codes would only be used to notify raffle winners and facilitate follow up with non-respondents. Consent to participate was indicated by completion and return of the questionnaire. Staff nurses who did not wish to participate in the study were asked to mail back their blank questionnaire.

A modified version of the Tailored Design Method (TDM), previously termed the Total Design Method, was utilized to facilitate data collection in the present study (Dillman, 2000). Use of this method is proposed to increase the likelihood of obtaining high response rates in most populations. In addition to the initial mailing described above, three weeks following the initial mailing, a reminder letter was sent to all non-respondents. Four weeks following the second mailing, a final package consisting of a

follow-up letter, replacement questionnaire, and a self-addressed stamped envelope was sent to all non-respondents.

Response rate. Of the 1000 surveys mailed, 11 were returned due to incorrect address, 55 were returned blank indicating the recipient did not want to participate, and 46 did not meet inclusion criteria (1. registration with the CNO as a registered nurse; 2. employment in an acute care hospital in the province of Ontario; 3. having a direct patient care role). Overall, 264 respondents met the inclusion criteria, resulting in a response rate of 28%. This was lower than what was anticipated using the TDM, but reflected an adequate sample size as indicated by several sample size calculation techniques and sample size considerations.

Instrumentation

Authentic leadership. The *Authentic Leadership Questionnaire* (ALQ) (Avolio, Gardner, & Walumbwa, 2007) was used to measure staff nurse perceptions of nurse manager authentic leadership. The ALQ is a theory-driven survey consisting of 16 items, divided into four subscales based on the components of authentic leadership: relational transparency (five items), balanced processing (three items), self-awareness (four items), and internalized moral perspective (four items). Items were rated on a 5-point Likert scale ranging from 0=*not at all* to 4=*frequently, if not always.* Items in each subscale were summed and averaged, resulting in a score between 0 and 4 for each dimension of authentic leadership. The subscale scores were then summed and averaged to produce a total scale score between 0 and 4, with higher scores representative of higher levels of authentic leadership.

The initial publication of ALQ psychometrics established discriminant validity and supported the notion that authentic leadership is significantly distinguishable from ethical and transformational leadership (variance extracted .52 to .67) (Walumbwa et al., 2008). Although confirmatory factor analysis (CFA) results published by Walumbwa and colleagues supported the appropriateness of constructing the ALQ around the four dimensions of authentic leadership, it was recently disclosed that model modifications, which resulted in acceptable fit, had not been reported. In order to address these criticisms, unmodified model fit statistics were disclosed and revealed that adequate fit was achieved in the Chinese sample, but poor fit was achieved in the American sample (Avolio, Wernsing, & Gardner, 2018). These conflicting results highlight the importance of researchers validating the use of the four-factor ALQ in their analyses. In the present study, the Cronbach's alpha coefficient of the total scale was .97, while the subscale values were .88 (relational transparency), .91 (internalized moral perspective), .89 (balanced processing) and, .94 (self-awareness). In addition, a second order CFA supported the four-factor structure of the ALQ.

Professional identification. Professional identification was measured using Mael and Ashforth's (1992) 6-item scale. Items were rated on a 5-piont Likert scales ranging from 1= *strongly disagree* to 5= *strongly agree*. Items were summed and averaged to produce a total scale score between 1 and 5, with higher scores representative of higher levels of identification. Although this tool was initially developed to measure organizational identification, Ashforth and Mael suggest the target of identification (i.e. organization) can be modified for use in other contexts (i.e. profession). Van Dick (2004) suggested the tool has sound content validity as items represent core components of

social identification theory, supporting Riketta's (2005) observation that the Mael and Ashforth tool is the most frequently used measure of identification. In the present study, the Cronbach's alpha coefficient was .79, while exploratory factor analysis (EFA) and CFA results supported the one-factor structure of the professional identification scale.

Voice behaviour. Voice behaviour was measured using Van Dyne and LePine's (1998) 6-item scale. Items were rated on a 7-point Likert scale ranging from 1= *strongly disagree* to 7= *strongly agree*. Items were summed and averaged to produce a total scale score between 1 and 7, with higher scores representative of higher levels of voice behaviour. Results of VanDyne and LePine's EFA suggested voice behaviour is most appropriated measured using a one-factor structure. In the present study, the Cronbach's alpha coefficient was .86 and CFA results supported the one-factor structure of the voice behaviour scale.

Psychological safety. Psychological safety was measured using 3 items from Edmondson's (1999) 7-item psychological safety scale. Due to a printing format error, item-7 (PS_7: *"Working with members of this team, my unique talents and strengths are utilized"*) was not included in the final survey package. In addition, the positively worded items (PS_2: "*Members of your unit are able to bring up problems and tough issues*"; PS_4: "*It is safe to take risks on your unit"*; PS_6: "*No one on your unit would deliberately act in a way to undermine your efforts*") were deleted due to unacceptable parameter estimates in the CFA. It is believed that because the item- 1 was negatively worded (PS_1: *"If you make a mistake on your unit, it tends to be held against you"*), participants continued to interpret each subsequent item from a negative perspective. All items were rated on a 5-point Likert scale ranging from 1= *strongly disagree* to 5=

strongly agree. Noting that items 1, 3, and 5 were reverse scored, all items were summed and averaged to produce a total scale score between 1 and 5, with higher scores representative of higher perceptions of psychological safety. In order to elicit staff nurses' perceptions of the psychological safety in their work unit, items referring to a *"team"* were modified to refer to a *"unit"* (i.e. *"It is safe to take risks on this team"* was changed to *"It is safe to take risk on this unit"*). EFA has supported the single-factor structure of this tool, which explained 66% of the total variance in the items (Walumbwa & Schaubroeck, 2009). In addition, Walumbwa and Schaubroeck demonstrated criterion-related validity in relation to idealized influence leadership, ethical leadership, and supervisor-rated voice behavior at the individual level.

In the present study, the Cronbach's alpha coefficient was .66 for all items and the trimmed scale (see Chapter 4 for a full discussion of item trimming). Although .66 was below the commonly accepted threshold of .70, it was not unexpected given the limited number of items and the relatively low inter-item correlations (range= .376-401) (Kline, 2106); therefore .66 was considered sufficient as it was reasonably close to the .70 threshold. In addition, CFA results supported the one-factor structure of the psychological safety behaviour scale.

Missed nursing care. Missed nursing care was measured using a modified version of the adapted Part A of the Missed Nursing Care survey (MISSCARE survey) (Castner & Dean-Baar, 2014). The original tool consisted of 24 items which were considered applicable to all direct nursing care units (Kalisch & Williams, 2009), but was recently scaled back to the 15 items deemed most relevant in the context of acute care; thus, the latter was used to measured missed nursing care in the present study. Results of

psychometic testing by these authors has supported the inclusion of all items and the single factor structure of both the orgingial 24-item scale and adapted 15-item scale. However, in the present study one item (MC_9: "*Assessing patient each shift"*) was deleted due to unacceptable parameter estimates in the CFA, resulting in a total of 14-items being used to measure missed nursing care. Items outlined a series of nursing actions which were rated on a 5-point Likert scale ranging from 1=*never missed* to 5=*always missed.* Items were summed and averaged to produce a total scale score between 1 and 5, with higher scores representative of high frequencies of missed care. Items were modified to ask nurses to assess patient care missed by themselves rather than assess care missed by *all* nursing staff on their unit. This change was appropriate given the focus of the present study was on individual acts of omission rather than group. Furthermore, data collection and analysis were completed at the individual level, not the group level. In the present study, the Cronbach's alpha coefficient for the adapted Part A of the MISSCARE survey was .92 for all items and the trimmed scale (see Chapter 3 for a full discussion of item trimming). In addition, CFA results supported the one-factor structure of the scale.

Job satisfaction. There was a plethora of possible tools available to measure nurses' job satisfaction. In an attempt to mitigate responder fatigue, an exhaustive search was completed to find the most comprehensive, yet parsimonious measure of nurses' job satisfaction. In the end, the three-item Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale (MOAQ-JSS) (Cammann, Fichman, Jenkins, & Kelsh, 1983) was chosen. Items were rated on a 7-point Likert scale ranging from 1=*strongly disagree* to 7=*strongly agree*. Noting that one item was reverse scored, items

were summed and averaged to produce a total scale score between 1 and 7, with higher scores representative of high levels of job satisfaction. In contrast to other scales which measure different facets of job satisfaction (i.e. satisfaction with work duties, supervisor, co-workers, pay, etc.), the MOAQ-JSS measured global job satisfaction as indicated by participants responses to items which assessed the affective component of job satisfaction (Bowling & Hammond, 2008 when). According to Lu et al. (2012), a global approach to measuring job satisfaction is most appropriately chosen one is interested in the overall attitude of job satisfaction, while the facet approach is most appropriately chosen when one is interested in exploring which facet a job produces satisfaction or dissatisfaction. Nurses' overall attitude of job satisfaction was of interest in the present study; therefore, a global measure was most appropriately chosen. In the present study, the Cronbach's alpha coefficient was .90 and CFA results supported the one-factor structure of the MOAQ-JSS.

Adverse events. An instrument developed by (Sochalski, 2001) and derived from the American Nurses Association (ANA) Nursing Quality Indicators (American Nurses Association, 2000) was used to assess adverse events. Although the Nursing Quality Indictors initially identified ten indictors that reflected the structure, process, and outcomes of nursing, the list has been expanded and refined numerous times since then. Sochalski's tool was a condensed scale comprised of three items that measured nurses' perceptions of the incidence of medication errors, nosocomial infections, and patient falls with injury over the past year. This tool was selected as has been used extensively in large national studies of nurses (Aiken et al., 2001; Laschinger & Leiter, 2006; Sochalski, 2004) and reflected the definition of adverse events utilized in the present study. Items

were rated on a 4-point Likert scale ranging from 1=*never* to 4=*frequently*. Item scores were summed and averaged to produce a total scale score, with higher scores indicating a higher frequency of adverse events. The appropriateness of using nurses' perceptions to measure adverse events has been supported by those who argue nurses' position as the bedside and involvement in all of care make them well suited to assess the incidence and prevalence of adverse events (McHugh & Stimpfel, 2012).

In the present study, the Cronbach's alpha coefficient for the adverse event scale was .65. Although this value is below commonly accepted threshold of .70, it was not unexpected given the limited number of items on this scale and the relatively low inter-item correlations (range= .361-.401) (Kline, 2106). As such, a decision was made to accept the .65 value as sufficient as it was reasonably close to the .70 threshold. In addition, CFA results supported the one-factor structure of the psychological safety scale.

Nurse-assessed quality. Quality of care was assessed with a single item, "*In general, how would you describe the quality of nursing care delivered to patients on your unit on your last shift?*" and was rated on a 4-point Likert scale ranging from 1=*poor* to 4= *excellent.* This item elicited a response pertaining to nurses' assessment of the quality of care delivered on their last shift, which has been suggested to be less burdensome than eliciting a response pertaining to a general period of time (Sochalski, 2004). In addition, this item has been used repeatedly in large scale national and international studies (Aiken et al., 2002; Laschinger & Fida, 2015; Van Bogaert et al., 2013, 2009). Research has also shown that nurses' assessment of care quality can be used as a valid proxy for actual quality of care delivered to patients (McHugh & Stimpfel, 2012). Due to the single item

nature of the assessment of quality of care in the present study, a Cronbach's alpha coefficient could not be calculated and a CFA could not be completed.

Demographic variables. Information regarding participants' gender, age, experience, employment statues, specialty area, and educational preparation were collected. This information was used to provide a description of the demographic profile of the study sample. In addition, years of experience was used as control variable as previous research has found it to be significantly related to several variables in the preset study (see Chapter 2 for a full discussion).

Summary of study instruments. A summary study instruments used to measure the main study variables is presented in Table 1. All instruments were retrospective, self-report, rated on Likert scales and had been previously validated. In addition, the Cronbach's alpha coefficient and results of CFA supported reliability and validity in the context of the present study.

Value Screening

Value cleaning. *Value cleaning* refers to the process of ensuring the values entered in a dataset are within the limits of reasonable expectations (Meyers et al., 2013). It is an important precursor to data analysis as it helps minimize the errors associated with manual data entry. Value cleaning was achieved in the present study by creating and analyzing a table of minimum and maximum values for all variables. Although several errors were identified, they were easily corrected by verifying the correct response in the raw data.

Table 1
Summary of Study Instruments

Variable	Instrument	Scale Range	# of Items	*α*
Authentic Leadership	*Authentic Leadership Questionnaire* Avolio, Gardner, & Walumbwa (2007)	0-4	16	.97
Professional Identification	*Professional Identifcation Scale* Ashforth & Mael (1992)	1-5	6	.79
Voice Behaviour	*Voice Behaviour Scale* VanDyne & LePine (1998)	1-7	6	.86
Psychological Safety	*Psychological Safety Scale* Edmondson (1999)	1-5	6 *(3)*	.66 *(.66)*
Missed Nursing Care	*Adapted MISSCARE Survey (Part A)* Kalisch & Williams (2009) adapted by Caster & Dean-Baar (2014)	1-5	15 *(14)*	.92 *(.92)*
Job Satisfaction	*Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale* Canmann, Fichman, Jenkins, & Klesh, (1983)	1-7	3	.90
Adverse Events	Adverse Events Scale (Sochalski, 2001)	1-5	3	.65
Nurse-Assessed Quality	*Quality of Care Item* Sochalski (2004)	1-5	1	*

Note: *α*= Cronbach's alpha reliability coefficient; * indicates a single item measure for which a Cronbach's alpha could not be calculated; values for trimmed scales are presented in the italicized parenthesis

Multicollinearity. *Multicollinearity* refers to a condition when more than two predictor variables are highly correlated (Pallant, 2011). Extreme collinearity can occur when what appear to be separate variables are actually measuring the same thing (Kline, 2016). Multicollinearity is an issue because it can result in distorted regression coefficients and inflated standard error estimates (Meyers et al., 2013). Data were

assessed for multicollinearity using an iterative process where each predictor variable acted as an independent variable in a linear regression model. The tolerance statistic and variance inflation factor (VIF) were then inspected in each analysis. As outlined by Kline, the tolerance statistic indicates the proportion of total standardized variance that is unique, with values >.10 being acceptable and the VIF represents the ratio of the total standardized variance over the proportion of unique variance, with values <10.0 being acceptable. Based on analysis of the collinearity statistics presented in Table 2, it was determined that multicollinearity was not affecting results of the present study.

Outliers. *Outliers* refer to values that are extreme on a single or multiple variables (Meyers et al., 2013). It is important identify and analyze outliers as they can distort the data, resulting in over or underestimation of path coefficients (Pallant, 2011). SPSS identifies outliers as cases which are more than 1.5 inter quartile ranges (IQRs) away from the end of the boxplot (Meyers et al., 2013). Using trimmed scale scores and through examination of boxplots, it was determined that no outliers were present in the distribution of authentic leadership, psychological safety, quality, and adverse events. In contrast, missed nursing care had one outlier, professional identification had two outliers, and voice behaviour and job satisfaction had eight outliers. However, it has been noted that using the 1.5 IQR to identify outliers can mistakenly identify cases that are not truly outliers (Hoaglin & Iglewicz, 1987). Given the limitation of boxplots, the 5% trimmed mean was compared with the total scale mean for each variable identified as an outlier using boxplots: professional identification=3.97 vs 4.00; voice behaviour= 5.49 vs. 5.56; missed nursing care= 1.85 vs 1.87; job satisfaction= 5.84 vs. 5.97. These results were

quite similar, suggesting that deletion of the outlier cases would have very little influence on the overall mean (Pallant, 2011), thereby supporting the decision to retain these cases.

Table 2

Collinearity Statistics

Model	**Tolerance**	**VIF**
a. Dependent Variable: Authentic Leadership		
Professional Identification	.980	1.020
Voice Behaviour	.909	1.100
Psychology Safety	.912	1.096
Missed Care Nursing Care	.982	1.018
a. Dependent Variable: Professional Identification		
Authentic Leadership	.864	1.158
Voice Behaviour	.906	1.104
Psychology Safety	.827	1.209
Missed Care Nursing Care	.986	1.014
a. Dependent Variable: Voice Behaviour		
Authentic Leadership	.872	1.146
Professional Identification	.987	1.013
Psychology Safety	.878	1.139
Missed Care Nursing Care	.975	1.025
a. Dependent Variable: Psychology Safety		
Authentic Leadership	.952	1.050
Professional Identification	.980	1.020
Voice Behaviour	.954	1.048
Missed Care Nursing Care	.977	1.024
a. Dependent Variable: Missed Nursing Care		
Authentic Leadership	.859	1.150
Professional Identification	.991	1.009
Voice Behaviour	.900	1.112
Psychological Safety	.824	1.207

Note: Psychological safety and missed-nursing care values presented above calculated using trimmed scales

Normality. *Normality* refers to the extent to which a distribution of values reflects a bell-shape (Meyers et al., 2013). In the present study, normality was assessed using skewness and kurtosis values, visual inspection of Q-Q Plots and histograms, and Kolmogorov-Smirnov and Shapiro-Wilk tests (Table 3). Meyers et al. (2013) suggests skewness and kurtosis values close to zero suggest normally distributed data, while Kline (2016) suggests skewness values ±3 and kurtosis values less than 10 can be considered acceptable. All variables, with the exception of voice behaviour and job satisfaction, had skewness and kurtosis values less than one, indicating normal distribution. Voice behaviour and job satisfaction were positively skewed (values below the mean; -1.296 and -1.401) and leptokurtic (values clustered around the mean; 2.536 and 1.701), but were well within the threshold of ±3 for skewness and less the threshold of 10 for kurtosis, which would have indicated severe deviations from normality.

Inspection of the Q-Q Plots aligned with the results of the skewness and kurtosis values as the scores for psychological safety, missed nursing care, nurse-assessed quality, and adverse events were reasonably close to the expected values from a normal distribution, while the scores for voice behaviour and job satisfaction were not. In contrast, non-normal distribution of all study variables, with the exception of psychological safety, was suggested by visual inspection of histograms.

Results of the Kolmogorov-Smirnov and Shapiro-Wilk tests of normality further verified a non-normal distribution of all study variables. Statistically significant Kolmogorov-Smirnov and Shapiro-Wilk tests indicated univariate normality violations (Meyers et al., 2013) and suggested a statistically significant difference between the distribution of study variables and a normal distribution. However, Kline (2016) makes

note that these tests may not be helpful in large samples, because even slight departures from normality could be found to be statistically significant.

Table 3
Tests of Normality

			Kolmogorov-Smirnov		Shapiro-Wilk	
	Skewness	***Kurtosis***	***Statistic***	***p***	***Statistic***	***p***
Authentic Leadership	-.433	-.691	.080	<.001	.957	<.001
Professional Identification	-.697	1.170	.096	<.001	.957	<.001
Voice Behaviour	-1.296	2.536	.149	<.001	.912	<.001
Psychological Safety	-.171	-.377	.102	<.001	.979	.008
Missed Nursing Care	.476	-.406	.087	<.001	.968	<.001
Job Satisfaction	-1.401	1.701	.214	<.001	.837	<.001
Adverse Events	2.19	-.499	.142	<.001	.945	<.001
Nurse-Assessed Quality	-.729	-.445	.339	<.001	.726	<.001

Note: Psychological safety and missed-nursing care values presented above calculated using trimmed scales

Managing non-normal data. The breadth of techniques available to assess normality and the variability in the interpretation of their outputs contributes to questions around the most appropriate way to handle non-normal data. Despite these difficulties, it is important to address violations of normality, as failure to do so can result in an overestimation of the chi-squared statistic and an underestimation of standard errors of parameter estimates (Meyers et al., 2013).

Data transformations are frequently used when dealing with non-normal data. This technique uses multiple formulas to mathematically modify the scores in a dataset to new scores which may be more normally distributed (Pallant, 2011). It is often suggested as a way to force non-normal data to conform to a normal distribution; however, a decision was made not to transform data in the present study as it was expected that items that elicited responses regarding some work attitudes (i.e. quality of care) and behaviours

(i.e. missed nursing care) would be non-normal. Transforming inherently non-normal variables to force a normal distribution it not advised as it alters the data in a way that results in the target variable no longer being studied (Kline, 2016); therefore, the estimation techniques available in Mplus were examined for use with non-normal data.

Mplus contains several estimation techniques that can be used with non-normal data. ML is the default estimation technique in Mplus; however, appropriate use of this technique is dependent on the use of normal or slightly non-normal data (Kelloway, 2015). Given the extent of non-normality was difficult to determine, other estimation techniques were also considered.

An alternative option to ML is the use of MLM. This technique is robust to non-normality, but cannot handle missing data (Kelloway, 2015). As the dataset in the present study contained missing data, MLM was not used. MLR is an extension of MLM that is robust to non-normality and can handle missing data (Muthen & Muthen, 2017b). In order to determine the extent to which non-normality was affecting model results, each CFA was run using ML and MLR estimation, and results were compared. Kelloway (2015) suggests that if there was little difference in the fit statistics generated by ML and MLR, it could be concluded no violation of multivariate normality was present. However, it is important to note that the chi-square statistic could not be directly compared using ML and MLR estimation, but rather the MLR scaled chi-square statistic (χ^2_{MLR}) was computed for MLR estimation. This statistic is calculated by dividing the unscaled model chi-square (χ^2_{M}) by the scaling correction (*c*) (Kline, 2016). Analysis of Table 4 revealed improved RMSEA with corresponding confidence interval, and improved CFI for all variables, suggesting data in the present study violated the assumption of multivariate

normality required for use of ML estimation; therefore, MLR estimation was used to run all subsequent analyses.

Table 4
Comparison of Initial Fit Indices Using ML and MLR Estimation

	$\chi^2_M(df)$	*RMSEA*	*90% CI*	*SRMR*	*CFI*
ML Estimation					
Authentic Leadership	330.510(98)	.095	.084 and .107	.032	.945
Professional Identification	34.707(9)	.105	.069 and .143	.044	.940
Voice Behaviour	157.616(9)	.250	.217 and .285	.078	.821
Psychological Safety	20.089(9)	.069	.027 and .109	.040	.939
Missed Nursing Care	276.031(90)	.089	.077 and .101	.055	.888
Job Satisfaction	**	**	**	**	**
Adverse Events	**	**	**	**	**
Nurse-Assessed Quality	*	*	*	*	*
MLR Estimation	$\chi^2_{MLR}(df)$				
Authentic Leadership	256.527(98)	.079	.067 and .091	.032	.948
Professional Identification	27.092(9)	.088	.051 and .127	.044	.936
Voice Behaviour	81.904(9)	.175	.142 and .211	.078	.801
Psychological Safety	19.236(9)	.066	.023 and .107	.040	.934
Missed Nursing Care	211.680(90)	.072	.059 and .084	.055	.902
Job Satisfaction	**	**	**	**	**
Adverse Events	**	**	.**	**	**
Nurse-Assessed Quality	*	*	*	*	*

Note: all χ^2_M and χ^2_{MLR} values were significant at $p < .01$; * indicates a single item measure; **indicates a saturated model for which a CFA could not be completed

Missing data. *Missing data* refers to missing values in a dataset (Meyers et al., 2013). There are a variety of reasons why a dataset may contain missing data. For example, it has been suggested that unclear or ambiguous questions, intentional nonresponse, and errors in data entry can result in missing values (Kline, 2016). When

analyzing missing data, it is especially important to consider the proportion and mechanisms of missing data.

Proportion of missing data. There is a lack of consensus as to what proportion of missing data is considered acceptable. Dong and Peng (2013) outline some scholar's suggestions that 5% is negligible, while others are more lenient suggesting up to 10% is acceptable. Using the more conservative estimate, missing data was below 5% for most items with the exception of one item on the ALQ (6.8% missing), 7 items on the missed care survey (5.3% - 7.6% missing), and one item on the adverse event tool (6.8% missing).

In addition to analyzing variables for missing data, each case was screened for item-level and construct-level missingness. Item-level missingness occurs when a respondent leaves one or more items blank on a multi-item scale, while construct-level missingness occurs when a respondent fails to answer any items on a scale (Newman, 2014). Of the 264 usable surveys, 172 represented full respondents (answered all items in the survey) and 92 represented partial respondents. Of the partial respondents, 83 cases had item-level missingness and 13 cases had construct-level missingness.

Mechanisms of missing data. In addition to the proportion of missing data, the mechanisms of missing data were also analyzed. Dong and Peng (2013) suggest that analyzing this aspect is especially important as it may have the greatest impact on results. Little's MCAR test was used to determine if the missing observations were due to chance (Little & Rubin, 2002). Professional identification, psychological safety, adverse events, and job satisfaction resulted in a non-significant Little's MCAR test ($p>.05$), suggesting data were missing completely at random. Thus, it was inferred that cases with missing

data were comparable to cases with complete data (Meyers et al., 2013) and ignoring the MCAR data would not introduce bias (Dong & Peng, 2013). However, it is also important to note that, Little's MCAR test was significant for authentic leadership (p = .001), voice behaviour (p= .012), and missed nursing care (p = .018), suggesting the data may have been MAR or MNAR. Kline (2016) suggests that when the assumption of MCAR is rejected, it is almost impossible to determine if the data loss mechanism is MAR or MCAR

Managing missing data. Pairwise deletion was used to manage missing data when computing descriptive statistics. This technique is the default method in SPSS and only excluded cases if they were missing the data required for a specific analysis (Meyers et al., 2013). Pairwise is considered more favourable compared to listwise deletion which would have excluded all cases that were missing even one piece of information (Pallant, 2011).

Full Information Maximum Likelihood (FIML) is the default method of managing missing data in Mplus (Kelloway, 2015). This technique was implemented in conjunction with MLR estimation and is considered superior to traditional methods of managing missing data such as listwise deletion, pairwise deletion, and imputation (Wang & Wang, 2020). FIML technique manages missing data by partitioning cases in the raw data file into subsets with the same pattern of missing data. Relevant statistical information (ie. means and variances), parameters, and standard errors of the hypothesized model are then hypothesized from each subset (Kline, 2016). FIML is especially useful as it can be used for cases with construct-level missingness (D. A. Newman, 2014) and variables with data MCAR, MAR, and MNAR (Muthen & Muthen, 2017b).

FIML and pairwise deletion were used as they both allow the greatest preservation of cases thereby maximizing sample size, help minimize the bias that is introduced by deleting cases with missing values, and maintain variability in the data is often lost through imputation.

Data Analysis

Data analyses were conducted using Statistical Package for Social Sciences (SPSS) version 24 (IBM Corp., 2016) and Mplus version 8 (Muthen & Muthen, 2017a). SPSS was used for data screening and to compute descriptive statistics. Mplus was used to complete CFA for each measurement model and to test the hypothesized study model using latent variable path analysis.

