AN EXPLORATION OF ACCIDENT/FAILURE ATTRIBUTIONS AND THE
POTENTIAL IMPLICATIONS FOR FUTURE RESEARCH IN
OCCUPATIONAL HEALTH PSYCHOLOGY WITH PSYCHIATRIC NURSES

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ABSTRACT

The current review of the literature provides an overview of Attribution Theory (AT) and the themes, trends and gaps that have emerged for this construct within the field of occupational health psychology. AT is a widely published area of research and has served as a theoretical framework to investigate how individuals interpret accidents and their causes. Within this framework, researchers have investigated cognitive biases such as the self-serving bias, the false consensus effect, the actor-observer bias, the fundamental attribution error, the ultimate attribution error, Fischoff’s hindsight bias, the hedonic relevance bias, the optimism bias, and defensive attribution theory. Themes and trends of this review include subjective attribution tendencies, the types of attributions and their relation to safety behaviours, controversies regarding the assumptions of responsibility and the importance of accurate accident appraisals.

Current gaps in the literature include somewhat dated research and only partial use of Weiner’s AT model (1985; 2010). In addition, there seems to be a paucity of research on AT as it applies to occupations with a high prevalence of accidents such as psychiatric nursing. The review further describes the extent to which the theory may be useful for occupational health and safety, accident prevention and in psychiatric nursing where practitioners face not only the common risks inherent to the profession but also the significant and unique risks in mental health facilities such as patient aggression and violence. This paper concludes by suggesting avenues of possible research as it applies to this profession, methodological challenges and the implications for future studies.
TABLE OF CONTENTS

ACKNOWLEDGEMENTS.......................................................... 2

ABSTRACT.................................................................................. 3

PSYCHIATRIC NURSES AND OCCUPATIONAL ACCIDENTS.......... 6
  Challenges in the Nursing Profession........................................ 6
  Factors Contributing to Injury, Absenteeism and Emotional Exhaustion...... 8
  The Perspective of Psychiatric Nurses........................................ 12

ATTRIBUTION THEORY: ORIGIN AND CONTRIBUTORS...................... 14
  Heider’s Naïve Psychology.................................................... 14
  Jones and Davis’s Correspondent Inference Theory........................ 15
  Kelley’s Covariation Theory.................................................. 16
  Weiner’s Model for Achievement Related Events.......................... 16

ATTRIBUTION BIASES AND THEORY............................................. 18
  Self-Serving Bias............................................................... 18
  False Consensus Effect...................................................... 18
  Actor-Observer Bias........................................................... 18
  Fundamental Attribution Error............................................ 18
  Ultimate Attribution Error.................................................. 18
  Fischhoff’s Hindsight Bias................................................... 19
  Hedonic Relevance Bias..................................................... 19
  Optimism Bias............................................................... 20
  Defensive Attribution Theory.............................................. 52

DEJOY’S MODEL OF WORKPLACE SAFETY MANAGEMENT.................. 20

SUBJECTIVITY IN ATTRIBUTION.................................................. 22
  Internals and Externals..................................................... 22
  Patients of Psychiatric Nurses............................................. 24
  Witnesses and Victim...................................................... 25
  Attribution Asymmetries................................................... 26
  Culture Bias............................................................... 27
  Socioeconomic Status..................................................... 28
  Hierarchal Status.......................................................... 28
  Occupation Type........................................................... 29

FACTORS RELATED TO CAUSAL ATTRIBUTIONS.......................... 30
  Emotions............................................................................ 30
  Learned Helplessness....................................................... 31
  Covariation Data............................................................ 32
  Safety Climate and Communication........................................ 33
Hierarchical Position, Gender and Accident Severity ........................................ 33
Previous Accident Experience ........................................................................... 35
Job Satisfaction ..................................................................................................... 35
Perceived controllability, danger, risk-taking and desirability ................................. 36
Age ....................................................................................................................... 36

ATRIBUTIONS FOR ACCIDENTS AND ASSOCIATED OUTCOMES ............... 37
Accusations ........................................................................................................... 37
Group Attributions and Impact on Performance .................................................... 37
Acts of Criminal Violence ..................................................................................... 38
Causal Responsibility and Culpability ................................................................ 39
Post-Crash Symptomatology .............................................................................. 39
Effort and Supervisory Response to Accidents ..................................................... 40
Racially Biased Attributions ................................................................................. 41
Alcohol-Impaired Driving ..................................................................................... 41
Spontaneous Attributional Search ....................................................................... 42
Crash Survivors .................................................................................................... 42
Aggressive Driving Incidents .............................................................................. 43
Teacher’s Attributions of Student Failure ............................................................ 44
Student Attributions for Success/Failure in Mathematics ..................................... 44
Attribution Patterns of Unsafe Behaviour Incidents in Mining Enterprise .............. 45
Small Business Owner Attributions for Injury-Related Work Absence .................. 46
Nurses Causal Attributions for Severity Dependent-Error ................................... 47
Role of Causal Attributions in Accident Analysis and Safety Interventions .......... 49

ANALYSIS OF ACCIDENTS AND IDENTIFICATION OF HUMAN ERROR ...... 49
Attribution Patterns among Victims, Coworkers and Supervisors .......................... 49
Blame, Victim, Offender Status and Pursuit of Revenge ...................................... 50
Consumer Response to Public Hospital Service Failure ..................................... 50

SUMMARY AND FUTURE CONSIDERATIONS ........................................... 52
Themes in Literature ............................................................................................ 52
Trends in Literature ............................................................................................. 54
Gaps in Literature ............................................................................................... 56

PROPOSED METHODOLOGY FOR FUTURE STUDIES .......................... 58
Central and Ongoing Role of Researchers ............................................................ 60

REFERENCES ...................................................................................................... 61

APPENDICES ....................................................................................................... 84
Psychiatric Nurses and their Vulnerability to Occupational Accidents

Nurses’ contributions to the health care system are essential and immense. In public surveys, the nursing profession tends to garner significant support and respondents tend to view nurses as trustworthy (Health Canada, 2002), honest, and ethical (American Nurses Association [ANA], 2010; 2014). Also inherent to the profession are a number of hazards and stressors, most of which are unique to their specific duties. It follows that nurses will likely also experience unique occupational health and illness related issues.

To offer some perspective, Health Canada (2013a) estimates that each year, more than 16 million nursing hours are lost as a result of injury and illness, which represents about 9000 full-time positions. The Canadian Labour and Business Centre (CLBC) (2002) estimated the cost of overtime, absenteeism, and replacement of nurses at $962 million to $1.5 billion annually. It reported that as many as 7.4% of all registered nurses (RNs) are absent from work due to injury, illness, burnout or disability (CLBC, 2002) in any given week. In addition, nursing absenteeism is 80% higher than the average of 47 other occupational groups (i.e., 8.1% in nursing and 4.5% for others). Health Canada (2013b) found that LPNs (licensed practical nurses) and RPNs (registered psychiatric nurses) appear to have even higher rates, although exact numbers are unknown.

Researchers have sought to understand the reasons behind these statistics (Hackett & Bycio, 1996; Rajbhandary & Basu, 2010; Rauhala et al., 2007). For example, direct patient threats (Mckenna, Poole, Smith, Coverdale & Gate, 2003), assaults (Arnetz et al.,
2014) as well as physical and emotional abuse (International Council of Nurses, 2004) appear to be common in nursing. A Canadian survey by Henderson (2003) examined four clinical settings: maternity, community, emergency and mental health and found that 50% of front-line nurses were verbally abused and 22% reported physical abuse in a 12-month period. These statistics appear to be consistent with previously published data. Poster (1996) found that 45% of Canadian and 61% of United Kingdom (UK) nurses had been assaulted at work by both patients and patients’ relatives. Nurses also experience stressors and hazards unique to their scope of practice.