SEM refers to a family of multivariate analysis techniques that combine confirmatory factor (measurement) models and structural path models for single and multi-group data (Meyers et al., 2013). This technique can simultaneously estimate measurement and structural models by assessing the fit between the covariance structure of the data and the hypothesized model (Kelloway, 2015). Despite the sophisticated ability of SEM to estimate measurement and structural models in one step, a two-step process can also be used. Two-step modeling involves analyzing the measurement model before proceeding to analysis of the structural model (Kline, 2016). This technique decreases the likelihood of misspecification (i.e. including “bad” items in the model) as the validity of each item and factor structure of each tool is confirmed before analysis of the structural model occurs. Due to its benefits, a two-step SEM was used in the present study.

Measurement model. The *measurement model*, also termed the confirmatory factor model, assesses the relationships between indicator variables (measured variables) and their respective latent variables (a factor that representing an aggregate of indicator variables) (Meyers et al., 2013). CFA requires a priori specification of the number of factors in a model and requires the researcher to restrict items onto an identified factor (Kline, 2016). In the present study, authentic leadership was a latent variable with four factors (relational transparency with five items, balanced processing with four items, self-awareness with three items, internalized moral perspective with four item) which acted as indictors of authentic leadership. In contrast, professional identification, voice behaviour, psychological safety, missed care, job satisfaction, adverse events, and nurse-assessed quality were single factor structures, and therefore each item acted as indicators of their respective latent variable. It is important to note that at least three indicators are required to complete a CFA for a single factor model (Kline, 2016); therefore, because nurse-assessed quality was a single item measure, a CFA could not be completed for this tool.

Structural model. The *structural model*, also termed the path model, assesses the relationships between exogenous (variables not predicted by another variables) and endogenous variables (variables predicted by other variables) (Meyers et al., 2013). In the present study, authentic leadership and psychological safety were exogenous, while professional identification, voice behaviour, missed nursing care, job satisfaction, adverse events, and nurse- assessed quality were endogenous.

Latent variable path analysis was used to analyze the structural model. *Latent variable*s are not directly measured or observed in the process of data collection, but rather are assessed indirectly through indicator variables and ultimately created through

analysis (Meyers et al., 2013). The subscales, self-awareness, balanced processing, relational transparency, and internalized moral perspective acted as indicators of authentic leadership, whereas the items measuring professional identification, psychological safety, voice behaviour, missed nursing care, job satisfaction, adverse events, nurse-assessed quality acted as indicators of each respective variable. For the aforementioned scales, the use of total verses partial disaggregation was carefully considered.

Total disaggregation refers to the process of using items as indicators of latent variables, whereas *partial disaggregation* refers to the process of using parcels as indicators of latent variables (Kelloway, 2015). Although there are advantages to each technique, the excessive number of parameters resulting from total disaggregation (the use of items) supported the use of partial disaggregation (the use of parcels) in the present study. However, it is important to note that conditions of identification would not have been met if parcels were created for scales with less than six items; therefore total disaggregation (items) was used for scales will less than six items and partial disaggregation (parcels) was used for scales six or more times. The use of parcels in the present study was important as it helped reduce the number of parameter estimates, lowered the indicator-to-sample size ratio, and decreased the likelihood of correlated residuals and dual factor loadings (Little, Rhemtulla, Gibson, & Schoemann. Alexander, 2013).

Parceling. *Parceling* refers to the process of grouping items, then summing or averaging the scores of these items to create an individual parcel (Kline, 2016). It has been suggested that a sum can be used when all parcels are comprised of the same

number of items, whereas an average is most appropriate when the number of items going into each parcel differs (Little et al., 2013). Parcels are not defined in terms of content, therefore are not interpretable, but rather are used to represent a latent variable (Coffman & MacCallum, 2005). Although parceling can be a contentious issue (Marsh, Lüdtke, Nagengast, Morin, & Von Davier, 2013), it has been argued that using thoughtfully composed parcel provides efficient, reliable, and valid indicators of latent variables (Little, Cunningham, Shahar, & Widaman, 2002).

When determining which items to segment into specific parcels, Little and colleagues (2002, 2013) provided a thorough review of the many techniques to consider. *Random parceling* is a technique in which items are randomly assigned into parcels. In contrast, *balanced parceling* involves pairing items with the highest item-scale loadings with items that have the lowest item-scale loadings. *Correlation parceling* involves analysis of the correlated residuals and deciding to either assign the corresponding items to the same parcel or different parcels. Finally, *facet-representative parceling* involves choosing items that share secondary facet-relevant content (i.e. shared uniqueness) and grouping them in the same parcel. After careful consideration of all techniques, the balanced approached was selected for parcel construction. This technique was most appropriate as the single factor scales were unidimensional (as evident by parameter estimates > .50) (Kelloway, 2015) and it resulted in the creation of parallel parcels which ideally replicated overall factor structure in each of the parcel (Little, 2013).

Assessment of measurement and structural models. Assessing the measurement and structural models embedded in SEM was dependent on a five-stage

process of specification identification, estimation, model fit, and respecification (Kelloway, 2015)

Model specification. *Model specification* refers to clarification of the relationships which are proposed in each model (Kelloway, 2015) and is considered the "most important step" in SEM (Kline, 2016, pg. 119). It was expected that the theory driven and previously validated factor structure of each instrument would be confirmed in analysis of the measurement models. In addition, it was anticipated that the hypothesized relationships between two exogenous variables (authentic leadership and psychological safety) and five endogenous variables (professional identification, voice behaviour, missed care, job satisfaction, and outcomes of care) would be supported (see Chapter 2 for a detailed discussion of hypothesized relationship).

Model identification. *Model identification* refers to the difference between the number of data points in the analysis (knowns) and the number of parameters that need to be estimated by the model (unknowns) (Meyers et al., 2013). Model identification was required for Mplus to derive unique estimates free parameters and was indicated when the difference between knowns and unknowns, also termed degrees of freedom, was positive (Kline, 2016). In addition, identification of measurement models required at least three indictors per latent variable if the factors were uncorrelated or two indictors per latent variables if the factors were allowed to correlate (Kelloway, 2015). Meaningful analysis could only be performed when the measurement and structural models are identified.

Model estimation. *Model estimation* refers to the use of numerical methods to estimate parameters in SEM (Kelloway, 2015). ML estimation is the default estimation

technique in Mplus (Muthen & Muthen, 2017b). This technique uses repeated attempts to estimate the values of the parameters that would result in the highest likelihood, or "best-fit", of the model matching the data set (Meyers et al., 2013). It estimates all free model parameters at once, requires identified models, and is dependent on multivariate normality (Kelloway, 2015). Although use of ML with non-normal data can result in relatively accurate parameter estimates, their standard errors tend to be too low and the value of some test statistics tend to be too high (Kline, 2016). Due to questionable normality, the MLR estimator in Mplus was used in the present study.

MLR provides maximum likelihood parameter estimates with standard errors and a chi-squared statistic that is robust to non-normality (Muthen & Muthen, 2017b) and can handle a variety of missing data (Kelloway, 2015). The importance of choosing the correct estimator is highlighted by the increased incidence of Type I (i.e. rejecting the null hypothesis when it is true) and Type II error (i.e. accepting the null hypothesis when it is false) when models violating assumptions of normality are analyzed with ML (Kline, 2016).

Model fit. *Model fit* assesses how well the hypothesized model fits the data (Kenny, 2011). It is important to note that a multitude of fit statistics exist, and there are no universally agreed upon set of measures to utilize. Furthermore, fit statistics do not provide a simple yes-or-no answer to questions around model retention, but rather should be used as interpretative guidelines which are scrutinized and cautiously applied (Kline, 2016). In the present study, assessment of model fit was achieved by evaluating absolute and comparative (incremental) fit indices.

Absolute fit measures. *Absolute fit measures* were used determine how well the proposed interrelationships between study variables match observed interrelationships in the data (Meyers et al., 2013). Absolute fit was assessed using the MLR scaled chi-square statistic and associated p-values, the root-mean-square error of approximation (RMSEA) with 90% confidence intervals, and the standardized root mean square residual (SRMR).

The MLR scaled chi-square statistic (χ^2_{MLR}), also referred to as Yuan-Bentler T* test statistic (Muthen & Muthen, 2017b) or the Satorra-Bentler scaled chi-square (Kline, 2016), was calculated by diving the unscaled model chi-square (χ^2) by the scaling correction factor (*c*) (Yuan & Bentler, 2000). This statistic was interpreted in the same way as the unscaled model chi-squared statistic, with a non-significant ($p>.05$) statistic being desired and indicting no statistically significant difference between the hypothesized relationships and the observed in the data (Meyers et al., 2013). It was also important to note that correlations and sample size affect the scaled chi-square statistics in the same way it influences unscaled chi-square statistics (i.e. large correlations generally cause poorer fit and large sample sizes often supply too much power, making it highly unlikely a non-significant test statistic would be obtained) (Kelloway, 2015). Many researchers compensate for this limitation by dividing the chi-square statistic by the degrees of freedom in order to create a normed chi-square statistic. Despite the common occurrence of this practice, it is widely criticized (Muthen & Muthen, 2017), with some going as far to suggest that "because there is little statistical or logical foundation for the normed chi-square, it should have no role in global fit testing" (Kline, 2016, pg. 272). Given the opposition to the practice of generating normed chi-square statistics, the technique was not employed in the present study.

The RMSEA is a fit statistic that reflects departures from absolute fit and was based on analysis of residuals (Kelloway, 2015). Although there is debate as to what constitutes an acceptable RMSEA statistic, values equal to or less than .06 (L. T. Hu & Bentler, 1999) or .08 (Meyers et al., 2013) were deemed acceptable. In addition, while a value of zero would have indicated perfect fit, values greater than .10 could have indicated a serious specification problem (Kline, 2016). In the context of the present study, it was also important to the note that models with fewer degrees of freedom and smaller sample sizes have higher RMSEA values compared to models with the more degrees of freedom and larger sample sizes (Kenny, 2015)

The 90% confidence interval reflected significance testing based on the RMSEA (Kline, 2016). A lower bound below .05 and an upper bound below .10 was desired, and reflected the precision in the estimate of the RMSEA (Kenny, 2015). When these two values are within an acceptable range, a researcher can reject the *not-close-fit test hypothesis* (the model does not have close fit) and the *poor-fit-test hypothesis* (the model is just as bad as or worse than a poor-fitting model) (Kline, 2016). In contrast, lower and upper bounds above these desired values could indicate a larger sample is needed to obtain more precise results.

The SRMR is a “badness of fit” statistic that reflects a standardized version of the RMSEA (Kline, 2016). It was calculated by taking the square root of the mean of the squared discrepancies between the implied and observed covariance matrices (Kelloway, 2015). Values less than .08 were accepted as indicating good fit (Hu & Bentler, 1999), while values greater than .10 may have indicated poor fit. For values greater than .10, Kline suggests inspecting the correlation residuals for evidence of poor local fit.

Comparative fit measures, also termed incremental fit measures, are used to determine how well the hypothesized model fits the saturated model (assumes perfect fit) (Meyers et al., 2013). The comparative fit index (CFI) and Tucker-Lewis index (TLI) are reported in Mplus; however, Kline (2016) states that only one of these two fit statistics should be reported because their values are highly correlated. Although there is some variation in the literature as to what constitutes an appropriate cutoff, values can range from 0-1.0, with values exceeding .95 being widely accepted as establishing good fit to the data (Hu & Bentler, 1999).

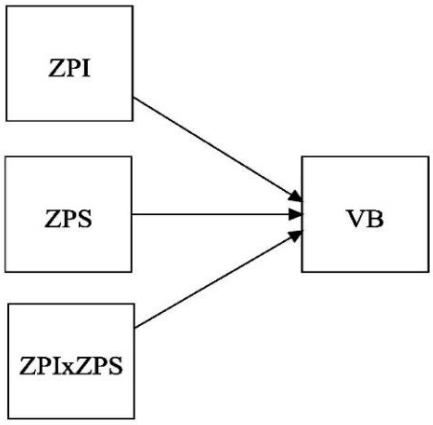
Table 5
Summary of Fit Statistics

	Desired levels	***Interpretation***
χ^2_{MLM}(df), *p*	*p* >.05	A non-significant χ^2_{MLR} indicates good model "fit"
RMSEA	<.06 or <.08	A value of 0 indicates perfect fit
90% CI	<.05 and <.10	A lower bound <.05 and upper bound <.10 reflects precision in the RMSEA value
SRMR	<.08	A value of .0 indicates perfect fit
CFI	>.95	A value of 1.0 indicates perfect fit

Respecification. It is not uncommon for researchers respecifying models in an attempt to improve fit to (Meyers et al., 2013). In the present study, respecification of the measurement models often (but not always) included deleting items with parameter estimates below .50 and/or correlating error terms. In the structural models, respecification involved deleting non-significant paths and/or using modification indices to guide the addition of new paths. Although any model can be improved by adding parameters (Kelloway, 2015), careful attention was given to ensure the addition of any new path was theoretically driven.

Testing moderation effects. *Moderation* describes effects that are causally heterogeneous (Kline, 2016). As testing for moderation using latent variable path analysis requires very large samples, the moderation model was segmented from the structural model and tested using regression analysis (Figure 3). This decreased the number of parameters in the overall structural model, thereby increasing power in both analyses. First, centered variables were calculated by subtracting the mean from each score and were used to provide more meaningful results (Muthen & Muthen, 2017b). An interaction term was then created by multiplying the centered variables (Zprofessional identification x Zpsychological safety) and was used to represent their combined effects. The centered variables and interaction term were then regressed onto voice behaviour in a hierarchical manner. Parameter estimates were analyzed for significance and would have indicated that the relationship between professional identification and voice behaviour was significantly stronger for nurses who had higher perceptions of psychological safety. Point estimates were also calculated to determine if a moderating effect was present at low (-1SD), moderate (mean), or high (+1SD) levels psychological safety.

Figure 3
Moderation Model



Note: ZPI = centered professional identification score; ZPS= centered psychological safety score; ZPI xZPS= interaction term of centered professional identification and centered psychological safety scores

Protection of Study Participants' Rights

As outlined by the *Tri-council Policy Statement* (2014), the protection of study participants' rights is required throughout the duration of any research process. Before the present study commenced, approval was obtained from the Health Science Research Ethics Board (HSREB) of Western University. In accordance with the mandate of the WUREB, the basic principles of beneficence, autonomy, and justice were assured for the duration of the study.

Beneficence is refers to act of doing good, while increasing benefits and decreasing harm for participants (Miracle, 2016). Participants were not subjected to any harm during the course of the study. In addition, no individual participant personally benefited from participation in the present study. As a collective, participants benefited by contributing to nursing knowledge and helping develop empirical links between authentic leadership, nurses work attitudes and behaviour, and outcomes of care.

Autonomy refers to the ability of persons to make their own decisions, and for researchers to respect those decisions once they are made (Miracle, 2016). This principle was upheld through the process of full and informed consent. Within the letter of information, all registrants were informed of the voluntary nature of the present study, and potential risks and benefits. Individuals right to participate, decline to participate, or withdraw from the study was fully described. In addition, it was made explicit that consent to participate was indicated by completion and return of the completed survey package. Careful consideration was taken to ensure the participation incentive (i.e. the chance to win iPad mini) was not excessive, thereby not coercive.

Justice refers to the obligation to treat people fairly and equitably (Miracle, 2016). This principle was reflected in the use of justifiable inclusion criteria, thereby ensuring no groups of nurses were unnecessarily excluded from participation in the study. In addition, the privacy and confidentiality of all participants was protected through strict adherence to data protection measures, while anonymity was protected by ensuring no identifying information was/will be disclosed.

Summary

An overview of the research methods was provided in the preceding chapter. A non-experimental, cross-sectional research design was used to gather data from 264 registered nurses, employed in direct patient care roles, in acute care hospitals, in the province of Ontario. Study data were collected using a modified version of the TDM and a mailed a self-report survey comprised of a demographic questionnaire and seven previously validated and reliable instruments. Thorough data screening suggested that although multicollinearity and outliers were not affecting the data, the presence of non-normal data distributions and missing data needed to be addressed; therefore, a thorough discussion non-normal and missing data management strategies were explored. Data analysis procedures included using SPSS to perform descriptive statistics and Mplus to perform moderation analysis, CFA, and latent variable path analysis with total and partial disaggregation using parcels. Finally, participants rights were protected though the assurance of beneficence, autonomy, and justice.

Chapter 4: Results

Results of data analyses procedures are presented in the following chapter. Descriptive statistics, including sample characteristics, main study variables, and correlation analysis are provided with comparisons to results from similar studies. Parameter estimates, model fit statistics, and any relevant respecifications are outlined for each CFA (completed for each measurement tool). The parameter and point estimates of the moderation analysis are also presented. Details pertaining to the use of latent variable path analysis to test the full structural model are provided including all path coefficients, model fit statistics, and any relevant respecifications. In addition, an alternative model is proposed and subsequently tested. Model fit, path coefficients, respecification procedures, and all direct and indirect effects are examined for the alternative model. This chapter concludes with a summary of study results.

Descriptive Statistics

Sample characteristics. The demographic profile of participants is presented in Table 6. The final study sample consisted of 264 registered nurses, working in direct patient care roles, in the province of Ontario. The average age was 44.6 years (range 24-69), while 18.7 years (range 2-47 years) was the average amount of time participants had been employed as a registered nurse and 11.9 years (range 1-42 years) was the average amount of time participants had been employed in their current role. Most participants indicated their unit manager was a nurse (87.8%) and the average nurse-to-patient ratio was 1:4 (range 1-15). Participants were primarily female (93.2%), worked full-time (79.5%), and were bachelor's degree prepared (53.4%). Medical-surgical was the most frequently indicated specialty (22.7%), followed by critical care (18.9%), other (14.4%),

emergency (12.9%), peri-operative (12.1%), material/child (7.6%), pediatrics (5.3%), mental health (2.7%), palliative care (1.9%), and geriatrics (1.5%).

Table 6
Demographic Profile of Participants

	Range	**Mean**	**SD**
Age (years)	24-69	44.6	11.3
Years as a Registered Nurse	2-47	18.7	11.3
Years in Current Role	1-42	11.9	9.0
Nurse-Patient Ratio	1-15	4	2
	N	**%**	
Unit manager is a nurse:			
Yes	230	87.8%	
No	32	12.2%	
Missing	2	.8%	
Gender:			
Female	246	93.2%	
Male	16	6.1%	
Unspecified	1	.4%	
Missing	1	.4%	
Employment status:			
Full-time	210	79.5%	
Part-time	45	17%	
Casual	9	3.4%	
Education:			
College Diploma	116	44.1%	
Bachelor's Degree	141	53.4%	
Master's Degree	6	2.3%	
Missing	1	.4%	
Specialty:			
Medical-surgical	60	22.7%	
Critical Care	50	18.9%	
Emergency	34	12.9%	
Geriatrics	4	1.5%	
Maternal/Child	20	7.6%	
Pediatrics	14	5.3%	
Mental Health	7	2.7%	
Peri-operative	32	12.1%	
Palliative Care	5	1.9%	
Other	38	14.4%	

Although the overall demographic profile of participants in the present study was similar to the demographic profile of nurses working in Ontario (CNO, 2017; Canadian Instituate for Health Information, 2019), several deviations were noted. One substantial difference was the proportion of nurses employed full-time (study sample= 79.5%; provincial average= 62.7%), part-time (study sample= 17%; provincial average= 29.3%) and casual (study sample= 3.4%; provincial average= 8%). The under representation of part-time and casually employed nurses can likely be attributed to an error on the demographic questionnaire in the first mailing of the survey package. During the initial conceptualization of the present study, the inclusion of only full-time employed nurses was considered. Although it was ultimately decided that all nurses, regardless of employment status, would be included in the study sample, the demographic questionnaire was not changed to reflect this broad inclusion; therefore, nurses employed part-time and casual were asked to return the questionnaire blank in the first mailing of the survey package. It is important to note this error was corrected in the second mailing.

In addition, just over 12% of participants reported their unit manager as not being a registered nurse. This finding may be explained by the role of unit managers evolving from head nurse positions with the sole responsibility of nursing staff and practice, to management positions that liaise with leaders at all levels of the organization and collaborate with a variety of disciplines in regard to both clinical practice and education (Wanko Keutchafo & Kerr, 2019). As such, many first-line leadership roles in Canadian hospitals include responsibility for other disciples beyond nursing (Laschinger et al., 2008), potentially resulting in unit manager positions being filled by non-nurse leaders.

Finally, lack of published data on provincial or national nurse-to-patient ratios made it difficult to make comparisons with results from the present study. Although an exhaustive search was completed, no system level data could be found which reported nurse-to-patient ratios in Ontario or Canada. However, the ratio of 1:4 reported in the present study aligned with previously published national recommendations (Berry & Curry, 2012).

Main study variables. The minimum and maximum values, means, and standard deviations for the main study variables are presented in Table 7. All minimum and maximum values fell within an expected range. Overall, participants perceived their nurse managers to have a moderate level of authentic leadership (*M*=2.46, *SD*=1.06). Relational transparency (*M*=2.56, *SD*=1.01) and internalized moral perspective (*M*=2.56, *SD*=1.09) were rated the highest, followed by balanced processing (*M*=2.43 *SD*=1.12) and self-awareness (*M*=2.24, *SD*=1.24). Nurses reported high levels of professional identification (*M*=3.98, *SD*=.67), voice behaviour (*M*=5.47, *SD*=1.03), job satisfaction (*M*=5.83, *SD*=1.22), and nurse-assessed quality (*M*=3.46, *SD*=.62); a moderate level of psychological safety (*M*=3.19, *SD*=.64) and adverse events (*M*=1.86; *SD*=.47); and low levels of missed nursing care (*M*=1.82, *SD*=.53). A comparison of these results with those from similar studies are outlined below.

Table 7

Minimum/Maximum Values, Means, and Standard Deviations of Study Variables

Variable (Scale/Subscale)	Minimum	Maximum	Mean	SD
Authentic Leadership	0	4	2.46	1.06
Relational Transparency	0	4	2.56	1.01
Moral Ethical Reasoning	0	4	2.56	1.09
Balanced Processing	0	4	2.43	1.12
Self-Awareness	0	4	2.24	1.24
Professional Identification	1	5	3.98	.67
Voice Behaviour	1	7	5.47	1.03
Psychological Safety	1	5	3.29	.84
Missed Nursing Care	1	3.43	1.87	.55
Job Satisfaction	1.67	7	5.83	1.22
Adverse Events	1	3.33	1.86	.57
Nurse-Assessed Quality	2	4	3.46	.62

Note: Psychological safety and missed-nursing care values presented above calculated using trimmed scales

Authentic leadership. Results of the ALQ found in the present study are similar to results from other studies examining staff nurses' (Bamford et al., 2013; Laschinger et al., 2013; Laschinger & Fida, 2015; K. Nelson et al., 2014; Wong & Giallonardo, 2013; Wong & Laschinger, 2013; Wong et al., 2010) and new graduate nurses' (Alkaabi & Wong, 2019; Boamah, Read, & Spence Laschinger, 2017; Dirik & Intepeler, 2017; Fallatah, Laschinger, & Read, 2017; Fallatah & Laschinger, 2016; Laschinger et al., 2013, 2015, 2012; Laschinger, Cummings, et al., 2016; Laschinger & Fida, 2014; Laschinger & Smith, 2013; Read & Laschinger, 2013, 2015) perceptions of nurse manager authentic leadership. In addition, staff nurses in the present study reported lower levels of authentic leadership compared to new graduate nurses' (< 3 years of work experience) perceptions of preceptor authentic leadership in both Canada (N= 170, M=

3.05, *SD*=.62; Giallonardo et al., 2010) and the United States (*N*= 136, *M*= 3.79, *SD*=.76; Dwyer, Hunter Revell, Sethares, and Ayotte, 2019). These results suggest that regardless of experience, staff nurses in Canada tend to rate nurse managers as having a moderate level of authentic leadership, while new graduate nurses tend to rate their preceptors as having a higher level of authentic leadership. The higher levels of authentic leadership found among preceptors may speak to the extended one-on-one relationship preceptors and preceptees share (Powers, Herron, & Pagel, 2019), allowing new nurses to develop more insight into the authenticity of preceptors.

It is also important to note that results found in the present study are significantly higher than hospital and long-term care nurses' perceptions of authentic leadership in India (*N*= 405, *M*= 1.87, *SD*= 1.12; Malik, Dhar, & Handa, 2016). Given other studies of nurse managers authentic leadership in hospitals in India have reported similar levels to those found in the present study (Malik & Dhar, 2017), it is likely that context (i.e. nursing home) rather than geography (i.e. India) contributed to the low levels found by Malik and colleagues. In addition, low levels of relational leadership have previously been reported in these settings (Havig, Skogstad, Kjekshus, & Romoren, 2011). Although a recent secondary analysis reported a moderate level of authentic leadership in among managers in long-term-care facilities in Canada (*N*=78, *M*=2.64, SD= .92; Wong, Walsh, Basacco, Mendes Domingues, & Pye, 2020), results should be cautiously generalized given the small sample size and lack of replication.

Finally, results found in the present study are lower than staff nurses perceptions of nurse manager authentic leadership in Asia (*N*= 946, *M*= 3.66, *SD*= .72; Lee, Chiang, & Kuo, 2019) (*N*= 301, *M*= 3.25, *SD*= .59; Yun & Kang, 2018). It has been argued that a

culture rooted in confucianism, which posits morality and leadership are inseparable, aligns with the authentic leadership dimension of internalized moral perspective (H. Zhang, Everett, Elkin, & Cone, 2012). This may help explain the higher levels of authentic leadership found among nurse managers in Asia and is supported by extremely high level of authentic leadership found among non-nurse leaders in Asia (Hsiung, 2012; S. G. Liang, 2017; S. Zhang, Bowers, & Mao, 2020).

Professional identification. The high levels of professional identification found in the present study are higher than the levels reported among nurses in similar studies using Mael and Ashforth's (1992) professional identification scale (N= 153, M= 3.11, SD= .79; Trybou et al., 2014); however, the lower level reported by Trybou and colleagues may be attributed to the inclusion of nursing assistants in their study sample. In addition, results in the present study are higher than those reported in studies using alternative 5-point Likert measures of professional identification (N= 236, M= 3.72, SD= .58; Apker & Fox, 2002). Although it has been suggested that Mael and Ashforth's tool is the most widely used measure of professional identification (Riketta, 2005), it has been grossly underutilized among nurses and other healthcare professionals, making it difficult to draw comparisons.

Voice behaviour. Few studies have been published using Van Dyne and LePine's (1998) 6-item scale to measure voice behaviour among nurses. The high level of voice behaviour found in the present study are similar to levels reported in other studies examining the nurses' voice behaviour in Ontario (Wong et al., 2010) and Pakistan (Islam, Ahmed, & Ali, 2019). However, these results are substantially higher than levels found among clinical care providers at a Canadian cancer care agency (nurses,

pharmacists, physicians, and others) (*N*= 147, *M*= 2.76, *SD*= 1.11; Wong & Cummings, 2009b). The lower levels of voice reported by Wong and Cumming's may be due to differing levels of voice behaviour among different healthcare professionals, especially when working in interdisciplinary teams (Morrow, Gustavson, & Jones, 2016). In addition, nurse managers' perceptions of staff nurses' voice behaviour have been reported to be lower than the levels found in the present study (*N*= 586, *M*= 2.62, *SD*= 1.00; Tangirala & Ramanujam, 2008). The variation found between staff nurses' and nurses managers' perception of speaking up may be attributed to the inherent issue of social desirability bias in self-report measures (Hollbrook, 2008), resulting in nurses consciously or unconsciously rating themselves higher on the voice behaviour items.

Psychological safety. In the present study, the moderate levels of psychological safety reported by nurses using Edmondson's (1999) scale are similar to staff nurses across a variety of units, over 4 consecutive years, in the United States (*N*= 59-86, Median= 3.5-3.35; IQR= 3.12-3.69 to 3.11-3.80; Gilmartin et al., 2018). However, these results are significantly lower than the levels of psychological safety found among Korean fourth year nursing students' in the context of clinical simulation teams (*N*= 27= *M*= 5.81, *SD*= .60 and *N*= 27, *M*= 5.33, *SD*= .63; Roh, Ahn, Kim, & Kim, 2018) and American final year medical and nursing students in the context of their clinical settings *(N*=243, *M*=4.22 *SD*=.49; Appelbaum et al., 2020). The higher levels of psychological safety found among students may speak to an increased recognition that learning environments need to be 'safe spaces' in which students are able to pose questions and inquiries (Edmondson, Higgins, Singer, & Weiner, 2016). In addition, results in the present study are slightly lower than levels of psychological safety found among

physicians in Europe (*N*= 105, *M*= 3.94, *SD*= 0.54; Scheepers, Goor, Arah, Heineman, & Lombarts, 2018) and American (*N*= 106, *M*= 3.52, *SD*= .54; Appelbaum, Dow, Mazmanian, Jundt, & Appelbaum, 2016), and health care professionals across a variety of intensive care units in the North America (N= 1440, *M*= 5.31, *SD*= 1.08; Nembhard & Edmondson, 2006), and in the field of rare diseases (*N*= 149, *M*= 5.03, *SD*= 1.06; Kessel, Kratzer, & Schultz, 2012). The higher levels of psychological safety found among physicians and interdisciplinary healthcare teams may speak to physicians' position at the top of the decision making hierarchy and feeling as though they can speak up with less fear of retribution (Nembhard & Edmondson, 2006).

Missed nursing care. There has been a proliferation of studies reporting levels of missed nursing care in the last decade. The low-moderate levels of missed care found in the present study align with results from similar research in which the adapted version of Part A of the MISSCARE scale was also used (Castner & Dean-Baar, 2014). Comparable levels have also reported among nurse leaders (Kalisch & Lee, 2012) and staff nurses (Hessels & Wurmser, 2020; Jones et al., 2015; Kalisch, Doumit, et al., 2013; Kalisch & Lee, 2012; Kalisch, Tschanen, et al., 2011; Kalisch, Tschannen, et al., 2012; Tschannen et al., 2010; Waller Dabney & Kalisch, 2015) in United States and Iceland (Bragadóttir & Kalisch, 2018; Bragadóttir, Kalisch, & Tryggvadóttir, 2017) where the full 24-item version of the scale was used. However, results found in the present study are higher than those reported by nurses in Turkey (*N*= 436, *M*= 1.40, *SD*= .41; Kalisch, Terzioglu, & Duygulu, 2012), Lebanon (*N*= 114, *M*= 1.31, *SD*= 0.35; Kalisch, Doumit, et al., 2013) and Korea (*N*= 115, *M*= 1.39, *SD*= 0.23; Cho et al., 2015). The lower level of missed nurisng care in Asia may be reflected in the increased presence of patients' family

members at the bedside and their provision of basic nurisng care. As Kalisch, Terzioglu, et al. (2012) disucss, the health care system in Asia is more conducive to family presence, with family members often reporting they complete feeding, bathing, mouth care, ambuation, and turining for their loved ones.

Job satisfaction. A wide varitety of tools have been used to measure staff nurses' job satisfaction making direct comparisons with the MOAQ-JSS are difficult. In addition, many nursing reserachers have condensed the original seven-point MOAQ-JSS to a five-point scale (Aloisio et al., 2019; Berta et al., 2018; Boamah et al., 2017; Gillet et al., 2018; Laschinger, Cummings, et al., 2016; Laschinger & Fida, 2015; Laschinger, Zhu, et al., 2016), further complicating comparisons. After an exhaustive search, no nurisng research could be found which used the 7-point MOAQ-JSS; however, the high levels of job satisfaction found in the present study are compariable to the high levels reported by those using the MOAQ-JSS five-point measure.

Adverse events. Although Sochalski (2001) did not report the overall mean of adverse events in their seminal study, the moderate levels of adverse events found in the present study are similar to the moderate levels they found in units with excellent-to-good quality of care. It is interesting to note that Wong and Giallonardo (2013) found slightly higher levels of adverse events (N= 280; M= 2.03, SD= .66) using an expanded version of Sochalski's measure which included an additional item assessing complaints from family members and patients. Furthermore, Laschinger (2014) found slightly higher levels of adverse events (N= 336; M= 1.98, SD= .68) using the same measure, but with the addition of an item that assessed work-related injuries. The use of these additional

items may explain the higher levels reported among nurses in Ontario in these latter studies.

Nurse-assessed quality. The high levels of nurse-assessed quality found in the present study are similar to results reported in similar studies of registered nurses in Canada (Boamah et al., 2017; Laschinger, 2008, 2014; Laschinger & Fida, 2015; Laschinger, Zhu, et al., 2016; Purdy et al., 2010; Wong et al., 2010) but higher than levels reported among nurses in Belgium (N=1201, M= 2.90, SD= .48; Van Bogaert et al., 2013) using Sochalski's (2001) single item measure. However, it is important to note there are countless conceptualizations of patient care quality and metrics used to infer quality of care (Hanefeld, Powell-Jackson, & Balabanova, 2017); therefore, blanket comparisons could not be made across studies using different instruments.

Correlation analysis. *Correlation analysis* estimates the degree of linear association between two variables (Kline, 2016). The strength of relationships can vary from -1.0 to +1.0, with correlation coefficient values (r) larger than .50 considered large, between .50 and .30 considered moderate, and less than .30 considered small (Meyers et al., 2013). Several significant linear relationships were found between demographic variables and main study variables and are presented in Table 8.

Table 8

Correlation Matrix for Demographic Variables and Main Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Yrs as a Registered Nurse	-														
2. Yrs in Current Role	.63**	-													
3. Nurse-Patient Ratio	.02	.08	-												
4. Authentic Leadership	-.03	-.11	.16*	-											
5. Relational Transparency	-.02	-.10	.17**	.95**	-										
6. Moral Ethical Reasoning	.01	-.09	.13*	.95**	.86**	-									
7. Balanced Processing	-.05	-.10	.11	.91**	.85**	.85**	-								
8. Self-Awareness	-.06	-.13*	.18**	.95**	.85**	.89**	.86**	-							
9. Professional Identification	.09	.07	.03	.04	.03	.05	.06	.04	-						
10. Voice Behaviour	.13*	.07	.08	.20**	.18**	.18**	.17**	.20**	.11	-					
11. Psychological Safety	.01	.05	-.01	.35**	.35**	.35**	.36**	.30**	.03	.29**	-				
12. Missed Nursing Care	-.16*	-.05	.20**	-.117	-.09	-.12*	-.10	-.09	-.11	-.05	-.08	-			
13. Nurse-Assessed Quality	.11	.08	-.15*	.18**	.20**	.17**	.21**	.15*	.03	.09	.27**	-.39**	-		
14. Adverse Events	-.03	.04	.11	-.02	-.03	-.03	.01	.01	-.03	-.02	-.08	.38**	-.36**	-	
15. Job Satisfaction	.02	-.07	-.01	.42*	.38**	.42**	.42**	.39**	.15*	.25**	.40**	-.32**	.39**	-.28**	-

Note: ** p< 0.01; * p<.05; psychological safety and missed-nursing care values presented above calculated using trimmed scales; correlation matrix with untrimmed scales presented in Appendix D

Demographic variables. Years of experience as a registered nurse, which is used as a control variable in the present study, demonstrated a strong significant relationship with years of experience in current role (r=.63, p<.01). Not surprisingly, this result indicates that as years of nurses' experience increased, so did the years of experience in their current role and is supported by previous research reporting a high proportion of new nurses intending quit their jobs (Lavoie-Tremblay, Paquet, Marchionni, & Drevniok, 2011). In addition, years of experience as a registered nurse was weakly, albeit significantly, positively related with voice behaviour (r=.13, p<.05), and negatively related with missed nursing care (r=-.15, p<.05). This suggests that as years of experience increased, the propensity for nurses to speak up also increased, while the incidents of missed care decreased. These findings are supported by other researchers who also found positive relationships between nurses' tenure and voice behaviour (Tangirala & Ramanujam, 2008), and a negative relationship between nurses' tenure and missed nursing care (Castner, Wu, & Dean-Baar, 2015; Kalisch, Tschannen, et al., 2011; Tschannen et al., 2010).

Nurse-to-patient ratio was significantly related to a host of study variables. A weak, albeit significant positive relationship was found between nurse-to-patient ratio, authentic leadership (r= .16, p< .05) and several sub dimensions of the concept. Although these results do not align with findings from other studies reporting an inverse relationship between authentic leadership and short-staffing (Boamah et al., 2017; Laschinger & Fida, 2015), they may be explained by a nuanced difference in nurse-to-patient ratio and perceptions of adequate staffing (Clarke & Donaldson, 2008). In addition, nurse-to-patient ratio was significantly positively related to missed nurse care

(r= .20, p< .01), suggesting that as nurse-to-patient ratio increased, so did the incidents of missed nursing care. Although Kalisch and colleageues (2013) found nurse-to-patient-ratio had no significant effect on missed nursing care (p>.05), most recently Cho and colleagues (2020) found poorer staffing was associated with a greater number of missed care activities. Similarly, significant correlations have been reported between missed nursing care and other metrics such as hours per patient per day (Kalisch, Tschannen, et al., 2012), registered nurse hours per patient per day (Kalisch, Tschannen, et al., 2011), and adequacy of staffing (Bragadóttir et al., 2017). Finally, nurse-to-patient ratio was found to be significantly negatively related to nurse-assessed quality (r= -.15, p< .05). These results are similar to those found in studies reporting an inverse relationship between inadequate staffing and quality (S. H. Cho et al., 2020; Gillet et al., 2018; Laschinger & Fida, 2015) and suggest that as the nurse-to-patient ratio increased, missed nursing care increased while nurse-assessed quality decreased.

Main study variables. When analyzing main study variables, authentic leadership was significantly positively related to voice behaviour (r=.20 p<.01), psychological safety (r=.38, p<.01), job satisfaction (r=.42, p<.01), and nurse-assessed quality (r=.18, p<.01), but no other study variables (p> .05). Professional identification demonstrated a weak, significant inverse relationship with job satisfaction only (r=-.15, p<.05) suggesting that as nurses' levels of professional identification increased, their job satisfaction decreased. It is important to note that this finding was unexpected and does not align with current perspectives on professional identification; however, it may be explained by issues in the measurement of the concept or by nurses' daily work failing to meet the expectations of those who possess high levels of professional identification.

Voice behaviour demonstrated a strong significant positive relationship with psychological safety (r=.52, p<.01), and a weak significant positive relationship with job satisfaction (r=.25, p<.01). Psychological safety demonstrated a weak significant relationship with missed nursing (r=-.14, p<.05) and a moderate positive relationship with job satisfaction (r=.46, p<.05). Missed nursing demonstrated a moderate significant negative relationship with job satisfaction (r=-.32, p<.01) and quality (r=-.39, p<.01), and a moderate significant positive relationship with adverse events (r=.38, p<.01). Job satisfaction was significantly related to all study variables (p<.01 or p<.05), but not the control variable of years of experience (p>.05). Finally, adverse events demonstrated a moderate significant negative relationship with nurse-assessed quality (r=-.36, p<.01). A full discussion of these relationships in the context of the structural models can be found in Chapter 5.

Confirmatory Factor Analysis

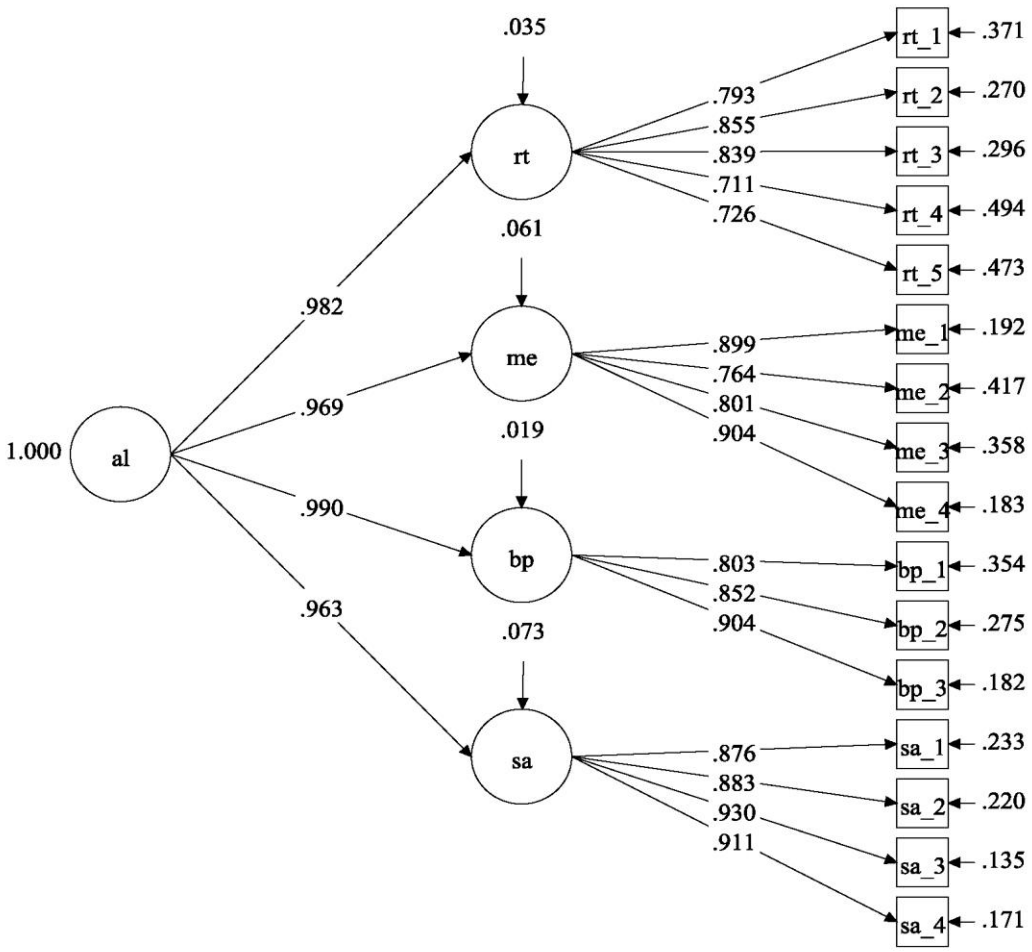
Confirmatory factor analysis was used to confirm the validity of each item and the factor structure of all instruments used in the present study. Each item was specified to load on a specific factor to determine if the hypothesized measurement model fit the data. In contrast to EFAs, CFAs were most appropriate as the purpose was to confirm the existing theory driven factor structure of each tool (Matsunaga, 2010). Significant parameter estimates equal to and above .50 were considered acceptable (Kline, 2016), while values below this range were carefully scrutinized for retention. In addition, the MLR scaled chi-square statistic with corresponding p-value, RMSEA and associated 90% CI, SRMR, and CFI were used to interpret the fit. When parameter estimates fell below .50 or inadequate fit was achieved, each measurement model was respecified based on

theoretical justification and modification indicates. Working iterations of measurement models can be found in Appendix E.

Authentic leadership. A second-order CFA was completed for the ALQ (Figure 4). The ALQ is a four-factor model with five items loading on factor one (relational transparency; items 1-5), four items loading on factor two (moral/ethical reasoning; items 6-9), three items loading on factor three (balanced processing; 10-12), and four items loading on factor four (self-awareness; items 13-16). It was expected that Avolio et al.'s (2004) theory driven four-factor structure of the ALQ would be confirmed in the present study. All parameter estimates were significant and well above the minimum threshold of .50 (variance extracted), providing good evidence of convergent validity and supporting the four-factor structure of the ALQ. In addition, the second order CFA achieved adequate fit [$\chi^2_{MLR}(100)= 255.714$, $p<0.001$, RMSEA=.077, CI= .066 and .089, SRMR= .033, CFI= .949].

For completeness, it can be noted that the modification indices suggested correlating the error terms of several items within the same factor (BP_1 with BP_3 and SA_2 with SA_3) and several items across factors (BP_1 with MA_4 and BP_3 with RT_2); however, theoretical justification could only be provided for correlating error terms within the same factor. The result of correlating BP_1 with BP_3 and SA_2 with SA_3 would have been a marginal improvement in fit [$\chi^2_{MLR}(98)= 230.175$, $p<0.01$, RMSEA= .072, 90% CI= .060 and .084, SRMR= .032, CFI= .957]. Given that the purpose the CFAs in the present study was to confirm the validity of each item, and because the initial model achieved adequate fit, the initial model was retained.

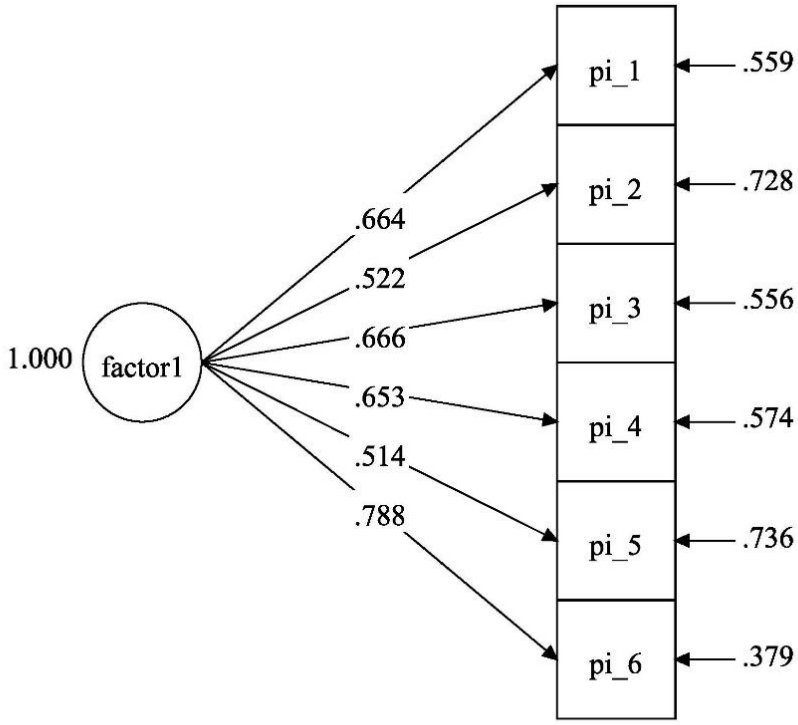
Figure 4
Confirmatory Factor Analysis of the Authentic Leadership Questionnaire



Note: All parameter estimates are significant at p <.001

Professional identification. A first-order CFA was completed for the professional identification scale (Figure 5). The single factor structure of the professional identification scale was supported by the parameter estimates of all items being significant and above the minimum threshold of .50; however, poor model fit was achieved [$\chi^2_{MLR}(9)$= 27.091, p<0.001, RMSEA= .088, 90% CI= .051 and .127, SRMR= .044, CFI= .936]. Respecification was not possible as Mplus only provides modification indices that have a minimum value of 10.00 and any potential change would have resulted in only negligible improvements (i.e. an improvement of < 10.00).

Figure 5
Confirmatory Factor Analysis of the Professional Identification Scale



Note: all parameter estimates are significant at $p < .001$

Given the relatively poor fit of the professional identification scale, an EFA was completed to further examine the factor structure. As outlined in Chapter 2, EFAs are unrestricted measurement models which can be used to identify the underlying factor structure of a measurement scale (Kline, 2016). Completion of an EFA was appropriate as it was believed that the poor fit of the single factor CFA may have been due to misspecification in the number of factors.

Syntax was entered into Mplus to compare a one and two factor model of the professional identification scale (note: a three-factor structure could not be analyzed because the result was a saturated model with zero degrees of freedom). Analysis of model fit suggested the one-factor structure (presented above) demonstrated superior fit

when compared to the two-factor structure [$\chi^2_{MLR}(4)= 18.835$, $p<0.001$, RMSEA= .119, 90% CI= .069 and .176, SRMR= .023, CFI= .947]. Furthermore, analysis of the factor loadings revealed only one item (PI_6) loaded significantly on the second factor (Table 9), resulting in the two-factor model failing to meet the conditions for identification. It was also noted that PI_2 and PI_3 did not load significantly on either factor, which would have resulted in these items being deleted from subsequent analysis. Given the superior fit demonstrated by the one-factor model, and failure of the two-factor model to meet the conditions of identification, the one-factor model was retained.

Table 9
Factor Loadings of the Professional Identification Scale

	Factor 1	***Factor 2***
Item 1: When someone praises the profession of nursing it feels like a personal compliment	.724*	-.011
Item 2: When someone criticizes the profession of nursing it feels like a personal insult	.279	.355
Item 3: I am very interested in what others think about the profession of nursing	.412	.359
Item 4: When I talk about the procession of nursing I usually say "we" rather than "they"	.702*	-.001
Item 5: The profession of nursing successes are my successes	-.002	.747*
Item 6: If a story in the media criticized the profession of nursing I would feel embarrassed	.617*	.256

Note: Estimation method= maximum likelihood with robust estimators; Type of rotation= oblique; * p <.05

Parceling. Using the balancing approach outlined by Little and colleagues (2013), parameter estimates from first-order CFA were used inform parceling decisions. Parcel 1 was created by pairing the item with the highest estimate (PI_5) with the item that had the

lowest (PI_6), parcel 2 paired the next highest (PI_3) and the next lowest (PI_2), and parcel 3 paired the third highest (PI_1) and third lowest (PI_4). In summary, parcel 1 was comprised of items PI_5 (β = .514) and PI_6 (β = .788), parcel 2 was comprised of items PI_2 (β = .522) and PI_3 (β = .666), and parcel 3 was comprised of items PI_1 (β = .664) and PI_4 (β = .653). The scores of the aforementioned pairing of items were then summed and averaged to create three indicators that were used to test the structural model.

Voice behaviour. A first-order CFA was completed for the voice behaviour scale (Appendix E). The single factor structure of the voice behaviour scale was supported by parameter estimates being significant and above the minimum threshold of .50; however, adequate fit was not achieved [$\chi^2_{MLR}(9)$= 81.906, p= <0.001, RMSEA=.175, 90% CI=.142 and .211, SRMR=.078, CFI= .801].

In the second iteration (Appendix E), the model was respecified to correlate the error terms of VB_1 (*"I develop and make recommendations to my supervisor concerning issues that affect my work"*) and VB_2 (*"I speak up and encourage others in my work unit to get involved in issues that affect our work"*). This change was based on modification indices and theoretical justification derived from ambiguity in the suffix "...*issues that affect our work."* For example, issues that affect nurses' work are often related to patient care or their work environments. Nurses may be more likely to speak up when work related issue directly affect patient care, while in contrast, may be less likely to engage in voice when they are faced with issues that affect their work environments. Although correlating the error terms of VB_1 and VB_2 resulted in parameter estimates

above .50 and improved fit, adequate fit was still not achieved [$\chi^2_{MLR}(8)= 33.322$, $p= <0.001$, RMSEA=.109, 90% CI=.73 and .149, SRMR=.039, CFI= .931].

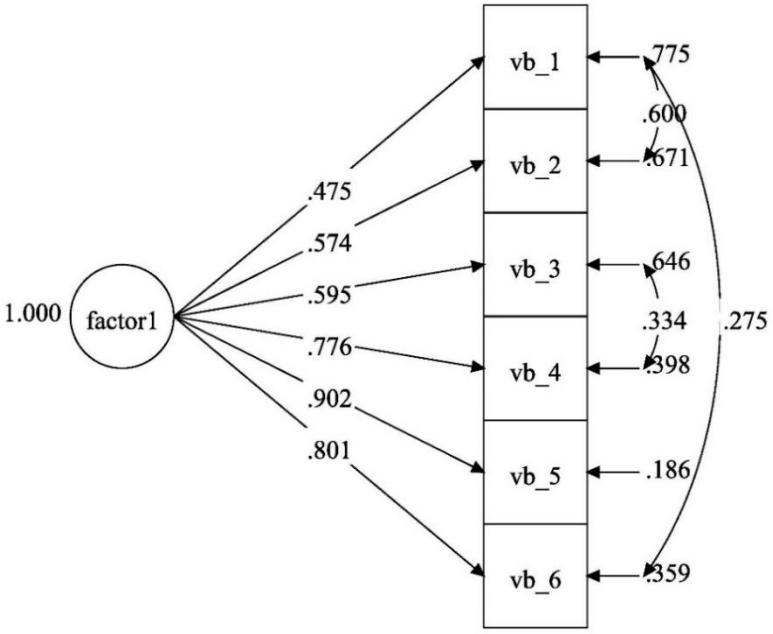
Based on modification indices and theoretical justification drawn from the contextual similarity of VB_1 (see above) and VB_6 (*"I speak up to my supervisor with ideas for new projects or changes in procedures at work"*), the error terms of these two items were correlated in the third iteration of the model (Appendix E). Although this change resulted improved fit, adequate fit was still not achieved [$\chi^2_{MLR}(7)= 25.077$, $p= <0.001$, RMSEA=.099, 90% CI=.059 and .142, SRMR=.039, CFI= .951]. In addition, while most parameter estimates were significant and above the threshold of .50, VB_1 fell below this value (β=.489, p<.001). Recognizing that standardized parameter estimates reflect the proportion of variance explained by an item (Kline, 2016), and given that VB_1 was relatively close to .50, a decision was made to retain this item. Further support was derived from Meyers et al. (2013) who poised meaningful significance can be derived from parameter estimates as low as .3.