In mental healthcare, there are a number of recurring problems and challenges such as bullying, violence, aggression, role conflict and having to control patients (Mctierman & McDonald, 2015; Muthuenkatachalam, Chetana, Sandhya & Sonika, 2014). In fact, violence and verbal abuse appears to have become “routine” for psychiatric and emergency nurses. Statistics Canada (2005) reported that RPNs are particularly at risk with 47% reporting physical assault and 72% reporting emotional abuse. Male nurses report emotional abuse more often (55%) than female nurses (46%). This is believed to be the result of the roles assigned or expected of male nurses with aggressive patients (Statistics Canada, 2005). Common to both genders are high rates of assaults, which have been shown to impact RPNs in the form of Post-Traumatic Stress Disorder (PTSD) (Jacobowitz, 2013).

Even the perceived risk of exposure to trauma can result in work stress. A study by Ito, Eisen, Sederer, Yamanda and Tachimori (2001) investigated the intention of psychiatric nurses to leave in relation to their perceived risk of assault. The National
Institute for Occupational Safety and Health (NIOSH) job stress questionnaire was used to assess the perceived risk of assault, job satisfaction, supervisory support and intentions to leave. Ito et al., (2001) found that the perceived risk of assault as well as insufficient job satisfaction and support from supervisors were all related to nurses’ intentions to leave their job.

Moreover, it has been long recognized that mental health is strongly linked with physical health (Bartholomew, Morrison & Ciccolo, 2005; Peluso & Silveira Guerra de Andrade, 2005). According to Berrios, Joffres and Wang (2015), nurses are more prone to distress and subsequent illness relative to other Canadian workers. This is often reported in studies that have investigated the relationship between nurse stress levels and related psychosomatic illness (Humaida, 2012; Kane, 2009; Tangestani, Khalafi & Esmaeily, 2014). In fact, nurses are at an increased risk of depression, absenteeism and disability claims, which can lead to compromised patient care (Berrios et al., 2015).

Nurses often perceive risk in their workplace and express insufficient support (e.g., organizational or managerial) in addressing these issues. This not only has implications for health and safety, but also for recruitment and retention (Health Canada, 2007; 2013c).

**Factors Contributing to Injury, Absenteeism and Emotional Exhaustion**

Workers in the health industry are vulnerable to lost time due to injury and illness (see appendix 1) (Association of Workers’ Compensation Boards of Canada [AWCBC], 2013). In the nursing profession, a number of working conditions seem to contribute to the likelihood of occupational accidents.
Compared to other healthcare professionals, nurses and nurse assistants experience a significantly higher number of injuries (see appendix 2 & 3) (Centre for Disease Control [CDC], 2015). Musculoskeletal injuries (Bruce. Sale, Shamian, O’Brien-Pallas & Thompson, 2002; Shamian, Kerr, Laschinger & Thompson, 2002), needle stick injuries (Clarke, Rockett, Sloanne & Aiken, 2002) and back strain injuries (WorkSafe BC, 2012) are particularly prevalent in nursing. In fact, compared to all other occupational groups investigated in British Columbia (see appendix 4); workers in healthcare were the most likely to suffer from back strain injuries (WorkSafe BC, 2012).

In fact, a cross sectional study by Byrns, Jin and Parchis (2004) assessed back pain disabilities in a sample of 270 RNs and this sample reported that back pain disabilities were associated with more years worked, frequent lifting and low social support. Similarly, Lipscomb, Trinkoff, Geiger-Brown and Brady (2002) found that a greater number of hours worked predicted musculoskeletal disorders of the shoulder, neck and back. Overexertion appears to be a common issue for nurses (see appendix 5), which has been associated with lifting patients (Bureau of Labor Statistics, 2006).

According to Karasek, Baker, Marxer, Ahlbom and Theorell, (1981), high job demands and low control over the job may also elicit health problems and the most satisfied/healthy workers are said to be those who have a job with high demand and high control. Unfortunately, nursing is reported as a high demands/low control profession (Johnston, Jones, Charles, Mccann & Mckee, 2013). This may in turn help explain burnout, emotional/physical exhaustion, higher stress levels, and injuries.
In Bruce, Sale, Shamia, O’Brien-Pallas and Thompson’s (2002) study, workload was the strongest determinant of high injury rates among RNs. A lack of equipment, crowded spaces, and poor ergonomics in the work setting were additional contributors. Similarly, O’Brien-Pallas et al., (2004) found a relationship between lost-time claims and the amount of overtime worked. This relationship also appears to be true with occupational accidents. That is, more overtime appeared to predict accidents such as needle-stick injuries of the hands/fingers (Ozarslan, 2011).

Mental health appeared to be a strong predictor of occupational accidents experienced by nurses in Suzuki et al’s (2004) study. The authors measured mental health status with the Japanese version of the General Health Questionnaire (GHQ-12). They assessed participant’s sleep, occupational accidents, and shift work. The authors found that for each type of accident (e.g., drug-administration errors, incorrect operation of medical equipment, errors in patient identification and needlestick injuries), medical errors were significantly higher among nurses who were in the mentally in poor health group than the mentally in good health group. The CNA (2004) also found that nurses who report higher mental health status tend to also report better working relationships with physicians. In addition, Lipscomb et al., (2002) found that mental health has been positively associated with job satisfaction and negatively associated with emotional exhaustion.

The term burnout has been used in the nursing literature to describe work-related exhaustion (Rudman & Gustavsson, 2012; Sprinks, 2015; Weber & Jackel-Reinhard, 2000). While other definitions exist, burnout was defined by McCarthy (1985) as a
“syndrome involving progressive physical and emotional exhaustion, the development of negative job attitudes and perceptions and loss of empathic concern for patients” (McCarthy, 1985, p.305). According to Melchior, Bours, Schmitz and Wittich’s (1997) meta-analysis, three risk factors are associated with burnout: the patient group with whom the nurse works (e.g., suicidal or aggressive patients), the exchange process between nurses and patients (e.g., verbal abuse by patients) and the unrealistic expectations for the patients’ potential for rehabilitation.

Mann and Cowburn (2005) discussed the “emotional labour” required of nurses, which has been understood by Brotherridge and Lee (2003) as the effort they expend to regulate their emotions and meet the expectations of their roles. They found that nurses engage in “surface acting”, where they simulate an emotion, and “deep acting” during which they try to actually experience the emotion. Results from questionnaires revealed that surface acting was a more important predictor of emotional labour than deep acting. Emotional labour was positively correlated with interaction stress (i.e., between patient and nurse) and daily stress levels. The authors reported a relationship between the intensity of interactions and the number of emotions experienced. Emotional labour was also associated with the intensity of interactions. Related to this, Kitts (2013) reported that helping individuals cope with illness could result in compassion fatigue and according to the CNA (2004), emotional exhaustion is especially prevalent among RPNs. These challenges, along with others reported by RPNs will be presented next from the results of a qualitative study.
Jackson and Morrissette (2014) used a qualitative phenomenological methodology to explore the experiences of 10 Canadian RPNs by way of semi-structured interviews. Five themes were drawn from this research.