In the fourth, and final iteration, the error terms of VB_3 (*"I communicate my opinions about work issues to others in my work unit, even if their opinions are different and they disagree with me"*) and VB_4 (*"I keep well informed about issues at work where my opinions can be useful"*) were correlated (Figure 6). This was based on modification indices and theoretical justification derived from both items speaking to *"opinions.*" Although VB_1 still failed to the minimum threshold of .50 after the error terms of VB_3 and VB_4 were correlated (β=.475, p<.001), acceptable fit was achieved [$\chi^2_{MLR}(6)= 10.153$, $p= <0.001$, RMSEA=.051, 90% CI=.000 and .104, SRMR=.028,

CFI= .989]. As discussed above, the decision was made to retain this item in the model at the parameter estimate was reasonably close to the .50 threshold.

Figure 6

Confirmatory Factor Analysis of the Voice Behaviour Scale: Final Iteration



Note: all parameter estimates are significant at $p < .001$

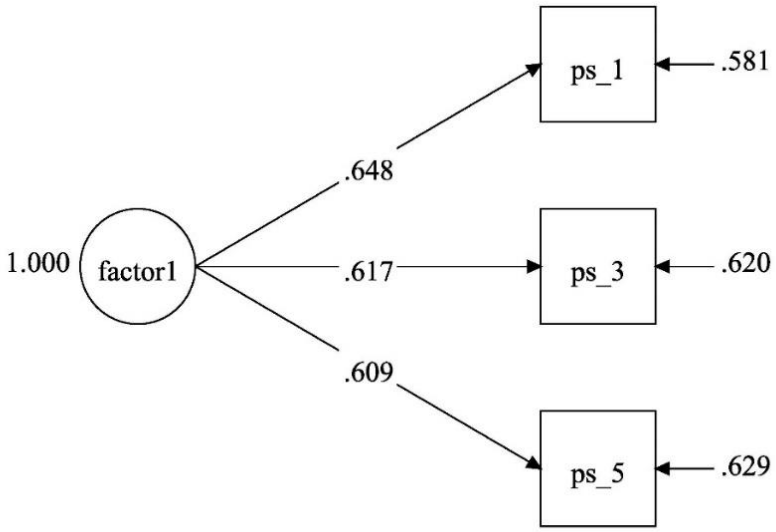
Parceling. Using the balancing approach outlined by Little and colleagues (2013), parameter estimates produced from the fourth iteration of the CFA were used to create three parcels for the voice behaviour scale. Parcel 1 was created by pairing the item with the highest estimate (VB_5) with the item that had the lowest (VB_1), parcel 2 paired the next highest (VB_6) and the next lowest (VB_2), and parcel 3 paired the third highest (VB_4) and third lowest (VB_3). Items in each parcel were summed and averaged to create three subscales that were used to test the structural model. In summary, parcel 1 was comprised of items VB_5 (β = .902) and VB_1 (β = .475), parcel 2 was comprised of items VB_2 (β = .574) and VB_6 (β = .801), and parcel 3 was comprised of items PI_3 (β

= .595) and PI_4 (β = .776). The scores of the aforementioned pairing of items were then summed and averaged to create three indicators that were used to test the structural model.

Psychological safety. A first-order CFA was completed for the psychology safety scale (Appendix E). Surprisingly, all negatively worded items had parameter estimates above .50 and all positively worded items fell below the .50 threshold. Although the inclusion of both positively and negatively worded items serves to decrease the likelihood of responder bias (i.e. acquiescence bias), they can also result in participants misinterpreting the positive or negative position of each item (Lavrakas, 2008). Given the first item in the psychological safety scale was negatively worded, and participants seemed to answer all questions from a negative position, it seems likely that the positively worded items were misinterpreted. In addition, although the absolute fit statistics were acceptable [$\chi^2_{MLR}(9)= 19.237$, $p= .023$, RMSEA=.066, 90% CI= .023 and .107, SRMR=.040], the comparative fit statistic was not (CFI= .934). Based on the low parameter estimates of all positively worded items (PS_2, PS_4, and PS_6) and the questionable fit, the aforementioned items were deleted and the model was rerun.

Deletion of the positively worded items resulted in significant parameter estimates above .50 in the second (final) iteration of the model (Figure 7); however, it also resulted in a saturated model with zero degrees of freedom. As discussed in Chapter 3, meaningful analysis can only occur when a model is identified with positive degrees of freedom, and as such, fit statistics could not be calculated and model fit could not be reassessed.

Figure 7
Confirmatory Factor Analysis of the Psychological Safety Scale (Final Iteration)



Note: all parameter estimates are significant at p <.001

Missed nursing care. A first-order CFA was completed for the adapted Part A of the MISSCARE survey (Appendix E). With the exception of on item (MC_9: *"Assessing patient each shift"*), all items had significant parameter estimates above the minimum threshold of .50 In addition, although the absolute fit statistics were acceptable, the comparative fit statistic failed to reach an acceptable level [$\chi^2_{MLR}(90)= 211.675$, $p=$ <0.001, RMSEA=.072, 90% CI= .059 and .084; SRMR=.055, CFI= .902]. In an attempt to create the most parsimonious instrument and given the unacceptable parameter estimate, MC_9 was deleted in the second iteration of the model (Appendix E). This resulted in all estimates above the minimum threshold of .50; however, acceptable comparative fit was still not achieved [$\chi^2_{MLR}(90)= 211.675$, $p=$ <0.001, RMSEA=.070, 90% CI= .056 and .083, SRMR=.052, CFI= .916]. Inspection of modification indices suggested correlating the error terms of MC_2 (*"Assessing vital signs as ordered")* and

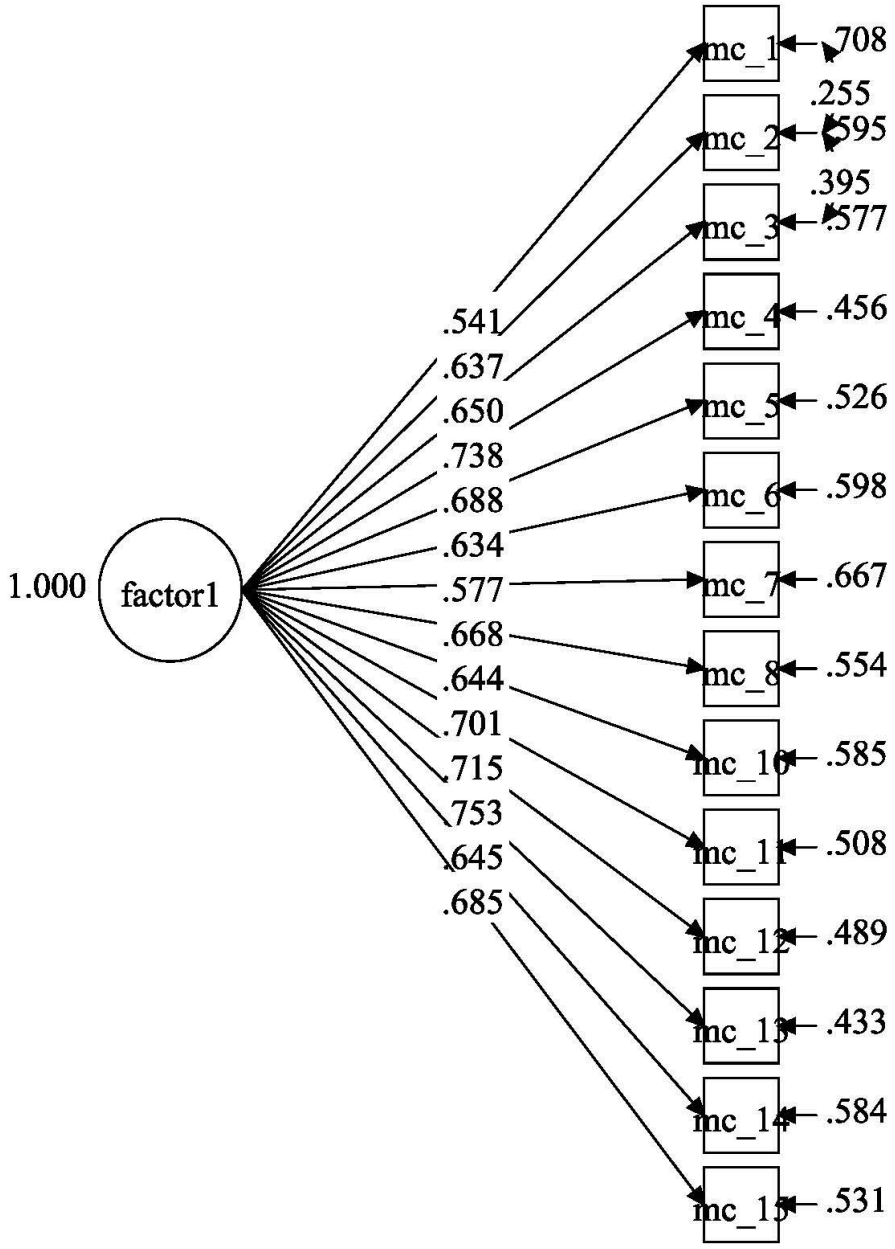
MC_3 ("*Monitoring input/output"*) in the third iteration of the model (Appendix E). This change resulted in parameter estimates above .50 and improved, albeit still unacceptable comparative fit [$\chi^2_{MLR}(76)= 141.459$, $p= <0.001$, RMSEA=.057, 90% CI= .042 and .072, SRMR=.052, CFI= .944]. Further inspection of modification indices suggested correlating the error terms of MC_1 (*"Administering medications within 30 minutes before or after scheduled time"*) and MC_2 (see above) in the fourth iteration of the model (Figure 8). The resulted in parameter estimates above .50 and acceptable model fit [$\chi^2_{MLR}(75)= 127.239$, $p= <0.001$, RMSEA=.051, 90% CI= .036 and .067, SRMR=.045, CFI= .955]. Correlating the error terms of the aforementioned items was justified as the scale was a single factor tool.

Parceling. Using the balancing approach outlined by Little and colleagues (2013), parameter estimates produced from the fourth iteration of the CFA were used to create three parcels for the adapted Part A of the MISSCARE survey. Parcel 1 was created by pairing the item with the highest item-scale correlation (MC_13) with the item that had the lowest (MC_1), parcel 2 paired the next highest (MC_4) and the next lowest (MC_7), and parcel 3 paired the third highest (MC_12) and third lowest (MC_6). The fourth highest (MC_11) and lowest (MC_2) were then placed in parcel 1, the fifth highest (MC_5) and lowest (MC_10) were then placed in parcel 2, and the sixth highest (MC_15) and the lowest (MC_14) were placed in parcel 3. The final two items (MC_8 and MC_3) were the seventh highest and lowest item-scale correlation respectively, and as such were placed in parcel 3. In summary, parcel 1 was comprised of items MC_1 (β = .541), MC_2 (β = .637), MC_3 (β = .650), MC_8 (β = .668), MC_11 (β = .708) and MC_13 (β = .753). Parcel 2 was comprised of items MC_4 (β = .738), MC_5 (β = .668), MC_7 (β = .577)

and MC_10 (β = .644). Finally, parcel 3 was comprised of items MC_6 (β = .634), MC_12 (β = .715), MC_14 ((β = .645) and MC_15 (β = .685). The scores of the aforementioned pairing of items were then summed and averaged to create three indicators that were used to test the structural model.

Figure 8

Confirmatory Factor Analysis of the Adapted Part A of the MISSCARE (Final Iteration)

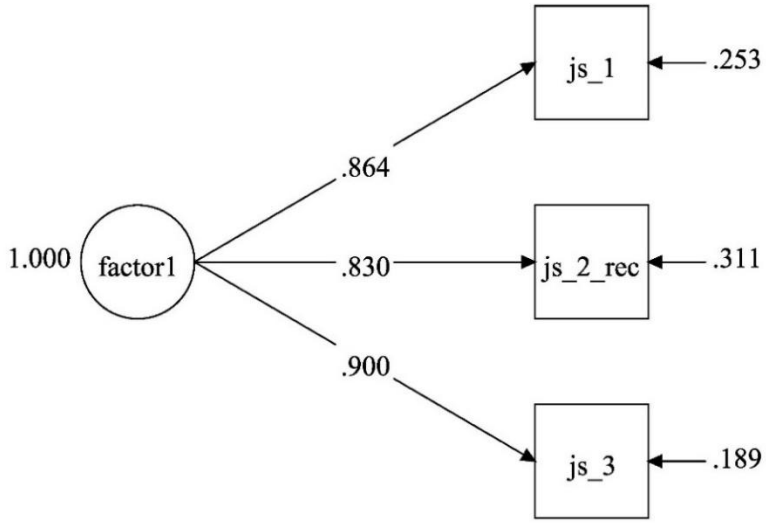


Note: all parameter estimates are significant at p <.001

Adverse events and job satisfaction. First order CFAs were run the MOAQ-JSS (Figure 9) and the adverse events scale (Figure 10) and. All items had significant parameter estimates above the desired threshold of .50; however, both of these models were saturated with zero degrees of freedom. As discussed above, fit statistics could not be computed for these saturated models.

Figure 9

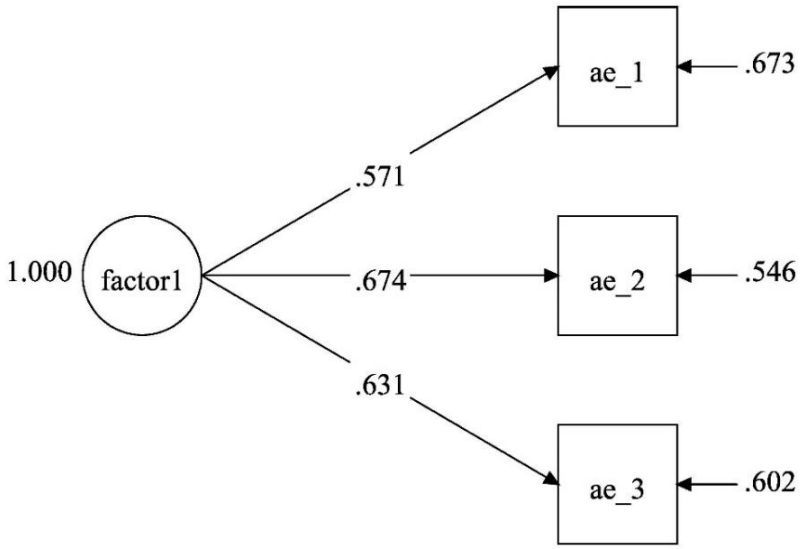
Confirmatory Factor Analysis of the Adverse Events Scale



Note: all parameter estimates are significant at p <.001

Figure 10

Confirmatory Factor Analysis of the Job Satisfaction Scale



Note: all parameter estimates are significant at p <.001

Summary of measurement models. Seven measurement models were tested in the present study. A second order CFA was completed for the ALQ, while first order CFAs were completed for the remaining scales. With the exception of one item on the voice behaviour scale (VB_1: *"I develop and make recommendations to my supervisor concerning issues that affect my work*), all items with parameter estimates below .50 were deleted (PS_2: *"Members of your unity are able to bring up problems and tough issues"*, PS_4: *"It is safe to take rusks on your unit"*, PS_6: *"No one on your unit would deliberately act in a way to undermine your efforts"*, MC_9: *"Assessing patient each shift"*). Justification was provided to support the retention of VB_1 as the parameter estimate was reasonably close to .50. Parameter estimates from the final iteration of each CFA were used to inform parceling decisions.

As recommended by Kline (2016), three absolute fit and one comparative fit statistics were used to assess model fit: the MLR scaled chi-square statistic with corresponding p-value, the RMSEA with the associated 90% CI, the SRMR, and the CFI. When adequate fit was not achieved, respecification occurred based on modification indices and theoretical justification. With the exception of professional identification, final iterations demonstrated acceptable fit (see Table 10 for a summary). Although an EFA was completed to determine if respecification in the number of factors was the cause of poor fit in the professional identification scale, result were inconclusive. In addition, CFA could not be completed for psychological safety scale (after trimming occurred), MOAQ-JSS, adverse events or quality of nursing care scales as these models were saturated.

Table 10
Summary of Measurement Model Fit Indices (Final Iterations)

	χ^2_{MLR}	*p*	df	RMSEA	90% CI	SRMR	CFI
AL	255.714	<.001	100	.077	.066 and .089	.033	.949
PI	27.091	<.001	9	.088	.051 and .127	.044	.936
VB	10.153	<.001	6	.051	.000 and .104	.028	.989
PS	**	**	**	**	**	**	**
MC	127.239	<.001	75	.051	.036 and .067	.045	.955
JS	**	**	**	**	**	**	**
AE	**	**	**	**	**	**	**
Qual	*	*	*	*	*	*	*

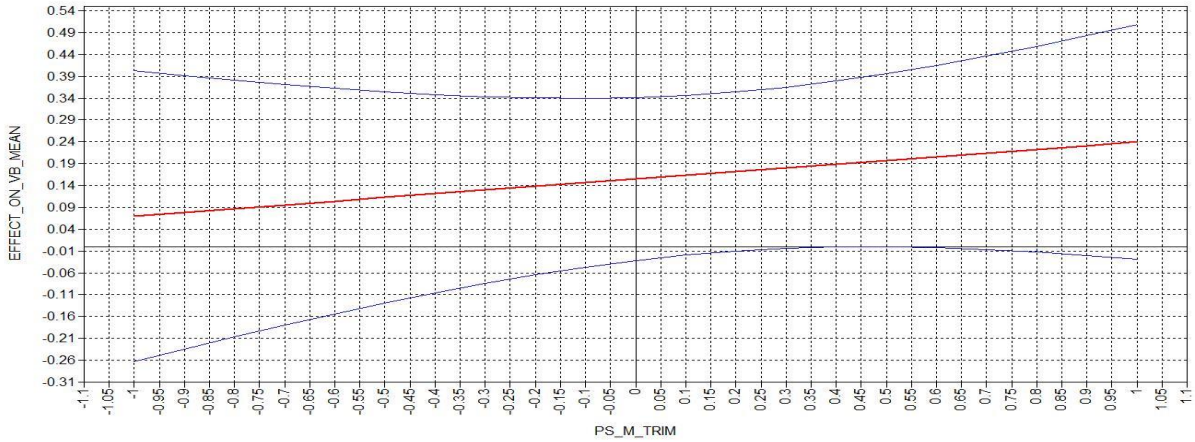
Note: AL=authentic leadership; PI= professional identification; VB= voice behaviour; PS= psychological safety; MC= missed nursing care; JS= job satisfaction; AE= adverse events; Qual= quality; * indicates a single item measure; **indicates a saturated model in which CFA could not be completed

Analysis of the Structural Models

Testing for moderation. It was hypothesized that psychological safety moderated the relationship between professional identification and voice behaviour. The following sequential steps were used to test for moderation: (1) professional identification and psychological safety were centered on their means; (2) an interaction term was created by multiplying the mean scale scores of professional identification and psychological safety and; (3) professional identification, psychological safety, and the interaction term were regressed onto voice behaviour. Although the effect of psychological safety on voice behaviour was significant (β= .291, p< .001), the path coefficients of professional identification (β= .101, p= .107) and the interaction term (β= .047, p= .487) were non-significant, indicating no moderating effect. As outlined in the plot diagram (Figure 11), psychological safety had a positive effect on the relationship between professional identification and voice behaviour; however, zero on the y-axis did not fall with the confidence intervals, visually depicting no moderating effect.

Figure 11

Plot Diagram of Interaction Effects



Three additional parameters were also created and were used to calculate the interaction effect for low, moderate, and high levels of the moderator. The point estimates for these parameters were non-significant, indicating no moderating effect even when levels of psychological safety were low [-1SD (-1.06 SD)], at the mean (SD 0) and high [+1SD (1.06)] (Table 11). Based on these results, it affirmed that psychological safety did not moderate the relationship between professional identification and voice behaviour, and consequently psychological safety was removed from the structural model.

Table 11

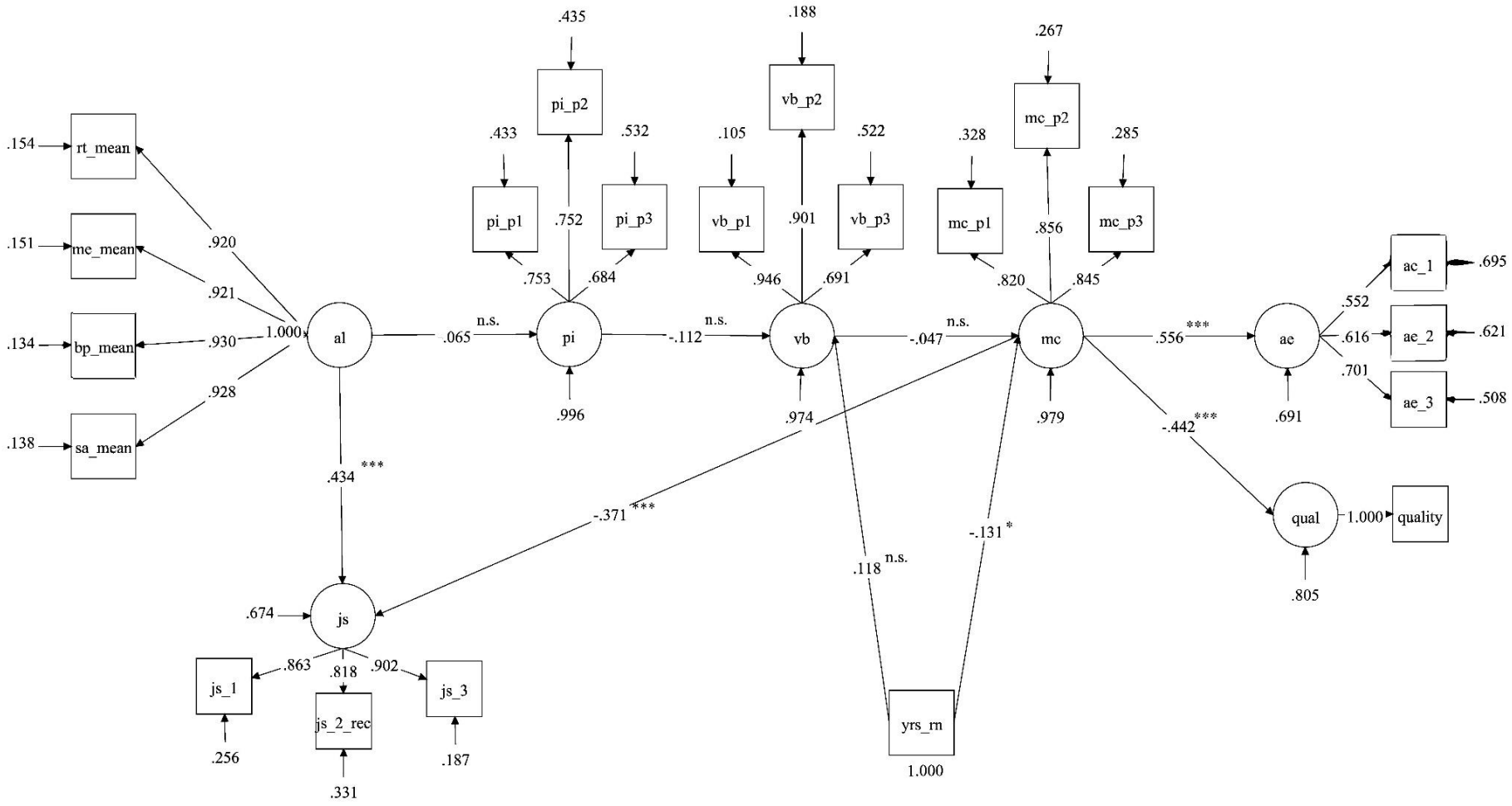
Results of Moderation Analysis

	b	***β***	***SE***	***CR***	***p***
Voice Behaviour ON					
Prof Identification	.155	.101	.062	1.611	.107
Psychological Safety	.357	.291	.060	4.817	<.001
Prof Identification x Psych Safety	.085	.047	.068	.695	.487
Intercepts					
VB_MEAN	5.468	5.338	.385	13.874	<.001
Residual Variances					
VB_MEAN	.948	.903	.038	23.741	<.001
Additional parameters					
Modlo	.065	-	.176	.370	.711
Mod0	.155	-	.095	1.629	.103
Modhi	.245	-	.142	1.719	.086

Testing the structural model. Controlling for the effect of years of experience on voice behaviour and missed nursing care, the hypothesized relationships between authentic leadership, professional identification, voice behavior, missed nursing care, adverse events, quality of nursing care, and job satisfaction were tested in a latent variable path analysis (Figure 12). The subscales, self-awareness, relational transparency, balanced processing, and internalized moral perspective, were used as indicators of authentic leadership. In addition, items were used as indicators (total disaggregation) for the adverse events scale and MOAQ-JSS, while parcels were used as indicators (partial disaggregation) for the professional identification scale, voice behaviour scale, and missed care.

Relatively good fit was achieved in the first iteration of the model [$\chi^2_{MLR}(182)$= 295.041, p= <0.001, RMSEA=.049, 90% CI= .038 and .058, SRMR=.083, CFI= .957]. In addition, the direct effects authentic leadership and job satisfaction (β= .118, p <.001), missed nursing care on job satisfaction (β= .371, p <.001), missed nursing care on adverse events (β= .556, p <.001), and missed nursing care on nurse-assessed quality (β= .442, p <.001) were significant. However, years of experience had a non-significant effect on voice behaviour (β= .118, p= .087), and the direct effects of authentic leadership on professional identification (β= .065, p= .435), professional identification on voice behaviour (β= -.112, p= .174), and voice behaviour on missed nursing care (β= -.047, p= .482) were non-significant, as were all indirect effects (p> .05). A summary of direct and indirect effects for the first iteration of the hypothesized model are presented in Appendix F.

Figure 12
Full Structural Model (First Iteration)

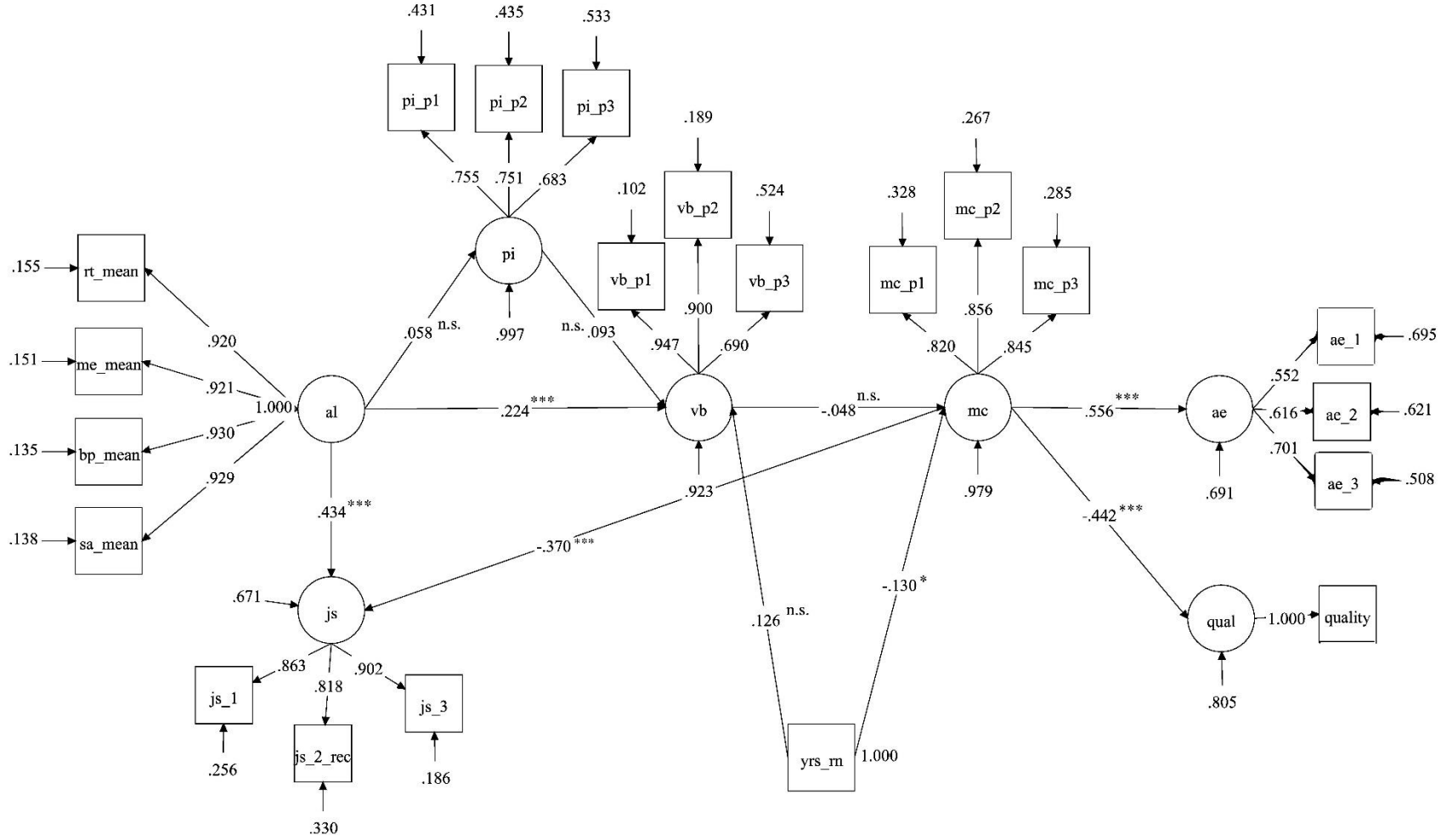


Note: *** p <.001; ** p <.01; * p <.05; n.s. p >.05

Based on the modification indices and theoretical justification, a direct path was added from authentic leadership to voice behaviour in the second iteration of the model (Figure 13). This change was supported by other scholars who have also found authentic leadership to predict voice behaviour (Hsiung, 2012; Wong et al., 2010). Although the model demonstrated good fit [$\chi^2_{MLR}(181)= 283.898$, $p= <0.001$, RMSEA= .046, 90% CI= .036 and .057, SRMR=.070, CFI= .961] and the new path showed significant direct effect of authentic leadership on voice behaviour ($\beta= .224$, $p<.001$), the non-significant direct and indirect effects from the first iteration of the model remained ($p> .05$).

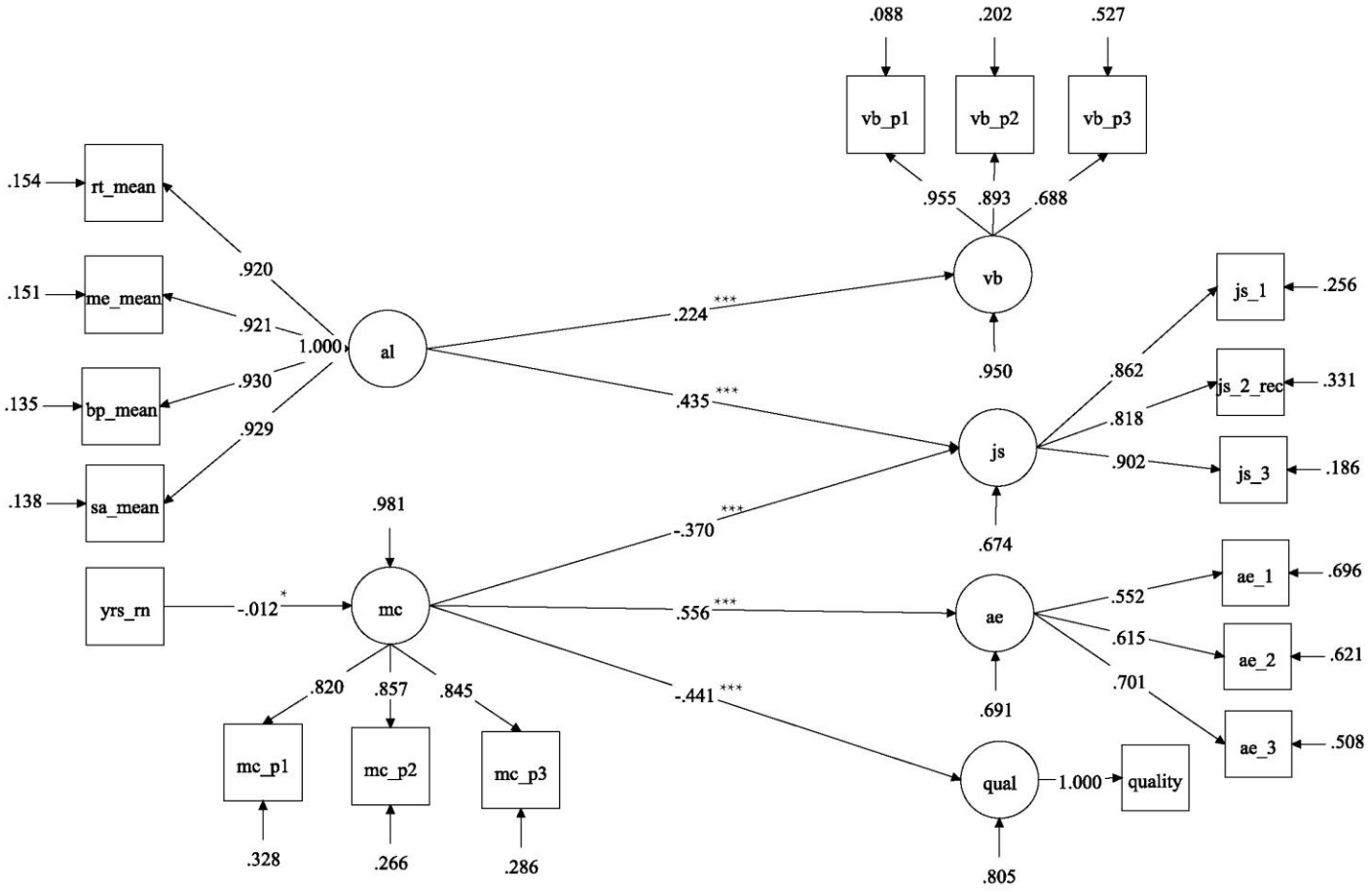
Given no other modifications were theoretically justifiable, all non-significant paths were deleted in the third (final) iteration (Figure 14). Lack of empirical support for aforementioned relationships resulted in professional identification being deleted from the model and missed care becoming an exogenous variable. The final structural model achieved good fit: [$\chi^2_{MLR}(131)= 203.829$, $p= <0.001$, RMSEA=.046, 90% CI= .033 and .058, SRMR=.073, CFI= .969]. Authentic leadership had a significant direct effect on voice behaviour ($\beta= .224$, $p<.001$) and job satisfaction ($\beta= .435$, $p<.001$). In addition, controlling for the effect of years of experience, missed nursing care had a significant direct effect on job satisfaction ($\beta= -.370$, $p<.001$), adverse events ($\beta= .556$, $p<.001$), and nurse-assessed quality ($\beta= -.441$, $p<.001$). The final model did not contain mediating variables; therefore, indirect effects could not be calculated. A summary of the direct effects in the final model is presented in Table 12.

Figure 13
Full Structural Model (Second Iteration)



Note: *** p <.001; ** p <.01; * p <.05; n.s. p >.05

Figure 14
Full Structural Model (Final Iteration)



Note: *** p <.001; ** p <.01; * p <.05; n.s. p >.05

Table 12

Path Coefficients for Structural Model (Final Iteration)

Paths	***b***	***β***	***SE***	***95% CI, lower & upper***	***p***
		Direct Effects			
Authentic Leadership → Voice Behaviour	.256	.224	.064	.099 & .350	<.001
Authentic Leadership → Job Satisfaction	.576	.434	.061	.316 &.555	<.001
Missed Nursing Care → Job Satisfaction	-.965	-.370	.063	-.494 & -.246	<.001
Missed Nursing Care → Adverse Events	.401	.556	.068	.422 & .690	<.001
Missed Nursing Care→ Nurse Assessed Quality	-.582	-.441	.058	-.555 & -.327	<.001

Note: *b*= unstandardized coefficient, *β*= standardized coefficient, *SE*= standard error, *95% CI*= 95% confidence interval, *p*= significance level

Overall, little support was found for the hypothesized model. The hypothesized relationships between authentic leadership and professional identification (H1) (*β*= .065, *p*= .435) and professional identification and voice behaviour (H2) were not supported (*β*= .112, *p*= .174). In addition, controlling for the effects of years of experience on missed nursing care, the hypothesized relationship between voice behaviour and missed care (H4) was not supported (*β*= -.047, *p*= .482). Despite the lack of empirical support for the aforementioned relationships, support was found for the relationships between authentic leadership and job satisfaction (H5) (*β*= .434, *p* <.001). In addition, an unanticipated finding was the relationship between authentic leadership and nurses' voice behaviour (*β*= .224, *p* <.001). Finally, controlling for the effect of years of experience on missed care (*β*= -.012, *p*= .025), the hypothesized relationships between missed care and job satisfaction (H6) (*β*= -.370, *p* <.001), adverse event (H7) (*β*= .556, *p* <.001), and nurse-assessed quality (H8) (*β*= -.441, *p* <.001) were supported.

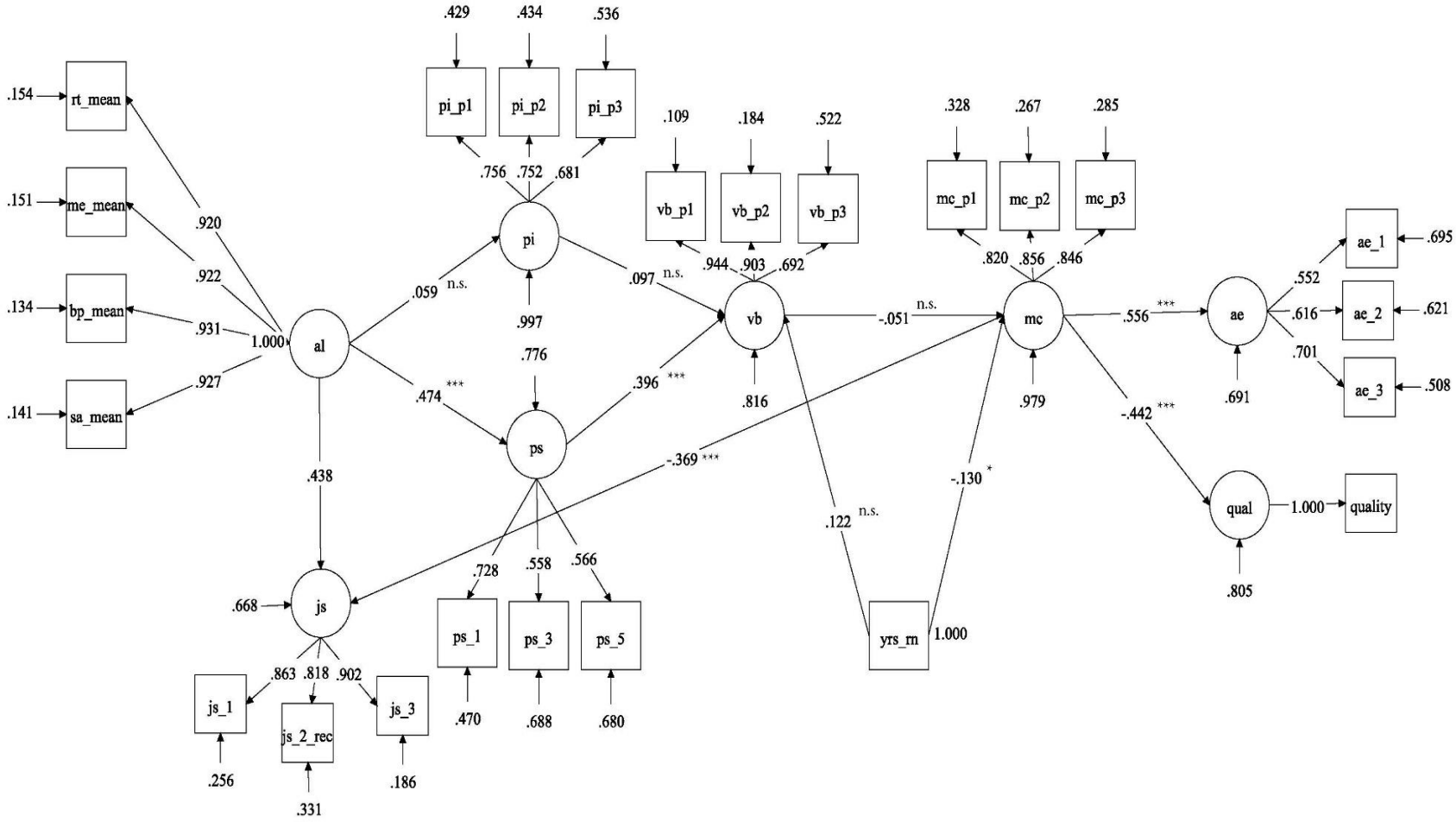
Alternative model consideration. Given the limited support found for the hypothesized study model, and the deviations in the initial model to final empirically supported model, an alternative model was explored in post-hoc analysis. It is important to note that post-hoc practices are contentious. Hollenbeck and Wright (2016) provide a robust discussion on two types of hypothesizing after results are known (HARKing) practices: SHARKing, which refers to the unethical practice of presenting hypotheses that emerged from post-hoc analyses and treating them as if they were a prior , and (2) THARKing, the potentially useful practice of transparently presenting new hypotheses that were derived from post-hoc results. These authors suggest that while SHARKing has no place in scholarly research, THARKing may offer some value. The new hypotheses are not merely the result of data mining, rather they are informed by theory and reconsiderations of the data that only became apparent when the researcher was confronted with unanticipated findings. They propose that THARKing can help promote a transparent and ethical spirit of inquiry, ultimately advancing the scientific process.

Alternative model specification. A central hypothesis in the present study was that psychological safety moderated the relationship between professional identification and voice behaviour (H3). Although this hypothesis was derived from theory and supported by the literature, it was not empirically supported. An alternative hypothesis was generated which aligned with the tenets of authentic leadership theory and was supported by findings from previous studies (see Chapter 2 for a full discussion):

> *Hypothesis 3b:* Psychological safety mediates the relationship between authentic leadership and voice behaviour.

Testing the indirect effects of psychological safety. An alternative model was tested which proposed that psychological safety could provide an indirect means by which authentic leadership influenced staff nurses' voice behaviour (Figure 15). This model demonstrated adequate fit [$\chi^2_{MLR}(243)= 373.668$, $p= <0.001$, RMSEA=.045, 90% CI= .036 and .054, SRMR=.075, CFI= .955]. The new direct paths between authentic leadership and psychological safety ($\beta= .474$, $p= <.001$), and psychological safety and voice behaviour ($\beta= .369$, $p= <.001$) were significant, as was the new indirect path between authentic leadership, psychological safety, and voice behaviour ($\beta= .369$, $p= <.001$); however, the effect of years of experience on voice behaviour was non-significant ($\beta= .122$, $p= .063$). Controlling for the effect of years of experience on missed nursing care ($\beta= -.130$, $p= .035$), the direct paths and associated indirect paths between authentic leadership and professional identification ($\beta= .059$, $p= .472$), professional identification and voice behaviour ($\beta= .097$, $p= .206$), and voice behaviour and missed nursing care ($\beta= -.051$, $p= .449$) remained non-significant, as they did in the initial hypothesized model. In addition, the direct paths between authentic leadership and job satisfaction ($\beta= .438$, $p= <.001$), missed nursing care and adverse events ($\beta= .556$, $p= <.001$), and missed nursing care and nurse-assessed quality ($\beta= -.583$, $p= <.001$) remained significant. As no suggested modifications were theoretically justifiable, the non-significant paths were deleted and the model was rerun. A summary of direct and indirect effects for the first iteration of the alternative model can be found in Appendix F.

Figure 15
Alternative Model: Testing the Indirect Effects of Psychological Safety (First Iteration)



Note: *** p <.001; ** p <.01; * p <.05; n.s. p >.01

The second iteration of the alternative model demonstrated adequate fit [$\chi^2_{MLR}(184)= 272.249$, $p= <0.001$, RMSEA=.043, 90% CI= .031 and .053, SRMR=.078, CFI= .966] (Figure 16). Authentic leadership had significant direct effects on psychological safety (β =.474, p <.01) and job satisfaction (β =.439, p <.01), while psychological safety had a significant direct effect on voice behaviour (β =.397, p <.01). Furthermore, controlling for the effect of years of experience (β= -.137, p= .025), missed nursing care had significant direct effects on adverse events (β =.556, p <.01), nurse-assessed quality (β =-.441, p <.01), and job satisfaction (β =-.369, p <.01. In addition, the indirect path between authentic leadership, voice behaviour, and psychological safety was significant (β =.188, p =<.01), suggesting psychological safety mediated the relationship between authentic leadership and voice behaviour. A summary of direct and indirect effects are presented in Table 13.

Table 13

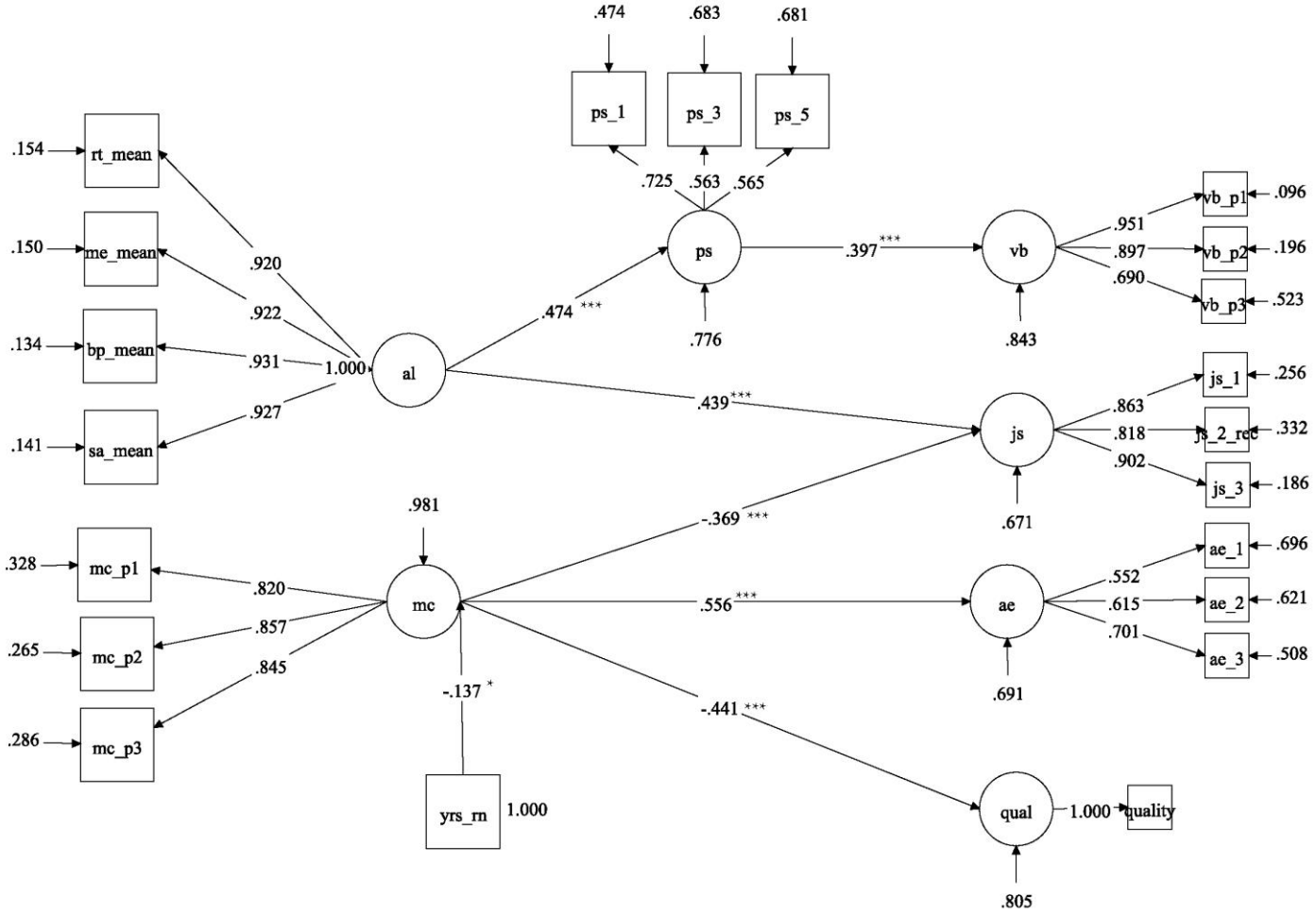
Path Coefficients for Alterative Model (Final Iteration)

Paths	***b***	***β***	***SE***	***95% CI, lower & upper***	***p***
	Direct Effects				
Authentic Leadership → Psychological Safety	.417	.474	.066	.344 & .603	<.001
Psychological Safety → Voice Behaviour	.511	.397	.073	.208 & .540	<.001
Authentic Leadership → Job Satisfaction	.583	.439	.061	.320 & .559	<.001
Missed Nursing Care → Adverse Events	.401	.556	.068	.422 & .690	<.001
Missed Nursing Care → Nurse Assessed Quality	-.582	-.441	.058	-.555 & -.327	<.001
Missed Nursing Care→ Job Satisfaction	-.962	-.369	.063	-.493 & -.245	<.001
	Indirect Effects				
Authentic Leadership → Psychological Safety → Voice Behaviour	.213	.188	.047	.095 & .280	<.001

Note: *b*= unstandardized coefficient, β= standardized coefficient, *SE*= standard error, CI= confidence interval, *p*= significance level

Figure 16

Alternative Model: Testing the Indirect Effects of Psychological Safety (Final Iteration)



Note: *** p <.001; ** p <.01; * p <.05; n.s. p >.05

Conclusion

Results of data analysis procedures were provided in the preceding chapter. Descriptive statistics were presented and used to describe the characteristics of study participants, main study variables, and results of the correlation analysis. With the exception of the psychological safety scale and the adapted Part A of the MISSCARE survey, which were trimmed accordingly, CFA results supported the hypothesized factor structure and inclusion of all items in each measurement tool. Although the initial hypothesized model was not supported by the data, a sequential process of respecification resulted in the development of a theoretically sound model that was supported by the data. Authentic leadership demonstrated significant direct effects on voice behaviour and job satisfaction, while missed nursing care demonstrated significant direct effects on job satisfaction, adverse events, and nurse-assessed quality. In addition, an alternative model was proposed in which psychological safety was hypothesized to mediate the relationship between authentic leadership and voice behaviour. This alternative model was supported by the data and demonstrated a significant indirect effect of authentic leadership on voice behaviour though psychological safety.

Chapter 5: Discussion

Results of hypotheses testing are discussed in the following chapter. Related research is used to examine the empirical support, or lack of support, obtained for each relationship in hypothesized moderation, structural, and alternative models. Limitations of the present study are examined, in addition to implications for theory development, research, nursing practice, and education. Directions for future research are also proposed. A final summary concludes this chapter.

Hypotheses Testing

Eight theoretically derived hypotheses were proposed in the present study: staff nurses' perceptions of nurse managers' authentic leadership is positively associated with professional identification (H1); staff nurses' professional identification is positively associated with voice behaviour (H2); staff nurses' perceptions of psychological safety moderates the relationship between professional identification and voice behaviour (H3); staff nurses' voice behaviour is negatively associated with missed nursing care (H4); staff nurses' perceptions of nurse managers' authentic leadership is positively associated with job satisfaction (H5); missed nursing care is negatively associated with staff nurses' job satisfaction (H6); missed nursing care is positively associated with adverse patient events (H7); missed nursing care is negatively associated with nurse-assessed quality of care (H8). The culmination of these hypotheses resulted in the formation of the structural model. In addition, an alternative model was generated based on the following alternative hypothesis: psychological safety mediates the relationship between authentic leadership and voice behaviour (H3b). The moderating relationship was tested using multiple regression, while the direct and indirect relationships in the hypothesized and alternative

models were tested using latent variable path analysis. A full discussion of these results is presented below.

Hypothesized Moderation Model

Psychological safety was hypothesized to moderate the relationship between professional identification and voice behaviour (H3); as such, the strength of the relationship between professional identification voice behaviour was expected to increase as psychological safety increased. Although the present study was the first to position psychological safety as a moderator in the relationship between professional identification and voice behaviour, the formation of this hypothesis was theoretically justified (Detert & Edmondson, 2011; Edmondson & Lei, 2014; Hsiung, 2012; Qin et al., 2014). Despite a strong theoretical basis, the moderating effect of psychological safety was not empirically supported (β= .047, p= .487).

As outlined by McClelland and Judd (1993) detecting moderating effects in non-experimental research is exceptionally difficult due to the presence of error. The uncontrolled conditions in which data is collected in non-experimental research designs reflects inherent sources of error (i.e. unintended extraneous variable), making reliable interaction effects difficult to detect. In addition, the presence of measurement error is multiplied when the interaction term is created, further impeding the ability to detect moderation. As such, Kline (2016) suggests using variables with reliabilities greater than .90 as one way to mitigate the effects of error in moderation analysis. Given the non-experimental design utilized, the poor model fit achieved in CFA, and the acceptable, albeit not exceptional, reliability achieved by the professional identification scale, it is

plausible that error may have contributed to the non-significant moderating effect of psychological safety found in the present study.