Theme 1 of Jackson and Morrissette’s (2014) study was the perception of psychiatric nursing. RPNs felt their profession-lacked identity. Similarly, studying experienced psychiatric nurses, Humble and Cross (2010) found that those within this nursing specialty felt misunderstood and underappreciated when they compared themselves to other non-psychiatric nurses and other professionals. It was also felt that psychiatric nurses carried the stigma of their patients. That is, they felt prone to being judged in a similar manner as their patients.

Theme 2 of Jackson and Morrissette’s (2014) study related to patient aggression (e.g., emotional, physical, and sexual), which has been documented by other researchers (Lowe et al., 2003; Myon & Robinson, 2012). The result can be a reluctance to get in harm’s way, which can lead to poorer group dynamics in the workplace (e.g., less cohesion, collaboration). Risk management and personal safety was of particular concern for nurses with young families and those contemplating pregnancy. Aggressive patients were described as more compliant with male nursing staff compared to females, who experienced higher levels of patient resistance.

Theme 3 of Jackson and Morrissette’s (2014) study related to patient family involvement. Not surprisingly, nurses reported more fatigue when they were required to deal with confrontational families. In addition, nurse-patient family disagreements (e.g., questioning interventions) created a variety of challenges such as altering effective
intervention modalities unnecessarily. Psychiatric nurses often felt marginalized and experienced a sense of powerlessness with patients and patient families. They also described being triangulated between patient families, patients, and physicians due to the nature of their work.

Theme 4 of Jackson and Morrissette’s (2014) study was related to the nurse-physician relationship. Participants reported that contact with physicians could often be positive. However, some nurses reported that their working relationships required a great deal of effort and the duties imposed by physicians could lead to job ambiguity. Also, the attitude that a physician may hold (e.g., superiority) or their indecisiveness regarding treatment could lead to frustration. Effective nurse-physician relationships seem to be enhanced when nurses held their work position longer, perceived greater autonomy, and felt empowered (CNA, 2004).

The last theme of Jackson and Morrissette’s (2014) study was the sense of responsibility. Relevant in this context is that some psychiatric nurses felt they had insufficient medical training. Others believed counseling was an aspect of nursing that required further attention since they did not feel their other duties allowed them enough time to listen to their patients.

As previously discussed, nurses and perhaps psychiatric nurses in particular, face a number of challenges in performing their work. Because these challenges may predispose members of the profession to accidents and injuries (AWCBC, 2013) it may be beneficial to understand how nurses interpret these events. In fact, Dejoy (1994)
argued that the interpretation of accidents could help guide remedial actions to prevent accidents from recurring.

With this in mind, researchers have found attribution theory (AT) to be a useful framework for exploratory and descriptive studies (Gyekye, 2003) including those related to accident interpretation. Given the putative relationship that exists between attributions and future behaviour (Gyekye, 2010), AT appears to hold the promise of contributing to a better understanding of occupational accidents.

**What is Attribution Theory (AT)?**

Humans have a long history of attempting to explain events, their behaviour, as well as the behaviour of others. In the social sciences, this phenomenon has been referred to as attribution, defined by Weary, Stanley & Harvey (1989) as “an inference about why an event occurred, about a person’s dispositions (i.e., a person’s inherent tendencies or inclinations) or other psychological states” (Weary et al., 1989, p.2). Attribution theory (AT) attempts to understand how people assign causality to behaviour with the intention of offering a better understanding of future behavior (Gyekye, 2010). The theory highlights that our attributions are based on both individual and situational factors.

AT appears to originate from the work of Heider (1944) who believed that people explain behaviour informally. He introduced the term naïve psychology emphasizing that we attempt to understand our physical and social world as we behave as “naïve psychologists” (Gonçalves, da Silva, Lima & Meliá, 2008). Heider also believed there was a tendency for people to attribute behaviour to dispositional factors (e.g., individual) rather than situational factors (e.g., physical or social environment). The theory has since
attracted considerable interest and there are, in fact, over 5000 published journal articles
containing the word attribution in their title (Petri & Govern, 2013).

Based in part on the work of Jones et al., (1972), Petri and Govern (2013)
explained that AT rests on three basic assumptions. First, it assumes that people “attempt
to determine the causes of both their behaviour and that of others” (Petri & Govern, 2013,
p.304). Second, the “assignment of causes to behaviour is not done randomly; that is,
rules exist that help explain our conclusions about the causes of behaviour” (Petri &
Govern, 2013, p.304). Finally, “the causes attributed to particular behaviours will
influence subsequent emotional and nonemotional behaviours” (Petri & Govern, 2013,
p.304). Once an attribution is made, it influences the attributor’s subsequent behaviour
(Petri & Govern, 2013).

There are other contributors to existing theories of attribution. Jones and Davis
(1965) agreed with Heider (1944) on the idea of dispositional preference and offered
additional insights on such with a correspondent inference theory. They theorized that
individuals look for a correspondence between the observed behaviour and the inferred
intent of that behaviour. In short, observers seek to understand the choice an individual
has (i.e., a choice made among multiple alternatives), the social desirability of the
behavior (i.e., behaviour that most likely meets the approval of most people), and the
noncommon effect (i.e., if the behaviour of others have rare/uncommon effects that are
unique to that particular circumstance, then observers infer an underlying attribution as to
why the person engaged in that behaviour).
Kelley (1967, 1971, 1973) viewed attributions on the basis of covariation between causes and effects across the dimensions of distinctiveness, consistency and consensus. He explained that attributions are based on past behaviours and that distinctiveness (i.e., the unique nature of present behaviour compared to previous behaviour), consistency (i.e., frequency that an individual engages in a particular behaviour) and consensus (i.e., how other people would respond in the same situation) are used in the attribution process.

Weiner (1985; 2010) expanded on the work of previous contributors such as Heider, (1944) and Rotter, (1966) for past success and failure to better understand how attributions can influence emotions, the expectation of future success/failure and future behaviour. He offered that attributions are determined by the degree to which behaviours are perceived as outcomes of internal versus external, stable versus unstable and controllable versus uncontrollable factors. To demonstrate Weiner’s (1985; 2010) work, Petri and Govern (2013) presented an abbreviated model in their book: Motivation: Theory, Research and Application (see appendix 6). The model was initially created to better understand achievement motivation but was then expanded to a variety of other phenomena and has been used to explain the behaviour of self and others. It highlights four elements in the interpretation of achievement-related outcomes (i.e., ability, task difficulty, effort and luck) (see appendix 6). In reference to Weiner’s work, Petri & Govern (2013) explained Weiner’s AT approach when attributing to these elements. More specifically, previous success/failure tends to lead to our attribution of ability. Second, to determine effort, we tend to evaluate how much is invested in a task. Third, to determine task difficulty, the tendency is to engage in social comparison. Finally, luck is
most often ascribed when there is no perceived control in the outcome. These elements vary along three causal dimensions: locus of control, stability and controllability.

Locus of control is the first causal dimension and refers to whether an outcome results from circumstances internal or external to the individual (Rotter, 1966). For example, ability and effort are internal to the individual, or based on individual dispositions (see appendix 6). However, outcomes that involve task difficulty or happenstance are situational in nature and thus external to an individual. Behaviour/outcome can thus be attributed to dispositional/internal factors or external factors such as the social situation or other involved individuals.

The stability dimension speaks to the extent to which the cause of a particular outcome is likely to change in the future (Martinko, 1995). If change is unlikely, events are believed to be stable (e.g., ability and task difficulty) whereas if change is likely, it is deemed unstable (e.g., effort and happenstance).

The last dimension is controllability, which estimates the degree to which some causes are controllable or uncontrollable by oneself or others (Weiner, 1979). For example, effort (e.g., individual effort) and task difficulty (e.g., others making a task more or less difficult) are controllable when writing a test (i.e., controllable factors). In that example, ability and luck are not controllable. According to Weiner, (1985; 2010) an attribution is a systematic process (see appendix 6).
Attribution Biases

Evidently, attributions are not always accurate and much of human decision-making is vulnerable to biases and errors. Four better-known biases are presented here.

The self-serving bias is the tendency to take credit for success and to avoid responsibility for failure (Sheperd, Malone & Sweeney, 2008). The false consensus effect can be understood as the tendency to believe that others think and act in a manner similar to ourselves (Mullen et al., 1985). The actor-observer bias is the tendency of an observer to attribute internal factors to an actor but to attribute the opposite when in the role of the actor (Malle, 2006). Finally, and related to the actor-observer bias, is the fundamental attribution error (FAE). Specifically, the FAE focuses on attributions made by the observer. It states that individuals tend to underestimate the influence of situational causes while overestimating stable-internal characteristics for the behaviour of others (Ross, 1977). There are four other biases presented below that are less well known but also described in the literature. They are, the ultimate attribution error, the hindsight bias, the hedonic relevance bias, and the optimism bias.

Pettigrew (1979) proposed the ultimate attribution error, which is an extension of the fundamental attribution error. He defined it as “a systematic patterning of intergroup misattributions shaped in part by prejudice” (Pettigrew, 1979, p.464). Hewstone’s (1990) research expanded on this and found (1) more internal attributions for positive acts and less internal attributions for negative acts by in-group members and the opposite for out-group members; (2) more frequent attributions for a lack of ability for out-group than
in-group failure and greater out-group successes that are attributed to luck, high effort
and ease of task; (3) group-serving attributions vary across intergroup situations. The
ultimate attribution error finds applicability in various contexts. For instance, Hewstone
and Ward (1985) found that ethnocentrism had influenced attributions for in-group and
out-group members. Additionally, group attributions may be stronger when groups have
histories of intense conflict and possess negative stereotypes (e.g., about minority groups)
(Hewstone, 1990).

For his part, Fischhoff (1975) offered the hindsight bias. Here, observers distort
their perceptions of the uncertainties that face decision-makers because they tend to
overestimate the degree to which others can foresee accidents (Fischhoff, 1975; Karlovac
& Darley, 1988). This phenomenon has been referred to as the “knew it all along effect”

Martinko, Douglas and Harvey (2006) referred to the hedonic relevance bias in
their review of the literature, which has been characterized as the personal benefits
derived from outcome or behaviour (Martinko, 2002). Specifically, it is an observer’s
tendency to attribute the behaviour of another to negative internal factors rather than
situational factors when that person’s behaviour has affective consequences to the
observer (Jones & Davis, 1965). This was demonstrated in Dossett and Greenberg’s
(1981) study that investigated supervisors who were involved in the goal setting
processes of subordinate workers. As supervisors were more involved, there was a
tendency to make more favorable attributions towards subordinates with successful
performances (e.g., high ability and effort) and more unfavorable attributions with
subordinate failures (e.g., low ability and effort), as negative performances were a poor
tool of the supervisors. This phenomenon potentially impairs the observer’s ability
to effectively evaluate employees, implement training, and make selection decisions
(Martinko, et al., 2006).

Lastly, there is optimism bias, which Caponecchia (2010) explained is the
tendency to think that negative events are less likely to happen to us than to peers. One
hundred and five postgraduate students and university employees were assessed via
questionnaires and optimism bias was found for several events including the likelihood of
suffering/injury. Thus, it appears that individuals believe hazardous events are less likely
to happen to them than to others with the same job.

There appears to be a lack of research related to attribution biases and their
application to nursing. Some researchers spoke of the negative attitudes and beliefs
nurses had about obese patients (Lee & Calamaro, 2012; Waller; Lupfer-Johnson, 2012).
However, there appears to be a lack of research that has investigated accident-related
biases or lack thereof in nurses. More research is needed here as this may have
implications for prevention. The next section will introduce a model that incorporates the
attributions and biases discussed thus far.

**Dejoy’s Attribution Model in the Context of Occupational Health and Safety**

Dejoy (1994), proposed an “Attribution Theory Analysis and Model” related to
Workplace Safety Management (see appendix 7). He explained that attributions of
safety-related events would strongly influence the actions taken to correct hazards and/or
prevent future injuries. Referring to the work of Pittman and D’Agostino (1985) on
motivation and attribution, Dejoy (1994) explained that ambiguous situations increase the chance of attribution errors and biases. He also proposed a model of attribution processes regarding safety management, which incorporated components of Green and Mitchell’s (1979) model of leader-member interaction and Ford’s (1985) model of corporate performance. The model includes three phases that evaluate the cause of an accident/event (see appendix 7). This includes decision-maker characteristics, safety-related events, and organizational policies and constraints.

The first step of Dejoy’s (1994) model is Informational Analysis where the observer determines whether the event or outcome was caused by the worker (person/actor), the task (entity), or by some set of circumstances related to the event (context). Informational analysis is dependent on distinctiveness, consistency and consensus (i.e., Kelley’s covariation model). Causal schemata and outcome severity can also play a role (Dejoy, 1994). A schema refers to processing information from experience or from explicit or implicit cultural norms. It is influenced by prior knowledge rather than real-time data (Dejoy, 1994). Second, a causal attribution is made according to Weiner’s attribution model (Weiner 1985; 2010). Finally, corrective actions are taken, subject to a number of factors such as attribution biases (Dejoy, 1994). The model also demonstrates that decision-maker characteristics and organizational policies and constraints act as moderators, ultimately determining how the causal inference is derived. The model emphasizes that attributions in safety management are strongly related to the remedial actions taken by organizations (e.g., correction of hazards and/or prevention of future injuries) and that safety events are complex (Dejoy, 1994).
Related to nursing, there are a variety of models that have sought to improve the health and safety climate of nurses. These include models related to leadership (Barling, Kelloway, Loughlin, 2002), workplace bullying (Hutchinson, Jackson, Wilkes & Vickers, 2008) and models related to ensuring safety and quality care of psychiatric patients (Gabrovec & Lobnikar, 2014). In the latter, Gabrovec and Lobnikar (2014) found their model to be useful in health and safety training and saw noticeable improvements in nurses in areas such as assertiveness, fear management and helplessness. Given that Dejoy’s (1994) model emphasized the importance of attributions in guiding remedial action, researchers may find value in applying a similar model to better understand the attributions of nurses in relation to the occupational accidents they may have experienced.

**Subjectivity in Attribution – Specific Pattern of Attribution in Individuals**

Researchers have applied AT as a theoretical framework for decades (Brewin, 1984; Feather & Simon, 1969; Fitch, 1970). There appears to be a lack of research investigating subjective patterns in nurses. Nevertheless, the studies presented in this section support the notion that as individuals, we appear to have innate tendencies to attribute in particular ways such as holding an external versus internal locus of control. Internals tend to believe that specific outcomes are the result of their own actions and efforts. In contrast, externals tend to believe that what happens to them is unrelated to their behavior, or that it is beyond their control (Olpin & Hesson, 2010).