Hypothesized Structural Model

Authentic leadership and professional identification. Staff nurses' perceptions of nurse managers' authentic leadership was hypothesized to be positively associated with staff nurses' professional identification (H1); however, the direct relationship between authentic leadership and professional identification was not supported (β= .065, p= .435). This finding was unanticipated and conflicted with the theoretical underpinning of authentic leadership. Through reflection and careful examination of the literature, it was determined that lack of support for the relationship between authentic leadership and professional identification may have been due to the number of staff nurses who reported their unit manager was not a registered nurse (N= 32, 11.2%).

A central tenet in Avolio et al.'s (2004) model is that authentic leadership influences the work attitudes and behaviours of followers through the processes of social identification. As outlined in Chapter 2, social identification refers to the process whereby a follower's group membership becomes an integral part of their identity (Hogg, 2001). Authentic leaders are thought to facilitate social identification by continually role modeling honesty, integrity, and prototypical attitudes and behaviours of the social group (Walumbwa et al., 2010). These positive behaviours connect with followers' self-concept, evoking a deep sense of identification with the social group (Gardner et al., 2005). Rooted in SIT (Tajfel & Turner, 1979) and SCT (Turner, 1985), many targets of social identification exist including, but are not limited to, identification with the work unit, organization, and profession (Johnson, Morgeson, Ilgen, Meyer, & Lloyd, 2006).

Although support has been be found for the relationship between authentic leadership and nurses' identification with the workgroup (Wong et al., 2010) and organization (Fallatah et al., 2017; Giallonardo, 2013), the present study appears to be the first to propose a direct link between authentic leadership and identification with the profession.

Previous studies examining relationships between authentic leadership and social identification among nurses have not reported what proportion of unit managers were registered nurses. Perhaps this is because, if the target of social identification is the work group or organization, the professional designation of the unit manager is irrelevant; however, when one is examining the relationship between authentic leadership and professional identification, the professional designation of one's manager may be of great importance. Although the notion that patient care units in acute care hospitals are managed solely by nurses is widely propagated, recent data suggests that a wide variety of non-nursing professionals may assume unit manager roles (Registered Nurses' Association of Ontario, 2013b). The significance of managers enacting prototypical professional behaviours is highlighted by Mason and Forsyth (2017) who suggested clinicians' leadership is influenced by the norms of their professional group, and that the leadership norms of other professions could be incompatible with each other. As such, the large proportion of unit managers identified as non-nurses in the present study should be considered a potential contributing reason to the non-significant relationship between authentic leadership and professional identification. One must critically evaluate how a non-nurse unit manager could role model the prototypical professional behaviours required for staff nurses' professional identification process, if in fact they are not a nurse.

Authentic leadership and job satisfaction. Empirical support was found for the hypothesized relationship between staff nurses' perceptions of nurse managers' authentic leadership and job satisfaction (H5) (β= .439, p <.001). This finding adds to the growing body of research supporting direct links between authentic leadership and job satisfaction among nurses (Baek, Han, & Ryu, 2019; Boamah et al., 2017; Fallatah & Laschinger, 2016; Giallonardo et al., 2010; Laschinger & Fida, 2015; Laschinger et al., 2012; Read & Laschinger, 2015; Wong & Laschinger, 2013). Although countless mediating mechanics have been identified in the relationship between authentic leadership and job satisfaction (Lu et al., 2019), the direct effects of leadership on satisfaction are more difficult to understand.

In the context of the present study, it is argued authentic unit managers had a direct effect on staff nurses' job satisfaction through each dimension of authentic leadership. Early theoretical works suggested authentic leaders' heighted self-awareness and resulting insight into how their values, beliefs, and feelings affected behaviour, and allowed them to act in ways to support followers' self-determination and motivation a work (Ilies et al., 2005), thereby positively influencing followers' job satisfaction. Similarly, Walumbwa and colleagues (2008) used the core dimensions of authentic leadership to suggest authentic leaders directly affect followers' job satisfaction by demonstrating a balanced processing of information, transparency in relationships, and consistency between values, words, and deeds (internalized moral perspective), resulting in elevated levels satisfaction. More recently, Aycą (2019) found the four dimensions of authentic leadership had a direct effect on employees' internal job satisfaction while only internalized moral perspective and self-awareness had a statistically significant effect on

external satisfaction (relational transparency and balanced processing did not have a statistically significant effect). In the context of nursing, Gillet et al. (2018) suggested that fairness (an important aspects of balanced processing and relational transparency) is a fundamental component of supportive practice environments, which they found to be a significant predictor of nurses' job satisfaction.

Authentic leadership and voice behaviour. An unanticipated finding was the significant direct relationship between authentic leadership and voice behaviour (β= .224, p <.001). Drawing on the basic tenets of authentic leadership theory, Gardner and colleagues suggested authentic leadership is a reciprocal process that encourages the development of authenticity among both leaders and followers (Gardner et al., 2005). Recognizing that internalized moral perspective is a fundamental aspect of authentic leadership, it is argued that the direct relationship between nurse managers' authentic leadership and staff nurses' voice behaviour found in the present study could be due increased levels of internalized moral perspective among staff nurse, resulting in the drive to speak up and "do what is right." This proposition is supported by Gardner and colleagues who suggested the moral aspect of authentic results in decisions being guided by internal moral standards, ethics and values, rather than group, organization and societal pressures (Gardner et al., 2005).

Leaders are inherently important in employees' us of voice behaviour, as concerns and suggestions are often directed toward them, and their response to voice can often encourage or discourage the process (Detert & Burris, 2007). It has been suggested that authentic leaders are more willing to accept the ideas and opinions of followers and encourage mutual transparency in their dealings with followers (Avolio & Gardner,

2005). Furthermore, authentic leaders promote prosocial ethical behaviour by building just and transparent channels of communication (S. M. Liu, Liao, & Wei, 2015), providing further support for the use of voice behaviour among followers. This sentiment was echoed by Morrow et al. (2016) who suggested authentic and supportive managers, who are open and able to engage with employees, are an important aspect of utilization of safety voice in healthcare. Although Wong et al. (2010) found a non-significant relationship between authentic leadership and voice behaviour in a sample of registered nurses in Ontario (N= 280, r= .10, p> .05), findings from more recent research outside of nursing have found significant associations between authentic leadership and employee voice behaviour (Hsiung, 2012; S. G. Liang, 2017; Monzani, Knoll, Giessner, Van Dick, & Peiró, 2019; S. Zhang et al., 2020).

Professional identification and voice behaviour. Staff nurses' professional identification was hypothesized to be positively associated with voice behaviour (H2); however, this direct relationship was not supported (β= .112, p= .174). According to the basic tenets of SIT (Tajfel & Turner, 1979) and SCT (Turner, 1985), nurses who were highly identified with the profession of nursing had integrated their professional membership into their self-concept, and as such, defined themselves accordingly. Professional identification should have had a direct effect on nurses' voice behaviour, as speaking up to improve nursing practice was aligned with an important aspect of their own self-concept. Although no research has examined the relationship between professional identification and voice behaviour, professional identification has been linked to employees' OCBs, which are commonly considered extra role behaviours (Ashforth, Joshi, Anand, & O'Leary-Kelly, 2013). In addition, the importance of social

identification in contributing to nurses' voice was highlighted by Wong et al. (2010) who found a direct link between workgroup identification and nurses' voice behaviour, and Islam, Ahmed, and Ali (2019) who found organization identification had a direct effect on nurses' voice behaviour. Similar findings have also been reported by researchers outside of nursing (D. Hu et al., 2015; W. Liu et al., 2010; Monzani et al., 2019; Qi & Ming-Xia, 2014; Tangirala & Ramanujam, 2008).

In trying to understand why data in the present study did not support the theoretically justified proposition that nurses who were highly identified with the profession would speak up to improve professional nursing practice, all items on the professional identification and voice behaviour scales were carefully scrutinized. Through careful examination, it was noted that items on the professional identification scale referred to the nursing "profession" while items on the voice behaviour scale referred to speaking up about issues that affected nurses "work." The significance of this language is highlighted by research on multiple work identities and identification.

Understanding nurses' professional identification is complicated and can become confused by the nature of multiple identities and identification processes (Thompson, Cook, & Duschinsky, 2018). A *work identity* refers to the meaning of a particular social entity (i.e. work group, organization, profession) in terms of defining tasks, discourses, values, goals, beliefs, stereotypic traits, and knowledge, skills, and abilities (Ashforth et al., 2008). In contrast, *work identification* refers to the cognitive/ psychological/emotional attachment an individual makes to the social entity (Miscenko & Day, 2016). Identity is viewed as a superficial categorization whereas identification is a deep internalization of

the social categorization, evoking a visceral sense of what it means to be a nurse and is a reflection of whom one is. (Ashforth et al., 2013).

Ashforth and colleagues (2008) proposed that work identities (targets of identification) exist on a continuum from lower to higher order: job → work group → department → division → organization. More recent work has included the profession as mid-to-high level work identity (Ashforth et al., 2013); however, a compelling argument can be made for professional identity as the highest order work identity as it does not need to be linked to a specific job, group, department, division, or organization. Empirical support has been found for different levels of identification in relation to different identities (Ashforth et al., 2008; Lammers, Atouba, & Carlson, 2013; Millward & Haslam, 2013; Trybou, De Caluwé, Verleye, Gemmel, & Annemans, 2015; Trybou et al., 2014). Findings from this research typically report highest levels of identification in relation to lowest order identities; however, it has also been argued that individuals belonging to well defined professions (i.e. nurses) are more likely to internalize the values of the profession than those of their organization (Ashforth et al., 2013).

Given items on the professional identification scale referred to the nursing "profession" whereas items on the voice behaviour scale referred to nurses' "work", the question arose as to whether these items elicited responses related to different work identities. Based on the order of work identities discussed above, it could be argued the professional identification scale reflected the highest order work identity (i.e. the profession), while the voice behaviour scale reflected a lower order identity (i.e. job, work group, department). This discrepancy may provide reasoning for the non-significant relationship between the two concepts, leading one to wonder if the targets of

identification and voice were similar across these two scales (i.e. referred to the profession), a significant relationship may have been found.

Voice behaviour and missed nursing care. Staff nurses' voice behaviour was hypothesized to be negatively associated with missed nursing care (H4); however, this direct relationship was not supported (β= -.047, p= .482). Although no previous studies have linked the concept of voice behaviour to missed nursing care, numerous researchers have identified interdisciplinary communication problems as a major contributing factor to missed care in a variety of patient care environments (Blackman et al., 2015; Castner et al., 2015; Kalisch, Terzioglu, et al., 2012; Kalisch & Williams, 2009). These studies highlight the significance of effective transparent communication between nurses, physicians, and administrators, which has also been identified as an important component of voice behaviour (Morrow et al., 2016). However, given the non-significant relationship between voice behaviour and missed-nursing care found in the present, one has to wonder if additional contextual factors were affecting missed nursing care. This sentiment is supported by Kalisch and colleagues (2012) who found that in addition to communication, staffing levels and adaptability, a collective orientation, backup, monitoring, leadership, nurse tenure, unit layout, trust, and accountability were commonly cited as contributing to missed care. Similarly, in a study of 439 nurses across three hospitals, communication was been found to be the least frequently cited reason for missed care (38%), while labor resources (85%) and material resources (56%) were cited more frequently (Kalisch et al., 2009).

Missed nursing care and job satisfaction. Empirical support was found for the hypothesis that missed nursing care would be negatively associated with staff nurses' job

satisfaction (H6) (β= -.370, p< .01). This finding is aligned with results from Kalisch, Tschanen, et al.'s (2011) seminal work which found lower levels of missed nursing care predicted higher levels job satisfaction in a large multi-site study of registered nurses and nursing assistants across Midwestern United States. Similar results have been reported by other researchers examining the relationship between missed nursing care and job satisfaction among registered nurses in the States (White, Aiken, & McHugh, 2019). Most recently, a secondary analysis of data from nurses in Korea (N= 2114) found a higher number of missed activities was associated with poorer job satisfaction (S. H. Cho et al., 2020).

Salsgiver (2011) provided a commentary of Kalisch and colleague's (2011) results, suggesting the inverse relationship between missed nursing care and job satisfaction may be due to nurses' deep-seeded desire to "make a difference" in healthcare. As such, when nurses are unable to complete the basic tasks of nursing (i.e. assessing vital signs, patient teaching, toileting, wound/care, etc), they feel as though they are unable to provide the care that is necessary for their patients' needs. This creates dissonance between what nurses actually do and what they ought to do, and dissatisfaction ensues (S. H. Cho et al., 2020; Tschannen et al., 2010). It has also been proposed that missed nursing care decreases job satisfaction by affecting staff nurses overall morale (Smith, 2018). Moreover, it has been suggested that nurses attribute feelings of frustration, worry, and dissatisfaction to the inability to provide complete care and practice nursing in a manner consistent with their educational preparation and professional values (Jones et al., 2015; Kalisch et al., 2009). This sentiment is supported by qualitative findings from Janikova, Plevova, and Jarosova (2020) who outlined

participants in their study cited emotional dissatisfaction, frustration, feelings of personal failure and inferiority, loss of motivation and fatigue as consequences of missed nursing care.

Missed nursing care and outcomes of care. Empirical support was found for the hypothesis that missed nursing care would be positively associated with adverse patient events (H7) and negatively associated with nurse-assessed quality of care (H8); (β =.556, p <.001 and β = -.441, p<.001 respectively). Results from the present study add to the growing body of research which has previously reported positive relationships between missed nursing care and adverse events, and negative relationships between missed nursing care and quality of care (Jones et al., 2015; Kalánková et al., 2020). Insights from these reviews suggest that errors of omissions can lead to a host of negative consequences for patients and highlight importance of understating the direct effect of missed nursing care on outcomes of care.

By nature, missed nursing care has direct effects on adverse events. For example, many adverse drug reactions can be mitigated by thorough patient monitoring (Jordan, 2011); however, item-2 on Part A of the adapted MISSCARE survey asks nurses to rate how frequently they missed monitoring vital signs, while items-9 and 10 ask nurses to rate how often they missed performing physical (re)assessment. In addition, errors in medication administration are often attributed to incomplete or incorrect documentation (Tubaishat, 2019), which reflects item-4 on the scale. Item-7 asks for nurses' insight on the frequency of missed handwashing, which has been identified as a major contributing factor to hospital acquired infections (Harris et al., 2011). Furthermore, items-14 and 15 ask nurses to rate how frequently they missed responding to patients' toileting request

and performing skin/wound care, which have been implicitly cited as major contributing factors to pressures ulcer formation through sustained pressure and increased moisture levels in immobilized patients (Bhattacharya & Mishra, 2015). Furthermore, timely response to patient call bells and toileting needs has been recognized as important in addressing the high incident of patient falls (Digby, Bloomer, & Howard, 2011; Ko et al., 2012).

It is also important to recognize the role workload and time constraints play in missed nursing care (Blackman et al., 2015; Bragadóttir et al., 2017; Kalisch, 2006; Kalisch, Doumit, et al., 2013; Kalisch, Gosselin, et al., 2012; Kalisch, Tschannen, et al., 2011; Waller Dabney & Kalisch, 2015). More specifically, the concept of *work intensification*, defined as an increase in the pace of work and the number of hours spent on the job, has been argued to be key structural aspect of missed care that greatly impacts patient safety (Willis, Harvey, Thompson, Pearson, & Meyer, 2018). This may result in nurses who are overworked and pressured by time being forced to perform incomplete assessments, potentially leading to catastrophic consequences for patients. Time spent with patients provides nurses the opportunity to identify signs and symptoms of complications that, if acted on quickly, may prevent deterioration in a patient's conditions and adverse events (Lucero et al., 2010). Jordan (2011) provides an insightful example of this scenario suggesting that although respiratory rate is the most effective predictor of physiological deterioration, it is the most frequently omitted assessment. This is because busy nurses may only have time to record heart rate and blood pressure from automated devices, but not observe a patient's chest for a full minute. Consequently, patients can suffer serious adverse events if time constraints prevent nurses from completing through

physical assessments, thereby overlooking subtle signs of physiological deterioration. In addition the decreased time nurses' spend with patients as a result of missed nursing care affects perceptions of nurse-patient communication and the over quality of the their relationship (S. H. Cho, Mark, Knafl, Chang, & Yoon, 2017).

Hypothesized Alternative Model

A unique contribution of the alternative model was the formation of an alternative hypothesis that proposed psychological safety mediates the relationship between authentic leadership and voice behaviour (H3b). Empirical support was found for the direct effects of authentic leadership on psychological safety (β= .474, p< .001), the direct effect of psychological safety on voice behaviour (β= .397, p< .001), and the indirect effects of authentic leadership on voice behaviour though psychological safety (β= .188, p< .001).

Authentic leadership and psychological safety. Since it was proposed that psychological safety develops through individual's interactions at work (Edmondson, 1999), supportive leadership behaviours have been continually identified as an important antecedent to psychological safety (A. Newman et al., 2017). More specifically, the importance of the authentic leader-follower relationship in creating psychologically safe environments has been demonstrated (Dirik & Intepeler, 2017; S. M. Liu et al., 2015; Meng, Cheng, & Guo, 2016). In addition, authentic leadership and psychological safety have both been cited as an integral aspect of healthy work environments in nursing (Huddleston & Gray, 2016).

In the context of the present study, the four dimensions of authentic leadership provide a useful framework to understand how authentic unit managers created psychologically safe work environments. For example, highly self-aware unit managers would have encouraged feedback others, using this information to engage in the process of self-reflection to understand their own strengths and weaknesses as a leader (Peus et al., 2011). Similarly, unit managers who demonstrated relational transparency would have openly shared information with staff nurses (Gardner et al., 2005) while taking accountability for their actions and disclosing personal weaknesses and mistakes (May et al., 2003). In addition, balanced processing would have been exemplified when nurse managers made explicit they were interested in hearing all viewpoints, even those that conflicted with their own perspective viewpoints (Walumbwa et al., 2010). These managers would have then based decisions on their well-developed internalized moral perspective rather than self-protective motives or organizational pressures (Avolio et al., 2004; Wong & Cummings, 2009b). The vulnerability demonstrated by managers by soliciting the opinion of others and disclosing insight into their weaknesses likely contributed to work environments where staff nurses felt safe to experience vulnerability also. In addition, having unit managers who based decisions on objective information and what was morally right, likely decreased the interpersonal risk of retribution perceived by nurses.

In addition to the four dimensions of authentic leadership, it is likely that trust was an important element in the direct effect of nurse managers' authentic leadership on staff nurses' psychological safety. Avolio et al. (2004) first highlighted the importance of trust in the authentic leader-follower relationship, suggesting trust is developed when

authentic leaders act in accordance with their personal values and do what they say they will do. Similarly, Gardner et al. (2005) suggested authentic leaders' use transparent communication, analyze of all perspective, and make moral/ethically sound decision helps build trust between leaders and followers. It is through the this establishment of trust that followers feel safe voicing their concerns and suggestions to leaders at all levels of the organization (Edmondson, 1999). Although results of Wong and Cummings' (2009b) study did not support the direct effect of authentic leadership on cancer clinicians' trust in management, significant correlations between all dimensions of authentic leadership and trust were found. Furthermore, subsequent studies have demonstrated significant direct effects of nurses managers' authentic leadership on staff nurses' trust (Alkaabi & Wong, 2019; Wong & Giallonardo, 2013; Wong et al., 2010).

Although trust is an important element in employees perceptions of safety, it is plausible that respect also played an important role in the direct effects of managers' authentic leadership on staff nurses' perceptions of safety. Edmondson (1999) suggested psychological safety goes beyond perceiving and experiencing high levels of interpersonal trust, but also includes mutual respect and a climate in which people are comfortable expressing their differences. Authentic leaders act in accordance with deep personal values and convictions to build credibility and develop respect with followers (Avolio et al., 2004). They also nurture the development of respect in the authentic leader-follower relationship by demonstrating high levels of personal integrity, openness and truthfulness (Ilies et al., 2005). Although no empirical evidence could be found which supported respect as an important element in the relationship between authentic leadership and psychological safety, the above arguments support this proposition.

Psychological safety and voice behaviour. Results from the present study add continued supported to the growing body of evidence that has identified psychological safety as an important antecedent to voice behaviour (Detert & Burris, 2007; Detert & Edmondson, 2011; Walumbwa & Schaubroeck, 2009). Similarly, research has shown that employees who perceive interpersonal risk from speaking up are likely to remain silent (Van Dyne et al., 2003). Although much of this research has occurred at the group level and outside of nursing (O'Donovan & McAuliffe, 2020), several qualitative studies have identified safety as an integral component of nurses' voice (Morrow et al., 2016).

The direct effects of psychological safety on nurses' voice behaviour can be understood by exploring the importance of nurses' work environments. Nurses working in psychologically safe work environments believe the benefits of speaking up outweigh the potential negative implications of engaging in voice (Pfeifer & Vessey, 2019). In contrast, lack of psychological safety can lead nurses to choose silence over voice, even when they believe their use of voice would be beneficial to the organization or patients (Morrow et al., 2016). Specific leadership behaviors such as leadership inclusiveness, trustworthiness, change- oriented leaders, and ethical leadership are important aspects of psychologically safe work environments (Aranzamendez et al., 2015). In addition, factors such as open communication, trust, and respect (Edmondson & Lei, 2014) are synonymous with psychological safety, and have been shown to facilitate nurses' use of voice.

Indirect effects of authentic leadership on voice through psychological safety. The significant indirect effect of authentic leadership on voice behaviour through psychological safety highlight psychological safety as an important mediating mechanism

in the relationship between authentic leadership and nurses' voice behaviour. This mediated relationship echoes findings from other studies in which psychological safety was found to mediate the relationship between ethical leadership, of which authentic leadership in considered a root construct (Avolio et al., 2004), and voice behaviour (Walumbwa & Schaubroeck, 2009). Similarly, psychological safety has been found to mediate the relationship between authentic leadership and a specific form of voice, internal whistleblowing (S. M. Liu et al., 2015). Finally, a metasynthesis of qualitative studies on nurses speaking up behaviours has highlighted the importance of supportive managers in creating authentically safe, open, supportive, and respectful spaces for nurses' to voice concerns (Morrow et al., 2016).

Social learning theory (Bandura, 1977) is a useful framework in understanding the indirect effects of authentic leadership on voice through psychological safety. Drawing on the central tenets of this theory, the trusting and respectful interactions, which characterized the authentic unit manager-staff nurse relationship, were pivotal in creating psychologically safe work environments as these behaviours demonstrated there was little risk associated with speaking up. This trust and respect then resulted in staff nurses modeling behaviour similar to that exhibited by authentic unit managers. As authentic unit managers would have encouraged staff nurses to voice their opinions on all work-related issues and then used that information to make objective and morally sound decisions, they created a safe space for nurses to speak up without fear of retribution. As speaking up carries inherent interpersonal risk, the importance of authentic unit manager's openness to the opinions and ideas voiced by nurses was fundamentally important.

Summary of Hypotheses Testing

Moderation, structural, and alternative models were tested in the present study. Findings were posited to address the boundary conditions in the relationship between professional identification and voice behaviour, and highlight the direct and indirect effects of authentic leadership on nurses work attitudes and behaviours, and outcomes of care. Despite the theoretical basis of all study hypotheses, not all relationships were supported. The moderating effect of psychological safety on the relationship between professional identification and voice behaviour was non-significant, as were the relationships between authentic leadership and professional identification, professional identification and voice behaviour, and voice behaviour and missed nursing care. In contrast, support was garnered for the direct effects of authentic leadership on job satisfaction and psychological safety, psychological safety on voice behaviour, and missed nursing care on adverse events and quality. In addition, the indirect effect of authentic leadership through voice behaviour was supported. Finally, an unanticipated finding was the support found for the direct effect of authentic leadership on nurses' voice behaviour. These results highlight the importance of authentic leadership in affecting nurses work attitudes and behaviour, and creating healthy work environments. Furthermore, these findings highlight the detrimental effects of missed nursing care on adverse events and overall patient care quality.

Implications

Findings from the present study can be used to help advance knowledge related to the direct and indirect influence of authentic leadership on staff nurses' work attitudes and behaviours. Furthermore, results highlight the role of psychological safety in

contributing to nurses' voice behaviour, and of missing nursing care in contributing to adverse events and poorer quality of care. As such, these results have implications for theory development, nursing practice, leadership, education.

Implications for theory development. Since Avolio et al. (2004) first developed a theoretical framework proposing authentic leaders directly and indirectly influence followers' work attitudes and behaviours, the theory has been tested in many contexts including business, education, and healthcare (Gardner et al., 2011). In the context of nursing, Wong and Cummings (2009a) were the first to use Avolio's theory to describe the relevance of authentic leadership to nursing leadership and its positive effects of nurses and patients. Since then, much of the research in nursing has focused on examining the outcomes of unit managers' authentic leadership in acute care hospital settings (Alilyyani et al., 2018; Malila et al., 2018). Results from the present study add to this large, and ever growing, body of research testing authentic leadership theory in the context of acute care hospital settings. Moreover, results add continued support for the direct effects of authentic leadership on employees work attitudes (i.e. satisfaction) and behaviours (i.e. voice), which has been a cornerstone of Avolio's model since its inception. Finally, results show how authentic unit managers affect nurses' work environments and play an important role in nurturing perceptions of psychological safety, thereby supporting the indirect means by which authentic leaders influence followers' work attitudes and behaviours.

In addition, the non-significant relationship between authentic leadership and professional identification found in the present study have important implications for theory testing and development. Although results did not support Avolio et al.'s (2004)

assertion that social identification, specifically professional identification, provides an indirect means through which authentic leadership impacts follower's work attitudes and behaviour, results can be used to as an impetus to deconstruct this relationship. Recognizing the importance of theory testing in a variety of contexts, it is interesting to postulate that a boundary condition, such as managers' span of control, may moderate the relationship between authentic leadership and nurses' professional identification. This notion is supported by previous findings which suggest a large span of control decreases the amount of time managers are able to spend with staff nurses and significantly attenuates effectiveness of their leadership (Lucas, Laschinger, & Wong, 2008; McCutcheon, Doran, Evans, Hall, & Pringle, 2009; Thiel, Hardy, Peterson, Welsh, & Bonner, 2018).

Implications for nursing leadership. Results from the present study highlight important implications for nursing leadership. First, attention must be given to developing the authentic leadership abilities of all nurses, at all levels, within all healthcare organizations. Given the moderate levels of authentic leadership reported in the present study and the fact leadership is a professional standard and responsibility of all nurses, including those in direct patient care roles (College of Nurses of Ontario, 2018), a focus on leadership development of those in formal and informal leadership positions is needed. The ability to develop nurses' authenticity is supported by scholars who suggest authentic leadership is not a fixed trait, but rather a set of personal and interpersonal skills that can be developed over time (Avolio et al., 2004; Gardner et al., 2005; George, Sims, Mclean, & Mayer, 2007; Shamir & Eilam, 2005). Authentic leadership development programs that focus on experiential learning (Corriveau, 2020),

self-reflection and self-regulation (Frasier, 2019), and the use of action learning to explore triggering events (Baron, 2016), have been shown to be especially effective and increases leaders levels of authenticity.