Davis and Davis’s (1971) study demonstrated this well. They conducted two studies to examine how 40 internals and 40 externals attributed responsibility to dispositional personal (internal) or external forces depending on failure or success.
scenarios. In these studies, introductory psychology student subjects received positive or negative feedback on a task where they were asked to predict another person’s attitude. They were then asked questions that probed their internal (e.g., ability) and external (e.g., luck) attribution tendencies. Findings suggested that external attributions might emerge for defensive purposes when failure is experienced. These individuals are categorized as defensive externals. The authors of this study differentiated between those with a strong external orientation (i.e., those who typically explain things with an external locus of control) and defensive externals (i.e., those who attribute externally or forget for defensive purposes in the face of failure). It appears that those who have a strong external orientation have a lower tendency to resort to “forgetting” or denying as defensive strategies since they attribute failure to impersonal forces (Davis & Davis, 1971). In both studies, internals showed a greater tendency to blame themselves for failure than externals. The two groups did not differ in how they attributed success.

Expanding on this work, Hyland and Cooper (1976) studied how internals and externals attributed causes in a happy accident (i.e., an accident that resulted in something positive). A hypothetical happy accident was presented to participants (56 psychology students categorized by Internal-External scores) whereby a chemist mixed chemicals carelessly but made an important discovery. Internals perceived the scientist as more responsible for the outcome than externals and those rated as moderates for the happy accident. Externals were the least certain about why the outcome occurred. Reconciling the findings of Davis and Davis (1971), Hyland and Cooper (1976) made the following observations. It appeared externality was a method of preserving self-esteem during
failure. When externals judge others, they may provide a more objective view than
internals, but when judging themselves, taking credit for pleasant experience may
overwhelm the need to see things as externally caused (Hyland & Cooper, 1976).

In another study involving student participants, Stebbins and Stone (1977)
investigated attributions made according to various success or failure feedback conditions
on a communication test. A questionnaire and interview with self-report satisfaction
measures were employed. This offered the 32 participants opportunities to attribute
responsibility following success or failure feedback to factors beyond personal control or
to various personal factors rated on a Likert scale. Participants with an external locus
were more likely to attribute outcomes to impersonal factors, whereas internals tended to
attribute to personal factors. Both groups favoured success conditions more than failure
and there was evidence of ego involvement. The results of this study suggest that
healthcare practitioners should encourage attribution processes that are consistent with a
client’s predispositions (Stebbins & Stone, 1977). For instance, for an external, the goal
might be to shift attributions more internally to encourage the assumption of
responsibility. In contrast, if the client’s attribution style (i.e., internal) is related to
negative psychological states such as low self-esteem or depression, the reverse pattern
may be needed.

In fact, a study by Peterson (1984) suggested that mental health nurses involved in
crisis interventions have recognized counterproductive attribution patterns in their
patients, which in turn was used to guide intervention. In her study, patient perceptions
were assumed as important in predicting subsequent patient behaviour. Patients attempted
to make sense of the distress or discomfort they were experiencing and in doing so, made attributions that were counterproductive or detrimental to their health. For example, patients who were recently divorced could attribute the dissolution of their marriage to their ex-spouse, which was seen as a maladaptive coping technique by Peterson (1984). Alternatively, attributing this to self and other external factors was seen as a more effective coping method. In certain cases, it was suggested that the psychiatric nurse must initiate the “re-attribution process”, which assists the patient in exploring other reasons for the crisis. It was suggested that finding external factors could help patients cope more effectively with the crisis. Other researchers (Nickerson, Aderka, Bryant & Hofmann, 2013; Thompson, O’Donnell, Stafford, Nordfjaern & Berk, 2014) have proposed that external attributions may lead to counterproductive ways of dealing with failure. Nevertheless, internal attributions presume personal responsibility, which in certain circumstances can be detrimental.

Furthermore, there appears to be discrepancies in the attributions of those typically involved in occupational accidents. Kouabenan (1985) studied employees of a telecommunications company who were 99 victims of, or 51 witnesses to, an occupational accident and asked them to explain their causes. Witnesses attributed causality to victims regardless of accident severity. Victims only blamed themselves in mild accidents and pointed to bad luck more often than did witnesses. The more involved a participant was in the accident, the more defensive the attribution. Using real accident victims strengthened the study since attributions for an accident one reads/hears about is often more neutral than when there is direct involvement (Kouabenan, 1985). This may
have methodological implications for research of this kind. It seems to be preferable to
draw from actual accident victim populations than to create entirely fictional vignettes,
which will be discussed at the end of this review.

Falbo, Wernick and Rowen (2001) spoke of attribution “asymmetries” (i.e.,
differences in attributions for success and failure). Twenty adults and one-hundred and
three children aged 4-6 years were asked to explain the outcome for a fictional character
along the dimensions of task, ability, effort and luck. Findings revealed that adults
attributed asymmetrically such that success elicited more ability and effort attributions
whereas failure elicited more task difficulty and luck attributions (Falbo et al., 2001).
Asymmetries were found for 5-6 year old children but not for 4 year olds. In the older
children (5-6 year olds), success was explained by effort and ability whereas failure was
explained with task difficulty. In adults, luck was used slightly more to explain failure
than success but children did not attribute outcomes to luck whatsoever.
Developmentally, asymmetrical attributions seem to emerge early and may serve a
self-protective function. With children over the age of 5 years, teachers can reinforce the
notion that success is the result of ability and effort and failure is due to insufficient
effort. This way, children learn to attribute in a manner similar to high achievers (Falbo et
al., 2001). The implications of Falbo et al’s (2001) study may also be important for those
educating/training newly hired nursing staff. For instance, trainers may want to encourage
high-achieving attribution styles. The newly trained staff might then realize the
importance of their own abilities/efforts in fostering a strong health and safety culture,
which might subsequently lead to higher efforts to remediate current or future shortcomings (e.g., occupational accidents, near-misses).

Some societies tend to maintain a rather fatalistic conceptualization of accidents (e.g., bad luck, misfortune or chance) and thus, there is value in understanding the influence of beliefs, value systems, norms, common experiences, attitudes, roles, social and technical practices on causal attribution. Kouabenan (1998) investigated if cultural biases were present in the attributions of traffic accidents in the Ivory Coast. A variety of questionnaires were used to identify beliefs in fate as well as risk-taking and their perceived relationship to the accidents. It was found that beliefs and social practices did indeed influence the perception of risks as well as causal explanations for accidents. For example, Kouabenan (1998) explained that in the Ivory Coast, death is rarely explained as accidental especially for someone who is well known. Instead, the victim’s death is most likely explained as a result of someone (or gods) harming them. By way of certain rituals, members of the community attempt to determine who (or what) was responsible for the outcome. Generally, fatalistic subjects seemed to have limited insight into risks and accidents (Kouabenan, 1998). This led to higher risk behaviours for the following reasons. The subjects believed the outcome was either inevitable or thought that by respecting certain rituals, they were able to avoid the outcome. Fatalists attributed causes that were outside drivers’ control as opposed to assigning driver responsibility due to a perceived lack of control over events (Kouabenan, 1998).
Socioeconomic status’ (SES) influence on subjective attributions has also been studied. Broderick (2001) recruited 60 seventh grade children to better understand this contributing factor. Subjects were assigned to one of three block design task conditions: solvable, unsolvable, or a control condition. Attributions for success did not differ across socioeconomic strata (Broderick, 2001). However, in failure situations, lower SES students were less prone to attribute the outcomes to unstable causes (e.g., effort and luck) and instead attributed the outcomes to stable causes (e.g., ability and task difficulty). Middle class children were more prone to attribute to unstable factors than stable factors in response to failure. Whether other variables mediated the relationship between SES and attribution was not explored in this study.

In an organizational context, Gibson and Schroeder (2003) examined the role of hierarchal positions on blame or credit attributions. Negative attributions/blame can lead to notable conflict whereas positive attributions/credit attributions can enhance perceptions of trust, reduce future conflict and increase chances of reciprocations (Gibson & Schroeder, 2003). In this study, 146 Masters of Business Administration (MBA) students were given blame or credit vignettes and asked to attribute accordingly. For failure events, individuals tended to assign more blame to those in higher-level positions. Moreover, blame assigned for failure surpassed the credit assigned for success. The opposite was true for lower-level positions (Gibson & Schroeder, 2003). In flatter hierarchal structures, where there is less oversight from supervisors, leaders attracted higher levels of blame and credit than leaders in more hierarchical structures. Additionally, groups were allocated less blame and credit than individuals. Throughout
the discussion of this study and prior research, sociologists and organizational theorists have argued that social roles have been neglected in attributions. That is, individuals are not only concerned with what the actor did but what they should have done. In this way, it was argued that we not only act as “intuitive scientists” but also as “intuitive lawyers” (Fincham & Jaspers, 1980; Hamilton & Sanders, 1981).

It has been hypothesized that attribution patterns might vary according to particular industries. According to the AWCBC (2013), the 5 most dangerous occupations in Canada are: 1) construction, 2) fishing and trapping, 3) mining, quarrying and oil wells, 4) logging and forestry as well as 5) transportation and storage. Based on existing literature (Sims, Graves & Simpson, 1984), Gyekye (2003) suggested that the higher the perceived likelihood of an occupational accident, the greater the fatalistic orientation of workers (i.e., attribution of accident causality to workplace factors, uncontrollable supernatural forces and nature). With mining known for its vulnerability to occupational accidents (Marshall, 1996), Gyekye (2003) compared 33 workers in Ghana’s mining industry with 88 workers in textile industries with the hypothesis that miners’ attributions would be more contextualized, defensive, and externalized. Contrary to expectation, no differences were found in the attributions of miners and non-miners. Occupational type and accident frequency did not appear to influence attributions.
Factors related to Causal Attributions

A number of factors impact how an individual attributes accidents/failures. There appears to be very few studies that have investigated such factors related to nurses and specialties such as psychiatric nursing. Nevertheless, some of the main factors found from this review are presented in the studies that follow.

Averill, Dewitt and Zimmer (1977) were interested in the role of emotion on attribution. Emotions were conceptualized as biologically primitive unconscious reactions and were expected to “excuse behaviour”. As such, an emotional attribution (i.e., an attribution of an outcome to one’s own emotions) may lead individuals to feel less responsible for the outcome (Averill et al., 1977). Emotions such as those related to fear and surprise were induced in 48 university students and their relationship with failure or success in a problem-solving task was assessed. Findings revealed that emotional attributions were more likely following failure than success regardless of state of arousal (i.e., positive or negative) (Averill et al., 1977). Success or failure was insufficient for the attribution of emotion since appropriate cues (e.g., affectively charged stimuli such as photos of nudes and corpses) also needed to be present. Self-attribution of emotion was used most frequently with ego-involved individuals (i.e., involvement of one’s self-esteem in the performance of a task or in an object) who needed to “excuse” behaviour (Averill et al., 1977).

More recently, Coleman (2013) studied human emotions in relation to the ultimate attribution error. In this study, fear, anger, or neutral mood states were induced in 420 undergraduate students. Participants were assigned to political teams and asked to
attribute good or bad behaviour in different political scenarios. Results confirmed emotions did influence the ultimate attribution error. First, there was a tendency for negative acts to be attributed to dispositional factors for out-group members. The opposite was true for in-group members (i.e., negative acts were attributed to external factors). Second, positive acts were attributed to situational factors for out-group members and vice versa for in-group members (i.e., positive acts were attributed to internal factors). Coleman (2013) identified that positive mood was associated with more internal attributions for success and fewer internal attributions for failure. The opposite tendency was noted for those in negative mood states.

Miller and Norman (1979) believed learned helplessness would be associated with particular attribution styles. They proposed a revised model of AT as a result. In their review of the literature, they determined that AT could influence a person’s expectation and their performance in future tasks. Also, the attribution of noncontingent failure (i.e., failure not dependent on anything else) to ability/personal competence led to increased learned helplessness, whereas attribution of these outcomes to situational factors or task difficulty did not produce learned helplessness (Klein, Fencil-Morse & Seligman, 1976; Tennen & Eller, 1977).

In another review of the literature, Zuckerman (1979) concluded that those with high self-esteem had a greater need to make protective attributions following failure and high achievers took more responsibility for success in higher reward/goal attainment (Feather, 1969; Fitch, 1970; Kuiper, 1978). Related to this, Schlenker and Miller (1977) studied group members (three or more people assigned to problem solving tasks) and
found that those who developed strong interpersonal bonds were less willing to take
credit for success or to blame others for failure. Also, externals tended to deny
responsibility for failure and to project blame onto others (Schlenker & Miller, 1977).

One of the few studies related to nursing made reference to Kelley’s covariation
model, whereby attributions are based on past behaviours. Mitchell and Wood (1980)
presented 2 samples of nursing supervisors (containing 23 participants respectively) with
hypothetical accidents in which distinctiveness, consistency and consensus determined
punitive action. The authors of this study did not specify which type of nurses
participated in this study. However, results showed that hypothetical accident victims
with poorer histories were identified by nursing supervisors as those who should receive
the most punishment and consensus, consistency as well as distinctiveness helped predict
causal attributions. Specifically, a poor history involves: 1) low distinctiveness (i.e.,
subordinate performed poorly on other types of tasks and poorly on the one in question)
2) high consistency (i.e., the subordinate has performed poorly on this type of task in the
past) and, 3) low consensus (i.e., no one else had difficulty with the task). The
seriousness of the accident led to more internal attributions to the worker, which caused
more frequent punitive responses by supervisors. In a similar study of nursing accidents,
Mitchell and Kalb (1981) found that supervisors assigned more internal attributions when
the outcome of unsafe behaviour was known, particularly if it involved negative
consequences to the victim.
Jeong (2009) also made reference to Kelley’s covariation model but focused on the influence of distinctiveness information (i.e., the degree to which behaviour is unique) on causal attributions. He examined 180 public responses to a corporation that caused an oil spill using Weiner’s attribution model. Specifically, he investigated how distinctiveness information affected public attributions about the accident and how these lead to punitive opinions and behaviour toward the corporation. Two experimental conditions were used: 1) a news article demonstrating high distinctiveness showing that the corporation had done well in the past, 2) a low distinctiveness condition where the company had performed poorly in the past, and 3) a control condition in which no message was given. Distinctiveness information significantly influenced attributions assigned to a corporation and subsequent punitive opinions towards the organization. Particularly, low distinctiveness (previous bad performance) produced more internal attributions, more damage to reputation and punitive opinions. On the other hand, high distinctiveness and no information were negatively correlated.