Additionally, the direct effect of authentic leadership on nurses' voice behaviour and indirect effects though psychological safety draw attention to important implications for nursing leadership. The moderate level of psychological safety reported by nurses in the present study aligns with results from previous studies which have suggested that nurses often feel unsafe to speak up (Nembhard & Edmondson, 2006), as do the direct effects of authentic leadership on psychological safety and indirect effects on voice (A. Newman et al., 2017). These results reinforce the importance of authentic leaders in creating a safe space for nurses to speak up for the purpose of improving patient care and organizational functioning. A recent review of interventions aimed to improve psychological safety and voice suggested that education alone is inadequate in changing patterns of voice, but rather it is necessary to have a context which is receptive to speaking up behaviour (O'Donovan & McAuliffe, 2020). This review also highlighted the importance of developing psychological safety interventions at all levels of the organization, suggesting that it is difficult to develop psychological safety at the individual and team level when voice is not an organizational norm. Additionally, Edmondson et al. (2016) suggested professional norms that perpetuate communication hierarchies act as barriers to nurses' speaking up behaviours. Authentic unit managers are well positioned to nurture nurses' psychological safety as the core dimensions of authentic leadership result in open, honest, transparent safe communications between nurses and leaders. Additionally, as authentic nurse managers role model prototypical

behaviours of the profession, demonstrating speaking up behaviours will help encourage similar behaviours among nursing staff and help reframe voice behaviour as a professional norm.

Finally, the significant direct effects of missed nursing care on adverse events and nurse-assessed quality highlights the importance of maximizing nurses' ability to provide complete patient care. Antecedents such as inadequate labor resources, lack of material resources, poor communication haven been identified as majoring contributing factors to missed nursing care (Kalisch et al., 2009). In addition, comparisons between units with high verses low levels of missed nursing care have identified teamwork and adequate staffing as defining characteristics of units with less missed care (Kalisch, Gosselin, et al., 2012). Similarly, interventions aimed at improving teamwork among nursing staff (Kalisch, Xie, et al., 2013) have been shown to be effective at decreasing missed nursing care. As such, a commitment from nursing leadership to allocate resources directed toward ensuring adequate staffing levels and increasing collaborations, could be an effective means to decrease missed nursing care, thereby decreasing adverse events and improving the quality of patient care delivered in Ontario hospital settings.

Implications for practice. Since authentic leadership was first proposed as essential in creating and sustaining healthy work environments for nursing practice (Shirey, 2006), empirical support for the direct and indirect effects of authentic leadership on nurses and patients has been continually demonstrated (Alilyyani et al., 2018; Malila et al., 2018). The direct effects of unit managers' authentic leadership on staff nurses' job satisfaction highlights the personal effects leaders have on followers. Nurses who are highly satisfied with their jobs are more likely to remain in their jobs, have higher levels

of job performance and organizational commitment, provide higher quality patient care, report lower levels of burnout, and lower turnover intentions from their job and the profession of nursing (Lu et al., 2019). In addition, the direct effects of authentic leadership on psychological safety highlights the important role in authentic nurse managers play in creating psychotically safe practice environments, which in turn increases nurses' propensity to engage in voice behaviour. Psychological safety plays a particularly vital role in high-risk work contexts, such as healthcare (A. Newman et al., 2017), and is critical to the delivery of safe and effective care (O'Donovan & McAuliffe, 2020). Extrapolating results from non-healthcare related research (Burris et al., 2013), nurses who speak up and challenge the status quo may show increased performance and lower levels of involuntary turnover.

The implications of missed nursing care and its direct effects on adverse events and nurse-assessed quality of care also have important implications for practice. When nurses cannot perform care in a way that meets their patients' needs, they often report personal distress (Kalisch et al., 2009), lower job satisfaction, and greater intention to leave their jobs (S. H. Cho et al., 2020; Tschannen et al., 2010). In addition, missed nursing care has been shown to contribute to patient dissatisfaction (Lake, Germack, & Viscardi, 2016) and a host of adverse events including medication errors, hospital acquired infections, patient falls with injury, skin breakdown/pressure ulcer formation, and intravenous line infiltration (Kalisch, Tschannen, et al., 2012; Kalisch et al., 2014; Lucero et al., 2010; S. T. Nelson & Flynn, 2015). Adverse events are a significant issue in Canadian hospitals, costing the system approximately $685 million per year (Lapointe-Shaw & Bell, 2019). Even more alarming are estimates that 7.5% of all hospital

admissions result in an adverse event, with almost 37% of these incidents deemed preventable, and upwards of 20% associated with permanent disability or death (Baker & Norton, 2006; Baker et al., 2004).

Implications for nursing education. The development of nursing leadership must begin at the outset of every nursing education program, and continue throughout one's career (Canadian Nurses Association, 2009a). Furthermore, nurse educators play an important role in helping develop students' authentic leadership abilities, which are essential in their successful transition to practice and ability to practice in a professional role (Waite, McKinney, Smith-Glasgow, & Meloy, 2014). Undergraduate nursing courses that provide students with structured time for self-reflection and to discuss/ synthesize classroom learning with clinical practice learning experiences have been found to be effective at nurturing students' socialization to the professional role and develop the dimensions of authentic leadership, especially the dimension of self-awareness (Dever et al., 2015). Similarly, interventions outside of nursing education that are based on experimental learning have been found to be effective developing students' authentic leadership skills (Corriveau, 2020). Given the importance of developing students' leadership abilities and the previous success of programs aimed at developing these abilities, nurse educators are charged with making space for authentic leadership development throughout undergraduate nursing curricula.

Limitations

Although every attempt was made to minimize limitations in the present study, several aspects of research design, sample, and measurement error were identified as factors that may have limited generalizability or influenced the findings.

Research design. A non-experimental design was used in the present study. Although non-experimental designs are well suited for theory development and exploration of relationships among variables, they lack manipulation of an independent variable, the presence of a control group, and randomization (Radhakrishnan, 2013); therefore, causal inferences could not be made. In addition, data were collected at one point in time (cross sectional), limiting insights into the effects of authentic leadership on nurses work attitudes and behaviour, and outcomes of care over time (Kline, 2016).

Sample. A random sample of registered nurses, working in acute care hospitals, in the province of Ontario, was used to test the hypothesized study model. This sample limits the generalizability of findings to nurses in Ontario who work in acute care settings. In addition, part-time and casually employed nurses were underrepresented in the study sample; therefore, results should be cautiously generalized to that subset of the population. Although the response rate was comparable to that of similar studies in nursing (Cooper & Brown, 2017), it was lower than desired. As such, the use of other data collection methods, such as on-line survey or face to face interview, in conjunction with mailed survey maybe needed to increase response rates.

Measurement error. Although all instruments demonstrated acceptable Cronbach's alpha coefficients (>.70 or reasonably close), several sources of systematic error were present. Systematic error was reflected in the transcription errors that resulted in the omission of item 7 from the psychological safety scale and the exclusion of part-time nurses and casual in the first round of data collection. Given there was no way to statistically control or compensate for these errors, results of hypotheses testing should be cautiously interpreted.

In addition, self-report was the sole data collection technique, thereby increasing the likelihood that common method bias was affecting the results. *Common method bias* refers to variance that is attributable to one measurement method rather than to the constructs the measures represent and is a type of systematic error that provides an alternative explanation for the observed relationships between variables (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Although nurses' self-reports have been shown to a comparable proxy for organizational/manager reported levels of missed-nursing care, adverse events, and quality (Kalisch & Lee, 2012; McHugh & Stimpfel, 2012), participants' responses may have been consciously or unconsciously affected by social desirability bias (Lavrakas, 2008), resulting in over or underinflated scores. Triangulation, or the use of alternative data collection methods (i.e. organizational data and observer/patient perceptions of missed nursing care, adverse events and quality) in conjunction with self-report, could be used to control for common method bias and mitigate the limitations associated with using one form of data collection. Finally, despite nurses' perceptions being most commonly used to measure of unit managers' authenticity, a recent argument has been made for effectiveness of leaders' self-reporting of their own leadership abilities (Černe, Dimovski, Marič, Penger, & Škerlavaj, 2014). As such, using both follower and leader reports of authentic leadership may be beneficial.

Future Research

Since it was first suggested that Avolio et al.'s (2004) model of authentic leadership could be effectively utilized by nursing leaders to advance their leadership practice over a decade ago (Wong and Cummings, 2009), research utilizing this framework has flourished. Findings continually highlight the importance of authentic

leadership in creating supportive work environments and demonstrate direct and indirect effects of authentic leadership on and positive outcomes among nurses and patients (Alilyyani et al., 2018; Malila et al., 2018). Despite the advancement in our understanding of the antecedents, outcomes, and core dimensions of authentic leadership in nursing, several gaps in the literature remain which can be used as the basis for future research.

Moving beyond non-experimental cross-sectional designs. Much of the existing body of research on authentic leadership in nursing has utilized non-experimental, cross-sectional research designs. Although often chosen for feasibility and pragmatic reasons (Radhakrishnan, 2013), there is a need to move beyond the limitations of collecting data at one point in time and the use non-experimental explanatory designs. Utilizing an experimental or quasi-experimental design, Podsakoff and Podsakoff (2019) suggest that field experiments can be effectively used to measure the effects of leadership and infer causality. In order to manipulate the independent variable (a criteria required in a true or quasi-experiment), a group of nurse managers could participate in an authentic leadership development program in which levels of authentic leadership and outcomes would be measured pre and post program completion. In addition, employing longitudinal data collection techniques would help provide insight into the impact of authentic leadership on outcomes over time. Results of (quasi)experimental, longitudinal studies would help build a more robust body of evidence that could be used to infer causal relationships, rather than simply associative relationships, between authentic leadership and hypothesized outcomes.

Diversifying target populations and practice settings. The vast majority of authentic leadership research in healthcare has focused on staff nurses' perceptions of unit managers' leadership in the context of acute care settings (Alilyyani et al., 2018; Malila et al., 2018). Although several studies have moved beyond nurse managers and considered authentic leadership of preceptors (Dwyer et al., 2019; Giallonardo, 2013; Giallonardo et al., 2010), there is an opportunity to diversify this research to informal leaders such as nurse educators, clinical teachers, charge nurses, and staff nurses. Although informal nursing leaders, defined as those without a formal title who influence others to work collaboratively toward a common goal, are essential in effective healthcare systems and are vital in the delivery of high quality patient care, little research has explored the quantitative impact of informal leaders (Douglas Lawson, Tecson, Shaver, Barnes, & Kavli, 2019). In addition, informal nursing leaders represent an overlooked resource that could be developed and supported by managers who recognize the importance of informal leaders and understand their effects on nurses and patients (Downey, Parslow, & Smart, 2011). Avolio et al.'s (2004) model of authentic leadership is especially useful in helping to understand and develop the authentic leadership abilities of informal nursing leaders, as leadership is viewed as a dynamic and reciprocal process that can be developed within any individual in this framework.

In addition, there is a need to examine the effects of authentic leadership in alternative practice settings, specifically long-term care. With only one Canadian study examining authentic leadership in long-term care (Wong et al., 2020), there is a vast opportunity to expand leadership focused research in this practice setting. Most recently, the high proportion of Covid-19 related deaths among residents in long-term care homes

in Canada highlighted a catastrophic failure of leadership. According to a recent national report, residents in long-term care homes accounted for over 80% of Covid-19 deaths in Canada (Canadian Institue for Health Information, 2020). Although there were a multitude of multi-system factors that contributed to the devastating outcomes in long-term care, it is widely accepted that leaders were not prepared and did not effectively respond to the outbreak of Covid-19 in healthcare settings in Canada (Holroyd-Leduc & Laupacis, 2020). The significance of this is highlighted by Forster, Patlas, and Lexa (2020) who suggest great leaders anticipate and plan for significant disruptions, and as such, “failing to prepare is preparing to fail.”

Although tragic, lack of leadership in long-term care during the Covid-19 crisis can be used as a catalyst direct research and resources to improving leadership in long-term care homes. Avolio et al.'s (2004) model of authentic leadership is especially useful in the context of long-term care as it aligns with Forster and colleagues (2020) suggestions that during crises leader should promote open discussions in which creative ideas can be exchanged without fear of reprisal. As such, findings from the present study, which reported significant relationships between authentic leadership, psychological safety, and voice behaviour, further support the appropriate application of authentic leadership in long-term care.

Authentic leadership development programs. Developing nursing leadership is a priority at national (Canadian Nurses Association, 2009a) and international levels (Blaney, 2012). At a provincial level, leadership development is a professional standard mandated by our regulatory body (College of Nurses of Ontario, 2018) and a best practice guideline outlined by our professional association representing nurses

(Registered Nurses' Association of Ontario, 2013a). Despite the importance of developing nursing leadership, the majority of research has focused on understanding and measuring the current state of leadership among nurse managers, rather than the development of authentic leadership abilities. Of the limited body of research that has aimed to evaluate the effectiveness of authentic leadership development initiatives, programs focusing on experiential learning (Corriveau, 2020), self-reflection and self-regulation (Frasier, 2019), and the use of action learning to explore triggering events (Baron, 2016) have been shown to be effective. In addition, shifting the focusing to conceptualizing, implementing, and measuring the effectiveness of leadership development programs for nurse managers, educators, preceptors, and staff nurses aligns with provincial, national, and international mandates and could help develop leadership abilities of all nurses. The importance of including staff nurses' in these leadership development programs is reflected in the CNO's mandate that leadership is a basic professional expectation of all practicing nurses (College of Nurses of Ontario, 2018).

Building the nomological network of missed nursing care. A joint position statement released by the Canadian Nurses Association and the Canadian Federation of Nurses Unions recently named the identification of factors that inhibit patient safety and decrease patient care quality as national priorities (Canadian Nurses Association & Canadian Association of Nurses Unions, 2019). Although research examining missed nursing care in American, European, and Asian health care settings has flourished (Kalánková et al., 2020), little research has been completed in the Canadian healthcare context. Although a small body of research has examined the conceptually similar concept of rationed care in Canada (Rochefort & Clarke, 2010), the present study was the

first to examine the concept of missed nursing. Expanding our understanding of the antecedent and outcomes of missed care, and testing the MISSCARE survey in a variety of practice settings will contribute to the nomological network of missed nursing care. Finally, there is an opportunity to develop a more nuanced understanding of missed nursing care by using multilevel research to examine relationships between individual nurse characteristics, contextual work environment factors, and missed nursing care (Castner et al., 2015).

Conclusion

The purpose of the present study was to test a hypothesized model of authentic leadership. Although the initial model was not supported by the data, a sequential process of respecification resulted in a theoretically sound model being supported. The significant direct relationships between authentic leadership and nurses' voice behaviour and job satisfaction provided support for Avolio et al.'s (2004) model of authentic leadership and assertion that authentic leaders directly effects followers' work attitudes and behaviours. In addition, psychological safety was found to mediate the relationship between nurse managers' authentic leadership and staff nurses' voice behaviour, providing further support for the indirect means through which authentic leaders influence followers. The direct effects of missed nursing care on adverse events and nurse-assessed quality serves to highlighted the importance of nurses' ability to provide complete care patients and identifying antecedents of missed care in nursing. These results have important for theory development, nursing practice, leadership, and education, and can be used as the basis for future research.

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Appendix A: Study Instruments

Demographic Questionnaire

Please tell me something about yourself and your work setting.

1. ***Are you currently registered with the College of Nurses of Ontario as a registered nurse?***

   □ Yes □ No

2. ***Are you currently employed in an acute care hospital in the province of Ontario?***

   □ Yes □ No

3. ***Are you currently employed in a direct patient care role as a registered nurse?***

   □ Yes □ No

**Please note:

- If you answered **YES** to question 1, 2, and 3, please complete the remaining survey questions and return the survey in the self-addressed stamped envelope provided.

- If you answered **NO** to question 1, 2, or 3, please return the survey incomplete in the self-addressed provided.

4. ***What is your gender?***

   □ Female □ Male □ Unspecified

5. ***What is your age in years?***

   _____ years old.

6. ***What is the highest level of education you have completed?***

   □ College diploma □ Bachelor's degree

□ Master's degree □ Doctoral degree

7. ***How many years have you been employed as a Registered Nurse?***

_____ years.

8. ***How many years have you been employed as a Registered Nurse in your current role?***

_____ years.

9. ***What is your specialty area?***

□ Critical Care □Emergency □ Geriatrics □ Maternal/Child
□ Medicine □ Mental Health □ Palliative Care □ Pediatrics
□ Peri-operative □ Surgery □ Other

10. ***What is the typical nurse-patient ratio on your unit?***

_____ patients per nurse.

11. ***Is your unit manager a nurse?***

□ Yes □ No

Authentic Leadership Questionnaire

(Avolio, Gardner, & Walumbwa, 2007)

Please respond to each item by circling the number that most closely indicates how you feel about you unit manager's leadership style.

Your Manager:	Not at all	Once in a while	Sometimes	Fairly often	Frequently, if not always
1. Says exactly what she or he means	0	1	2	3	4
[redacted]	0	1	2	3	4
[redacted]	0	1	2	3	4
[redacted]	0	1	2	3	4
5. Displays emotions exactly in line with feelings	0	1	2	3	4
[redacted]	0	1	2	3	4
[redacted]	0	1	2	3	4
8. Asks you to take positions that support your core values	0	1	2	3	4
[redacted]	0	1	2	3	4
[redacted]	0	1	2	3	4
[redacted]	0	1	2	3	4
12. Listens carefully to different points of view before coming to conclusions	0	1	2	3	4
[redacted]	0	1	2	3	4
[redacted]	0	1	2	3	4
[redacted]	0	1	2	3	4
16. Shows she or he understands how specific actions impact others	0	1	2	3	4

Professional Identifcation Scale

(Ashforth & Mael, 1992)

Please respond to each item by circling the number that most closely indicates how you feel about the profession of nursing.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. When someone praises the profession of nursing, it feels like a personal compliment	1	2	3	4	5
2. When someone criticizes the profession of nursing, it feels like a personal insult	1	2	3	4	5
3. I am very interested in what others think about the profession of nursing	1	2	3	4	5
4. When I talk about the profession of nursing, I usually say "we" rather than "they"	1	2	3	4	5
5. The profession of nursing successes are my successes.	1	2	3	4	5
6. If a story in the media criticized the profession of nursing, I would feel embarrassed	1	2	3	4	5

Voice Behaviour Scale

(VanDyne & LePine, 1998)

Please respond to each item by circling the number that most closely reflects your behaviour at work.

		Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
1.	**I develop and make recommendations to my supervisor concerning issues that affect my work**	1	2	3	4	5	6	7
2.	**I speak up and encourage others in my work unit to get involved in issues that affect our work**	1	2	3	4	5	6	7
3.	**I communicate my opinions about work issues to others in my work unit, even if their opinions are different and they disagree with me**	1	2	3	4	5	6	7
4.	**I keep well informed about issues at work where my opinion can be useful**	1	2	3	4	5	6	7
5.	**I get involved in issues that affect the quality of life in my work unit**	1	2	3	4	5	6	7
6.	**I speak up to my supervisor with ideas for new projects or changes in procedures at work**	1	2	3	4	5	6	7

Psychological Safety Scale

(Edmondson, 1999)

Please respond to each item by circling the number that most closely indicates how you feel about your work unit.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. If you make a mistake on your unit, it tends to be held against you	1	2	3	4	5
2. Members of your unit are able to bring up problems and tough issues	1	2	3	4	5
3. People on your unit sometimes reject others for being different	1	2	3	4	5
4. It is safe to take risks on your unit	1	2	3	4	5
5. It is difficult to ask other members of your unit for help	1	2	3	4	5
6. No one on your unit would deliberately act in a way to undermine your efforts	1	2	3	4	5
7. Working with member of your unit, your unique skills and talents are valued and utilized	1	2	3	4	5

Adapted MISSCARE Survey (Part A)

(Kalisch & Williams, 2009; adapted by Caster & Dean-Baar, 2014)

Please respond to the following items by judging how frequently each statement fits your behaviour at work.

	Never Missed	Rarely Missed	Occasionally Missed	Frequently Missed	Always Missed
1. Administering medications within 30 minutes before or after scheduled time	1	2	3	4	5
2. Assessing vital signs as ordered	1	2	3	4	5
3. Monitoring input/output	1	2	3	4	5
4. Documenting all necessary data	1	2	3	4	5
5. Teaching patient about illness, tests, diagnostic studies	1	2	3	4	5
6. Providing emotional support to patient and/or family	1	2	3	4	5
7. Hand washing	1	2	3	4	5
8. Monitoring bedside glucose as ordered	1	2	3	4	5
9. Assessing patient each shift	1	2	3	4	5
10. Performing focused reassessment according to patient condition	1	2	3	4	5
11. Performing intravenous/central line site care and assessments according to hospital policy	1	2	3	4	5
12. Acting on PRN medication requests within 15 minutes	1	2	3	4	5
13. Assessing effectiveness of medications	1	2	3	4	5
14. Assisting with toileting needs within 5 minutes of request	1	2	3	4	5
15. Performing skin/wound care	1	2	3	4	5

Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale
(Canmann, Fichman, Jenkins, & Klesh, 1983)

Please indicate your agreement on the following scale.

	Strongly Disagree	Disagree	Slightly Disagree	Neither Agree Nor Disagree	Slightly Agree	Agree	Strongly Agree
1. All in all, I am satisfied with my job	1	2	3	4	5	6	7
2. In general, I don't like my job	1	2	3	4	5	6	7
3. In general, I like working here	1	2	3	4	5	6	7

Adverse Events Scale
(Sochalski, 2001)

Over the past year, how often would you say each of the following incidents have occurred involving you or your patients?

	Never	Rarely	Occasionally	Frequently
1. Patient receive the medication or dose	1	2	3	4
2. Nosocomial infections	1	2	3	4
3. Patient falls with injuries	1	2	3	4

Quality of Care Scalea
(Sochalski, 2004)

Please indicate the overall quality of nursing care delivered to patients on your unit during your last shift.

	Poor	Fair	Good	Excellent
1. In general, how would you describe the quality of nursing care delivered to patients on your unit on your last shift?	1	2	3	4

Appendix B: Letters of Information

Letter of Information and Consent Form

Nurse managers' authentic leadership, staff nurses' work attitudes and voice behaviour, and outcomes of care: A structural equation model

Dear Nursing Colleague,

I would like to invite you to participate in a research project I am conducting as part of the program requirements to complete my Doctorate of Philosophy in Nursing at Western University.

Why is the researcher doing this study?

Although empirical links between leadership, nurses' work attitudes and behaviours, and outcomes of care are well established, there is a lack of research testing the indirect (mediated) effects of leadership on nurses and patients. It is proposed that the concept of authentic leadership can be used to explain the complex psychological processes that mediate the relationships between nurse managers' leadership, staff nurses' workplace attitudes, behaviours, and outcomes of care.

Results of this study will provide insight into the ways in which nurse managers' authentic leadership influences staff nurses' self-concept (professional identification), speaking up behaviours (voice), missed care, job satisfaction, and outcomes of care (adverse events and quality). In addition, testing the moderating effects of psychological safety addresses the boundary conditions under which professional identification influences staff nurses' voice behaviour. Nursing leaders can use this knowledge to create work environments which nurture the development positive work attitudes and behaviours among nurses, ultimately promoting positive outcomes of that care.

How will the researchers do the study?

I have enclosed a questionnaire seeks to elicit some demographic information, in addition to your opinion on your manager, work attitudes, work behaviour, work environment, and patient care. You are being invited to participate in this study because you indicated a willingness to be contacted for research purposes on your annual College of Nurses of Ontario registration. A random sample of 1000 Registered Nurses across the province of Ontario have been invited to participate in this study.

What will I be asked to do?

Your participation in this research is entirely voluntary. The enclosed questionnaire should take approximately 15 minutes to complete. Completion and return of the enclosed questionnaires indicates your consent to participate in the study. If you do choose to participate, please use the pre-addressed stamped envelope enclosed to return the questionnaire to the research office.

Can I withdraw from the study?

You may refuse to participate, refuse to answer any of the questions, or withdraw from the study at any time without penalty. If at any time you would like to withdraw from the study, please contact me and your data will be removed from the files. If you do not wish to participate, you may choose to take no further action or return the blank questionnaire in the self-addressed stamped envelope provided. If you chose to take no further action you will be send two additional invitations to participate; however, if you return a blank questionnaire, you will not contacted further.

How will my privacy be protected?

If you do choose to participate, your responses are will be kept strictly confidential. Questionnaire forms will contain no identifiers that link you to any specific response. A code is assigned to each questionnaire package to monitor response rates and send reminders to participants who have not returned the questionnaire package. There is also risk of privacy breach occurring due to personal information being accidently lost or stolen. In order to mitigate this rick, the laptop which will store all participant information will be password protected and encrypted with Bitlocker Encryption. All hard copy data will be stored in a locked filing cabinet accessible only to the study investigator. In accordance with Western University policy, data will be retained for five years, after which all study data will be destroyed using confidential shredding devices. Questionnaire results will be reported in summary only and data compiled will only be used for research purposes. If the results of the study are published, your name will not be used and no information that discloses your identity will be released. However, representatives of the Western University Human Research Ethics Board may contact you or require access to your study- records to monitor conduct of the research.

What are the risks and benefits of the study?

There are no known or expected risks associated with participation in this study. If you choose to partake in this research study, you will be helping advance knowledge related to nurse manager's authentic leadership, staff nurse's work attitudes and behaviour, and outcomes of care.

Will the study cost me anything and, if so, how will I be reimbursed?

You will incur no costs if you choose to participate in this study. As a small token of my appreciation, this survey package contains a perforated raffle ticket which you can divide and send back with your completed questionnaire for the chance to win one of two iPad minis. Returned raffle tickets will be deposited in a secure box accessible only to the researcher. The draw will take place at the end of data collection, approximately 8 weeks after it is initiated.

How will I be informed of study results?

If you are interested in receiving the results of this study, please indicate so in the space provided on the cover of your questionnaire package. I would be happy to send you a copy of the results.

What if I have study questions or problems?

If you have any questions, please feel free to contact me at [redacted]. My research supervisor Dr. Carol Wong is also available at the University of Western Ontario at [redacted] or [redacted]. Should you have any questions about the conduct of this study or your rights as a research subject, you can contact the Office of Human Research Ethics, Western University at [redacted] or [redacted].

Thank you very much for considering my request.

Sincerest Regards,

Lisa Giallonardo RN, PhD Student
Arthur Labatt Family School of Nursing
Western University

Dr. Carol Wong RN, PhD
Arthur Labatt Family School of Nursing
Assistant Professor, School of Nursing Western University

Follow-up Letter of Information and Consent Form

Nurse managers' authentic leadership, staff nurses' work attitudes and voice behaviour, and outcomes of care: A structural equation model

Dear Nursing Colleague,

Three weeks ago I sent you a package containing a questionnaire and letter of information related to a research study being conducted to examine the relationship between nurse manager's authentic leadership, staff nurses work attitudes and behaviours, and outcomes of care. Since it has been sent to a small, but representative sample of staff nurses, it is important that your responses be included in the study if the results are to accurately represent the opinions of all Registered Nurses in Ontario.

If you have already responded, *thank you* very much for your time and support. If you have not, I would appreciate you doing so as soon as possible. Your participation in this research is entirely voluntary. Completion and return of the questionnaire indicates your consent to participate in the study. If you do not wish to participate, you may choose to take no further action or return the blank questionnaire in the self-addressed stamped envelope provided. If you chose to take no further action you will be send two additional invitations to participate; however, if you return a blank questionnaire, you will not contacted further.

If you are interested in receiving the results of this study, please indicate so in the space provided on the cover of your questionnaire package. I would be happy to send you a copy of the results. If by some chance you did not receive the questionnaire, or it was misplaced, please contact me by email and I will mail another questionnaire to you today.

If you have any questions, please feel free to contact me at [redacted]. My research supervisor Dr. Carol Wong is also available at [redacted] x [redacted] or [redacted]. Should you have any questions about the conduct of this study or your rights as a research subject, you can contact the Office of Human Research Ethics, Western University at [redacted] or [redacted].

Thank you very much for considering my request.

Sincerest regards,

Lisa Giallonardo RN PhD(c)
Arthur Labatt Family School of Nursing
Doctoral Candidate
Western University

Dr. Carol Wong RN PhD
Arthur Labatt Family School of Nursing
Professor, School of Nursing
Western University

Second Follow-up Letter of Information and Consent Form

Nurse managers' authentic leadership, staff nurses' work attitudes and voice behaviour, and outcomes of care: A structural equation model

Dear Nursing Colleague,

Five weeks ago I sent you a package containing a questionnaire and information letter related to a study I am conducting as part of the program requirements to complete my Doctorate of Philosophy Degree at Western University. As of today, I have yet to receive your questionnaire.

Why is the researcher doing this study?

Although empirical links between leadership, nurses' work attitudes and behaviours, and outcomes of care are well established, there is a lack of research testing the indirect (mediated) effects of leadership on nurses and patients. It is proposed that the concept of authentic leadership can be used to explain the complex psychological processes that mediate the relationships between nurse managers' leadership, staff nurses' workplace attitudes, behaviours, and outcomes of care.

Results of this study will provide insight into the ways in which nurse managers' authentic leadership influences staff nurses' self-concept (professional identification), speaking up behaviours (voice), missed care, job satisfaction, and outcomes of care (adverse events and quality). In addition, testing the moderating effects of psychological safety addresses the boundary conditions under which professional identification influences staff nurses' voice behaviour. Nursing leaders can use this knowledge to create work environments which nurture the development positive work attitudes and behaviours among nurses, ultimately promoting positive outcomes of care.

How will the researcher do the study?

In the event that you did not receive you questionnaire, or it has been misplaced, I have enclosed a questionnaire that seeks to elicit some demographic information, in addition to your opinion on your manager, work attitudes, work behaviour, work environment, and patient care. You are being invited to participate in this study because you indicated a willingness to be contacted for research purposes on your annual College of Nurses of Ontario registration. A random sample of 1000 Registered Nurses across the province of Ontario have been invited to participate in this study

What will I be asked to do?

Your participation in this research is entirely voluntary. The enclosed questionnaire should take approximately 15 minutes to complete. Completion and return of the enclosed questionnaires indicates your consent to participate in the study. If you do choose to participate, please use the pre-addressed stamped envelope enclosed to return the questionnaire to the research office.

Can I withdraw from the study?

You may refuse to participate, refuse to answer any of the questions, or withdraw from the study at any time without penalty. If at any time you would like to withdraw from the study, please contact me and your data will be removed from the files. If you do not wish to participate, you may choose to take no further action or return the blank questionnaire in the self-addressed stamped envelope provided. If you chose to take no further action you will be send two additional invitations to participate; however, if you return a blank questionnaire, you will not contacted further.

How will my privacy be protected?

If you do choose to participate, your responses are will be kept strictly confidential. Questionnaire forms will contain no identifiers that link you to any specific response. A code is assigned to each questionnaire package to monitor response rates and send reminders to participants who have not returned the questionnaire package. There is also risk of privacy breach occurring due to personal information being accidently lost or stolen. In order to mitigate this rick, the laptop which will store all participant information will be password protected and encrypted with Bitlocker Encryption. All hard copy data will be stored in a locked filing cabinet accessible only to the study investigator. In accordance with Western University policy, data will be retained for five years, after which all study data will be destroyed using confidential shredding devices. Questionnaire results will be reported in summary only and data compiled will only be used for research purposes. If the results of the study are published, your name will not be used and no information that discloses your identity will be released. However, representatives of the Western University Human Research Ethics Board may contact you or require access to your study- records to monitor conduct of the research.

What are the risks and benefits of the study?

There are no known or expected risks associated with participation in this study. If you choose to partake in this research study, you will be helping advance knowledge related to nurse manager's authentic leadership, staff nurse's work attitudes and behaviour, and outcomes of care.

How will I be informed of study results?

If you are interested in receiving the results of this study, please indicate so in the space provided on the cover of your questionnaire package. I would be happy to send you a copy of the results.

What if I have study questions or problems?

If you have any questions, please feel free to contact me at [redacted]. My research supervisor Dr. Carol Wong is also available at the University of Western Ontario at [redacted] x [redacted] or [redacted]. Should you have any questions about the conduct of this study or your rights as a research subject, you can contact the Office of Human Research Ethics, Western University at [redacted] or [redacted].
Thank you very much for considering my request.

Sincerest regards,

Lisa Giallonardo RN PhD(c)
Arthur Labatt Family School of Nursing
Doctoral Candidate
Western University

Dr. Carol Wong RN PhD
Arthur Labatt Family School of Nursing
Professor, School of Nursing
Western University

Appendix C: Research Ethics Board Approval Letter

Western Research

Research Ethics

Western University Health Science Research Ethics Board
HSREB Delegated Initial Approval Notice

Principal Investigator: Dr. Carol Wong
Department & Institution: Health Sciences\Nursing,Western University

Review Type: Delegated
HSREB File Number: 109462
Study Title: Nurse managers' authentic leadership, staff nurses' work attitudes and voice behaviours, and outcomes of care: A structural equation model

HSREB Initial Approval Date: August 30, 2017
HSREB Expiry Date: August 30, 2018

Documents Approved and/or Received for Information:

Document Name	Comments	Version Date
Western University Protocol		2017/08/30
Letter of Information & Consent	Main	2017/08/27
Letter of Information & Consent	Follow-up LOI	2017/08/27
Letter of Information & Consent	Second Follow-up LOI	2017/08/27
Instruments	Questionnaire	2017/08/14
	Hypothesized Study Model - Received 6/19/2017	

The Western University Health Science Research Ethics Board (HSREB) has reviewed and approved the above named study, as of the HSREB Initial Approval Date noted above.

HSREB approval for this study remains valid until the HSREB Expiry Date noted above, conditional to timely submission and acceptance of HSREB Continuing Ethics Review.

The Western University HSREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use GuideLine for Good Clinical Practice Practices (ICH E6 R1), the Ontario Personal Health Information Protection Act (PHIPA, 2004), Part 4 of the Natural Health Product Regulations, Health Canada Medical Device Regulations and Part C, Division 5, of the Food and Drug Regulations of Health Canada.

Members of the HSREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

[redacted]

Ethics Officer, on behalf of Dr. Joseph Gilbert, HSREB Chair

EO: Erica Basile ___ Grace Kelly ___ Katelyn Harris ___ Nicola Morphet ___ Karen Gopaul ___ Patricia Sargeant ___

Western University, Research Support Services Bldg., Rm 5150

[redacted]

Appendix D: Correlation Matrix with Untrimmed Scales

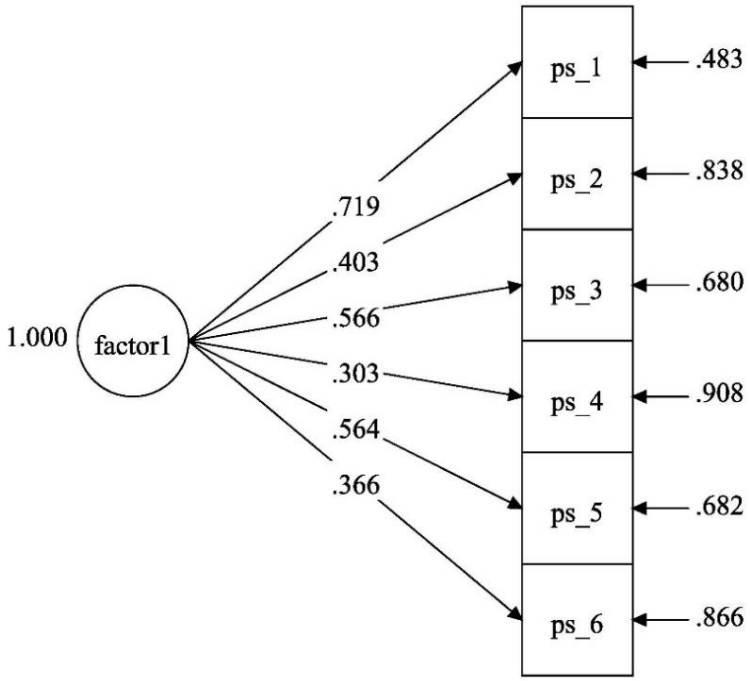
Correlation Matrix for Demographic Variables and Main Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Yrs as a Registered Nurse	-														
2. Yrs in Current Role	.63**	-													
3. Nurse-Patient Ratio	.02	.08	-												
4. Authentic Leadership	-.03	-.11	.16*	-											
5. Relational Transparency	-.02	-.10	.17**	.95**	-										
6. Moral Ethical Reasoning	.01	-.09	.13*	.95**	.86**	-									
7. Balanced Processing	-.05	-.10	.11	.91**	.85**	.85**	-								
8. Self-Awareness	-.06	-.13*	.18**	.95**	.85**	.89**	.86**	-							
9. Professional Identification	.09	.07	.03	.04	.03	.05	.06	.04	-						
10. Voice Behaviour	.13*	.07	.08	.20**	.18**	.18**	.17**	.20**	.11	-					
11. Psychological Safety	-.12	-.15*	.01	.29**	.26**	.25**	.33**	.30**	.04	.12	-				
12. Missed Nursing Care	-.15*	-.05	.20**	-.10	-.09	-.12*	-.10	-.08	-.11	-.05	-.16**	-			
13. Nurse-Assessed Quality	.11	.08	-.15*	.18**	.20**	.17**	.21**	.15*	.03	.090	.23**	-.40**	-		
14. Adverse Events	-.03	.04	.11	-.02	-.03	-.03	.01	.01	-.03	-.02	-.04	.38**	-.36**	-	
15. Job Satisfaction	.02	-.07	-.01	.42*	.38**	.42**	.42**	.39**	.150*	.250**	.30**	-.32**	.39**	-.28**	-

Note: ** p< 0.01; * p<.05; values presented above calculated using untrimmed scales

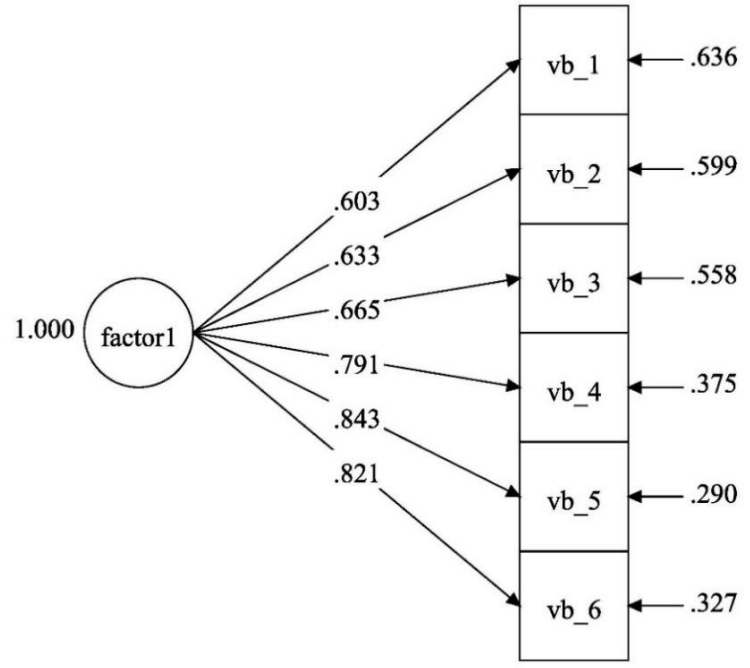
Appendix E: Working Iterations of Confirmatory Factor Analysis Models

Confirmatory Factor Analysis of the Psychological Safety Scale: First Iteration



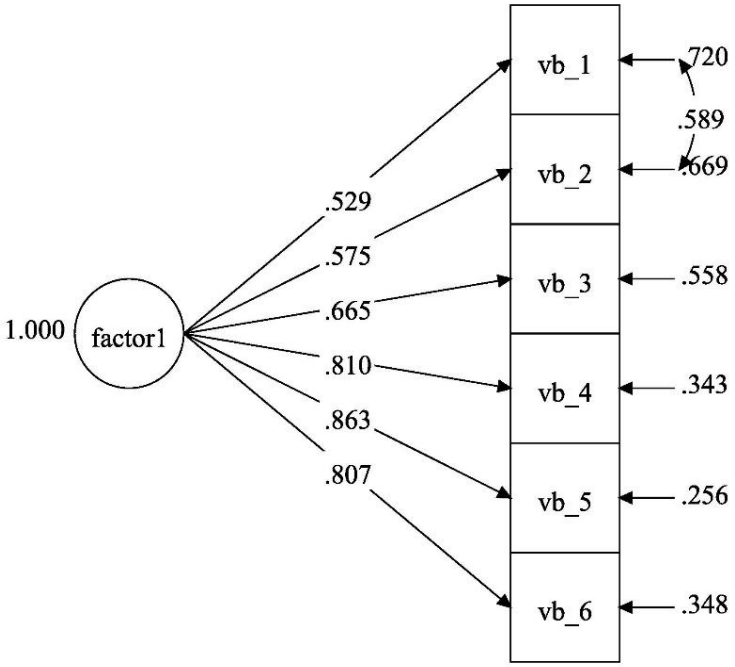
Note: all parameter estimates are significant at $p < .001$

Confirmatory Factor Analysis of the Voice Behaviour Scale: First Iteration



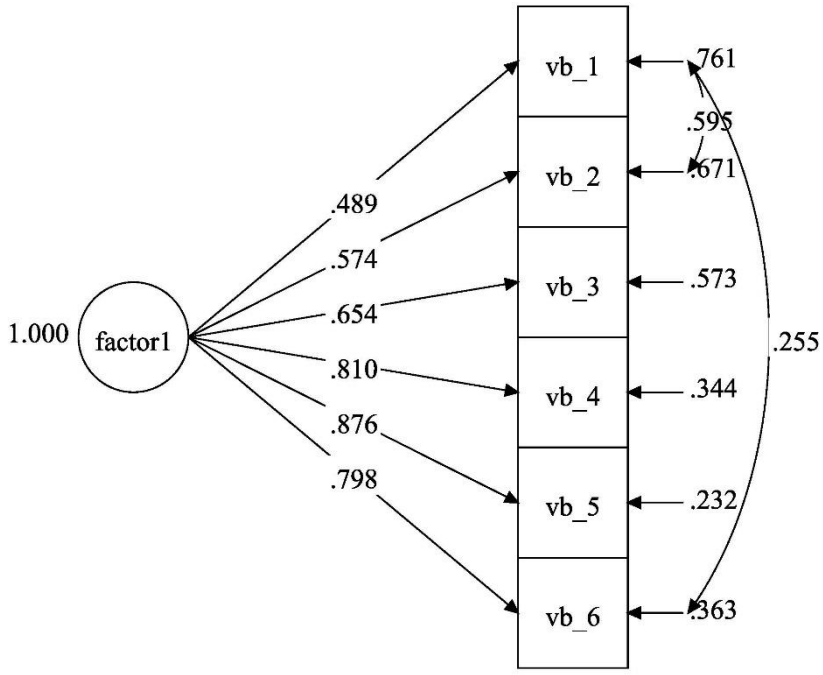
Note: all parameter estimates are significant at $p < .001$

Confirmatory Factor Analysis of the Voice Behaviour Scale: Second Iteration



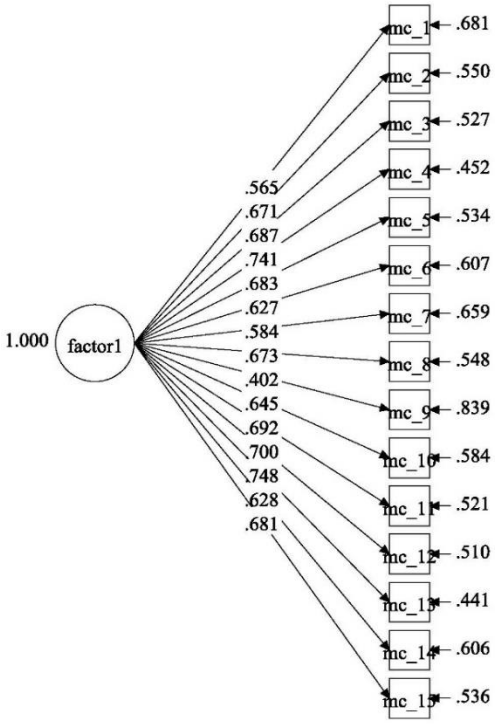
Note: all parameter estimates are significant at $p < .001$

Confirmatory Factor Analysis of the Voice Behaviour Scale: Third Iteration



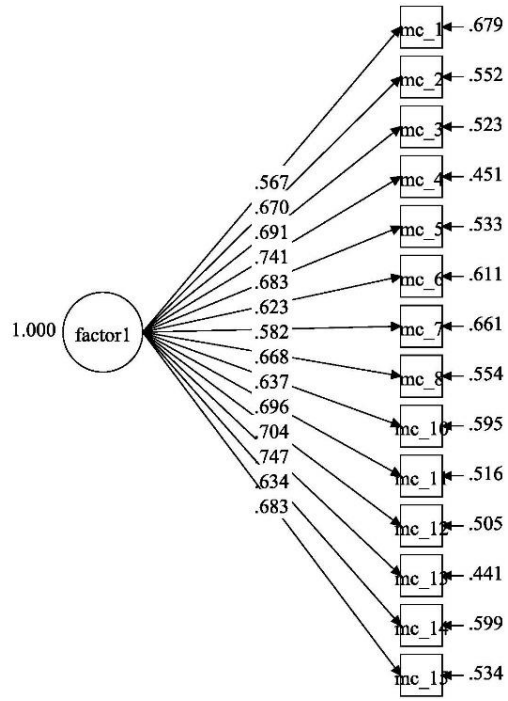
Note: all parameter estimates are significant at $p < .001$

Confirmatory Factor Analysis of the Adapted Part A of the MISSCARE (First Iteration)



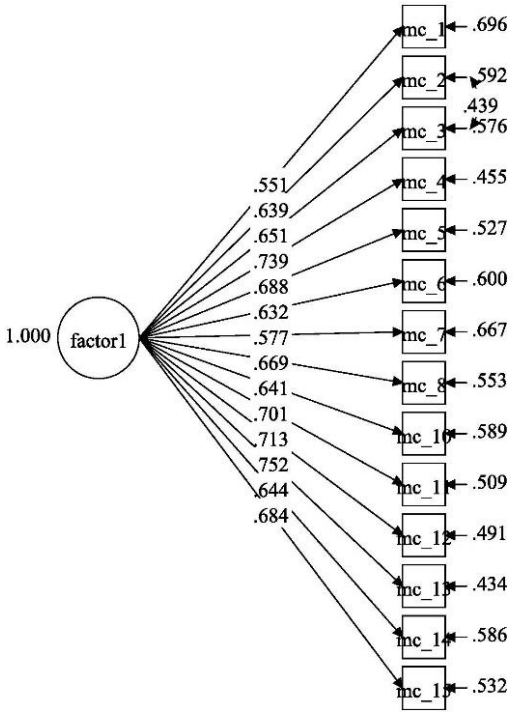
Note: all parameter estimates are significant at $p < .001$

Confirmatory Factor Analysis of the Adapted Part A of the MISSCARE (Second Iteration)



Note: All parameter estimates are significant at $p < .001$

Confirmatory Factor Analysis of the Adapted Part A of the MISSCARE (Third Iteration)



Note: All parameter estimates are significant at $p < .001$

Appendix F: Summary of Direct and Indirect Effects

Path Coefficients for Structural Model (First Iteration)

Paths	***b***	***β***	***SE***	***95% CI, lower & upper***	***p***
	Direct Effects				
Authentic Leadership → Professional Identification	.045	.065	.083	-.098 & .227	.435
Professional Identification → Voice Behaviour	.180	.112	.082	-.049 & .273	.174
Voice Behaviour → Missed Nursing Care	-.021	-.047	.066	-.177 & .084	.482
Authentic Leadership → Job Satisfaction	.576	.434	.061	.315 &.554	<.001
Missed Nursing Care → Job Satisfaction	-.968	-.371	.063	-.495 & -.247	<.001
Missed Nursing Care → Adverse Events	.401	.556	.068	.422 & .690	<.001
Missed Nursing Care→ Nurse Assessed Quality	-.583	-.442	.058	-.555 & -.328	<.001
	Indirect Effects				
Authentic Leadership → Professional Identification → Voice Behaviour	.008	.007	.012	-.016 & .031	.551
Professional Identification → Voice Behaviour → Missed Nursing Care	-.004	-.005	.009	-.024 & .013	.581
Voice Behaviour → Missed Nursing Care → Job Satisfaction	.020	.071	.025	-.031 & .066	.487
Voice Behaviour → Missed Nursing Care → Adverse Events	-.008	-.026	.037	-.098 & .046	.482
Voice Behaviour → Missed Nursing Care → Nurse Assessed Quality	.012	.021	.029	-.037 & .078	.483

Note: *b* = unstandardized coefficient, *β* = standardized coefficient, *SE* = standard error, *95% CI* = 95% confidence interval, *p* = significance level

Path Coefficients for Alternative Model (First Iteration)

Paths	***b***	***β***	***SE***	***95% CI, lower & upper***	***p***
	Direct Effects				
Authentic Leadership → Professional Identification	.041	.059	.081	-.101 & .218	.472
Authentic Leadership → Psychological Safety	.419	.474	.066	.344 & .603	<.001
Professional Identification → Voice Behaviour	.155	.097	.076	-.053 & .246	.206
Psychological Safety → Voice Behaviour	.505	.396	.072	.255 & .538	<.001
Voice Behaviour → Missed Nursing Care	-.023	-.051	.067	-.181 & .080	.449
Authentic Leadership → Job Satisfaction	.582	.438	.061	.319 & .558	<.001
Missed Nursing Care → Job Satisfaction	-.583	-.369	.063	-.493 & -.246	<.001
Missed Nursing Care → Adverse Events	.401	.556	.068	.422 & .690	<.001
Missed Nursing Care→ Nurse Assessed Quality	-.583	-.422	.058	-.555 & -.328	<.001
	Indirect Effects				
Authentic Leadership → Professional Identification → Voice Behaviour	.006	.006	.009	-.012 & .023	.530
Authentic Leadership → Psychological Safety → Voice Behaviour	.212	.188	.047	.096 & .279	<.001
Professional Identification → Voice Behaviour → Missed Nursing Care	-.004	-.005	.009	-.022 & .012	.566
Psychological Safety → Voice Behaviour → Missed Nursing Care	-.012	-.020	.027	-.074 & .034	.466
Voice Behaviour → Missed Nursing Care → Job Satisfaction	.022	.019	.025	-.030 & .068	.454
Voice Behaviour → Missed Nursing Care → Adverse Events	-.009	-.028	.037	-.101 & .045	.450
Voice Behaviour → Missed Nursing Care → Nurse Assessed Quality	.013	.022	.030	-.036 & .080	.451

Note: *b* = unstandardized coefficient, *β* = standardized coefficient, *SE* = standard error, *95% CI* = 95% confidence interval, *p* = significance level

Appendix G: Curriculum Vitae

Name: Lisa Giallonardo

Post-secondary Education and Degrees:

The University of Western Ontario
London, Ontario, Canada
2002-2006 BScN

The University of Western Ontario
London, Ontario, Canada
2007-2009 MScN

Western University Ontario
London, Ontario, Canada
2011-present PhD

- Leave of absence (maternity leave) 2015-2016 and 2017-2018

Honours & Awards:

Sigma Theta Tau International Iota Omicron Award Chapter Research Grant
2008-2009

University of Western Ontario Tuition Scholarship
2008-2009

Elizabeth Wooster Gold Medal Award
2009-1010

Governor General Gold Medal Award (nomination)
2010

Joseph and Vera Byrne 125th Anniversary Alumni Graduate Scholarship in Nursing Award
2011-2012

Dean's Entrance Scholarship
2011-2012

Western Graduate Research Scholarship
2013-2014

Irene E. Nordwich Graduate Student Award
2013-2014

Graduate Student Conference Travel Award
2013-2014

Ontario Graduate Scholarship
2014-2015

Western Graduate Research Scholarship
2014-2015

Humber College Staff Initiative Research Fund
2014-2015

Related Work Experience:

Registered Nurse
Toronto General Hospital
2006-2009

Teaching Assistant
The University of Western Ontario
2008-2009

Professor (Practical Nursing Program)
Sheridan College
2010-2013

Professor (Bachelor of Nursing Program)
Humber College
2013- Present

Publications:

Giallonardo, L.M., Wong, C.A., & Iwasiw, C.L. (2010). Authentic leadership of preceptors: predictors of new graduate nurses' work engagement and job satisfaction. *Journal of Nursing Management, 18*, 993-1003.

Giallonardo, L.M. (2011). Master's-prepared novice? Commentary from a new master's-prepared graduate. *Nursing Leadership, 24*(2), 36-37.

Wong, C.A., & **Giallonardo, L.M.** (2013). *Authentic leadership and nurse-assessed adverse patient outcomes. Journal of Nursing Management, 21, 7*40-752.

Wong, C.A., & **Giallonardo, L.M**. (2014). Leadership and its influence on patient outcomes (Eds.), *Leadership and nursing: Contemporary perspectives*. Australia: Elsevier.