In the organizational context, Hofmann and Stetzer (1998) demonstrated that safety climate and communication could influence attribution processes and/or accident interpretation. Respondents of this study were employees of a large utility company. Two samples containing over a thousand workers were asked to provide safety climate and communication ratings. They were given Occupational Safety and Health Administration (OSHA) reports or accident vignettes pointing to either a worker’s fault or factors beyond the worker’s control. This study highlighted that contextual factors can influence accident attributions. When safety communication was high, both samples made more internal
attributions when the evidence in fact implicated the worker. Those who had poorer safety communication made more external attributions when the evidence in fact implicated the worker (Hofmann & Stetzer, 1998). However, when the evidence implicated external causes, the attributions were external. Contrary to expectation, safety communication did not mediate the relationship between safety climate and attributions in either sample. Instead, Hoffman and Stetzer (1998) proposed that safety climate might mediate the relationship between safety communication and attributions. Investigations into the causes of negative events (e.g., industrial accidents) are therefore influenced by a number of factors. Importantly, investigations are more often driven by what investigators expect to find rather than other actual implicit causes (Hofman & Stetzer, 1998; Rasmussen, 1990).

Kouabenan, Medina, Gilibert and Bouzon (2001) investigated the role of hierarchical position, gender, and accident severity on attributions. These authors explored the attributions of 80 participants of an electrical production/distribution company and a ski-lift company. Two studies were conducted using questionnaires and accident analyses. The authors reported that internal attributions are more often assigned to subordinate victims in organizations with greater hierarchal structures. Subordinates who were at the same level as the victim were less likely to assign internal attributions. Out-group members or those at different hierarchal levels assigned more internal attributions to those at other levels. As explained by the ultimate attribution error, attributions for in-group accidents were less internal for group-protection purposes and this tendency increased, as accidents were more severe. No significant gender differences
were found. The researchers concluded that testimonials might be of questionable value in terms of the accuracy of information provided by those involved in accidents (Kouablenan et al., 2001).

Having been previously involved in accidents (i.e., previous accident experience) appears to be associated with the manner in which individuals will attribute accidents in the future. Gonçalves, Silva, Lima and Meliá (2008) analyzed this relationship and how it might influence a sample of 559 participants in an industrial organization and another sample of 335 participants in a research and development organization. The authors found work accident experience to be positively associated with external attributions. Unsafe behaviours were inversely associated with internal attributions. They proposed that training as well as accurate information (e.g., safety information, information among workers) might lead to more healthy/productive attributions. That is, “a well informed employee rarely attributes to one cause” (Gonçalves et al., 2008, p.999). Organizations with stronger safety cultures (i.e., good safety training and communication) tend to have more complex attributions and perhaps, more accurate ones (Gonçalves et al., 2008).

Gyekye and Salminen (2006) considered job satisfaction and its influence on attributions of workplace accidents in industrial Ghanaian workplaces such as mines and factories. Participants were 121 actual victims, 82 supervisors, and 117 co-workers involved in accidents. In this study, satisfied workers assumed greater responsibility for their failures. Dissatisfied supervisors attributed more externally (e.g., low wages, work overload, pressure from management and fatigue) while satisfied supervisors made more internal attributions (e.g., lack of adequate comprehension and ability/inexperience).
Satisfied workers seemed to have an internal attribution style, which may have a positive influence on organizational safety culture. Specifically, Dejoy (1989) emphasized that acknowledging relevancy to oneself in any safety or health initiative is key for its success. More research is needed to see if this internal attribution style is also related to job satisfaction in other occupational groups such as nurses.

Rickard (2014) looked at the influence of perceptions of risk such as controllability, danger, recreational risk-taking, and desirability of risk on causal attributions. In this study, Rickard (2014) built on Walster’s (1966) notion of “defensive attribution”, which is a self-protective mechanism whereby an observer concludes that if the actor had behaved differently, the negative outcome could have been avoided. Using three national parks in the United States as the context, hypothetical visitor accidents were presented for interpretation. Generally, participants (447 park visitors) made more internal (i.e., characteristics of the victim) than external attributions (i.e., characteristics of the park or management). When park risks were viewed as controllable, they were more likely to attribute the cause of an accident to the victim. However, when similar experiences were solicited from the participants’ lives, the author noted lower internal attributions.

Age has been found to influence workplace performance attributions. Cox (2014) asked 203 supervisors from various industries to attribute causality in a hypothetical scenario where a subordinate performed poorly. Poor performance by older targets was more often attributed to external and controllable causes by older raters. Younger raters were more inclined to assign stable causes (i.e., task difficulty and ability) to older
targets. The next section will look more closely at the attributions given for different types of accidents/failure and the associated outcomes of such.

**Attributions and Associated Outcomes**

Post-accident or failure attributions can influence outcomes in a productive or counterproductive manner (e.g., organizational safety culture, health). There appears to be a lack of studies related to nursing; however, one study will be presented in this section. Generally speaking, researchers have investigated post-accident failure attributions extensively.

Shaw and Breed (1970) considered the effects of accusations on the accused in terms of attitudes and perceptions as well as its overall impact on small group interaction/performance. Accusations, even when unjustified, have negative consequences for the accused. In this study, the accused tended to have negative feelings toward the accuser and other members of their group. As well, overall group performance decreased in situations where someone was accused. Finally, those who witnessed accusations tended to have more negative feelings toward the accused.

In another group context, Bazarova and Hancock (2012) examined attributions of 192 students divided into groups and how these can affect performance, communication, procedural change and effort. The authors asked groups to work on a two-step task (recommend merit-based bonuses for fictitious employees based on four characteristics) where they received negative feedback. Researchers found mixed results in that the attribution of failure to situational constraints improved communication among group members and improved procedures. However, the attribution of failure to self or group
produced greater effort. In contrast, attributions to others resulted in decreased communication and performance. The implications of this study are important in that normally, external attributions are seen as counterproductive but this may not always be the case in a group context. Specifically, attributing to a combination of internal and external factors was related to better outcomes.

Attributions are important determinants of sanctions. Using AT, Felson and Ribner (1981) examined acts of criminal violence in a sample of 226 incarcerated males and their sanctions. The authors distinguished between excuses (i.e., “a denial of personal causation”) (Felson & Ribner, 1981, p.137) and justifications, (i.e., “an attempt to align oneself with some norm other than the one violated, or reason”) (Felson & Ribner, 1981, p.137). The most common excuses used were accidents, drinking, drugs, and states of mind while the most common justifications were self-defense, victim wrong-doing, conflict with the victim and helping someone else. Justifications were used more frequently (50%) than excuses (18.7%) or other reasons (31%). The authors referred to Buss’s (1978) conceptual critique of AT in that attribution theorists have not placed enough emphasis on distinguishing between cause and reason in the literature. Here, offenders rationalized their homicides and assaults by way of reasons (i.e., justifications) more frequently than causes (i.e., excuses). With this in mind, Buss’s (1978) critique does seem to hold some validity. While cause and reason might be considered synonymous, it appears that both reasons (i.e., a statement offered in explanation or justification) and/or causes (i.e., someone or something that produces an effect) are used to infer why an event occurred and that these terms could be further distinguished in AT.
Brewin (1984) opined there were two dimensions of blame in the attribution literature: causal responsibility (i.e., the individual acts in such a way to produce the outcome) and culpability (i.e., a moral evaluation referring to whether a person deserves blame for the outcome). In this study, 93 male industrial accident victims were recruited from trauma clinics after injury then again after a return to work. The influence of attributions on rehabilitation outcomes was examined. Questionnaires were used to assess psychological and physical health, causal attributions, as well as culpability. Participants who felt responsible for their accidents reported better mood after their return to work. The findings suggest that a sense of regret or culpability may be related to positive outcomes. It may be the case that a more expedient return to work represents a type of restitution on the part of the worker.

Related to this and with a focus on return to work, Thompson, O’Donnell, Stafford, Nordjaern and Berk (2014) hypothesized that perceptions and attributions would influence rates of post-crash depressive symptomology and recovery. The client record data and outcome surveys of 303 participants were analyzed. Workers who did not self-attribute responsibility were three times more likely to experience depression and those who were depressed were 3.5 times less likely to return to work. This is consistent with Nickerson el al., (2013) who found that those who attributed externally in motor vehicle accidents exhibited higher rates of Post-Traumatic Stress Disorder (PTSD) than those who assumed responsibility. While contradictory evidence has been published in terms to assuming full responsibility for accidents (Miller & Norman, 1979; Peterson, 1984), it appears that psychological recovery is associated with attribution patterns. In
addition, given that nursing absenteeism rates are significantly higher than the Canadian average (CLBC, 2002) and these rates may be related to accidents experienced in the workforce, researchers may wish to investigate whether nursing attributions might also influence return-to-work in the same manner as Thompson et al’s (2014) and Nickerson et al’s (2013) study have indicated. Perhaps there may need to be a specific focus on nurses frequently exposed to traumatic events (e.g., patient violence) such as psychiatric nurses (Stevenson, Jack, O’Mara & Legris, 2015).

Lacroix and Dejoy (1989) considered the effect of attributions on effort and supervisory response to workplace accidents. One hundred and sixty-two business students were asked to read industrial accident reports, which varied in terms of causal locus, stability-instability as well as severity. They were asked to assume the role of the supervisor in assessing the accidents. The more internal the cause, the more responsibility and worker-directed corrective actions were prescribed to workers. Subjects seemed to “over-attribute” effort in that it was rated as important even when not mentioned in the accident reports. The author speculated that this could be explained by attribution biases (e.g., the fundamental attribution error) in that the tendency for observers is to explain the behaviour of others with stable-internal factors and to underestimate situational factors. In contrast, there is a tendency to attribute our own behaviour to situational factors. Moreover, worker-directed remedies were deemed more appropriate when stability factors (i.e., ability and task difficulty) were involved. The more stable the cause, the less optimistic future safety performance was believed to be. Counter to prediction, accident
severity did not significantly affect attributions. Expectations for safety performance were most optimistic when an external cause was identified.

In Orpen’s (1981) study, it was demonstrated that performance attributions could be subject to discrimination. The author examined how 136 managers in South Africa evaluated worker performance (White and Black race). Although discrimination had been abolished a year prior to the research, supervisors used racially biased attributions for performance. They more frequently attributed the success of Whites to internal factors (e.g., effort and ability) and the success of Blacks to external factors (e.g., luck or an “easy job”). The researcher highlighted how attributions can impact the careers of minority group members and result in unfair negative consequences. This study was limited in that the design was based on descriptive scenarios developed by the author to resemble attributions made in a typical supervisor setting. Thus, while these scenarios might be perceived as possible, they were not real accidents.

With alcohol-impaired driving, there appears to be some patterns in the way observers ascribe responsibility to those who drink and drive. Dejoy (1989) authored a review of the literature on this topic and offered a summary. The perceived seriousness of alcohol impaired driving was driven primarily by the consequence of the behaviour rather than the behaviour itself (i.e., minor consequences result in minor sanctions and vice versa) (Dejoy, 1987a; Dejoy, 1985). In support of Defensive Attribution Theory (DAT), observers who detected a degree of situational or personal relevancy in the behaviour of others more often engaged in self-protection motives (Walster, 1966). That is, people tend to seek differences between themselves (observer) and the actor (perpetrator), as this
seems to decrease the concern that negative events might also happen to them. Thus, internal attributions are made to actors. Alcohol-impaired driving was only perceived serious when there was a clear adverse consequence such as personal injury or property damage (Dejoy, 1984 Dejoy, 1985) and alcohol consumption prior to driving was not blameworthy unless it exceeded legal limits (Dejoy, 1987a).

A year afterward, Dejoy (1990) investigated spontaneous attributional search (i.e., immediate self-questioning) following near-miss and loss-producing traffic accidents. Ninety-six participants were given written descriptions of motor vehicle accidents and were asked to list questions they would ask themselves following an accident that differed in terms of outcome, severity and fault. Contrary to prediction, serious consequences produced more interest in damage control (i.e., concern about thinking about appropriate actions and likely consequences) than causal attribution analysis (i.e., trying to explain why the event occurred). Near-misses produced less emotional response and less self-questioning than more serious outcomes but there was an acknowledgement that the result might not be as benign if the near-miss were to happen again. There was evidence of self-serving biases and stricter penalty assignments for serious accidents than near-misses. Finally, subjects made more internal attributions of causality when the actor in the written description was believed to be at fault and more stable attributions were assigned with more serious outcomes.

In another study involving car accidents, Stewart (2005) studied the attributions of 321 crash survivors (i.e., drivers, road/weather conditions or themselves) using defensive attribution theory (DAT) and actor-observer bias. Consistent with DAT, surveys showed
that greater accident severity predicted fewer internal attributions, fewer attributions to weather/road conditions and greater blame assigned to other drivers by accident victims. Those involved in less severe crashes assigned approximately the same amount of responsibility to self as others. Passengers attributed in the same manner. However, those in non-severe crashes assigned more responsibility to others and to weather. Passengers in severe crashes attributed more responsibility to drivers than to weather and road conditions. In addition, the results provided some evidence of an actor-observer bias and the fundamental attribution error. Regardless of crash severity, when crash survivors accepted responsibility for crashes (i.e., as actors); they also ascribed more responsibility to weather and road conditions. This was not the case when they strictly assigned the cause of the crash to another driver (i.e., a focus on stable, internal characteristics) as observers. Finally, those who accepted more responsibility coped better with the crash than those who blamed the accident on other factors.

Focusing on aggressive driving incidents, Lennon, Watson, Arledge and Fraine (2011) found the actor-observer bias to be a useful framework in their study to explore perpetrator or victim attributions. A convenience sample of 193 drivers was assigned to perpetrator (or instigator) or victim groups. Participants completed the Aggression Questionnaire and Driving Anger Scale and responded to driver aggression scenarios. Compared to perpetrators, victims more often attributed the cause of driver aggression to instigators’ driving skills. For their part, perpetrators assigned external temporary factors (e.g., lapses in judgment or errors) as the cause of the accident suggesting some self-awareness while minimizing outcome severity. Contrary to expectation, perpetrators
rated victim emotional impact higher than victims themselves. The fact that perpetrators tended to attribute to internal-unstable factors was seen as a positive outcome. Perpetrators perceived their behaviour as modifiable, which would bode well for intervention.

In the educational setting, Georgiou, Christou, Starvrinides and Panaoura (2002) investigated 277 teachers’ attributions of student school failure and teacher behaviour towards a failing students. Using a structural equation model, the authors concluded that teachers behaved more empathetically and with less anger when they attributed students’ low achievement to insufficient ability. However, in contrast to prior research, this study showed that teachers expressed more anger when attributing low achievement to inadequate effort. Anger was inversely related to wanting to help a student improve (i.e., teacher giving up on student) (Georgiou et al., 2002). Teachers with higher self-efficacy were more willing to accept responsibility for student failures, see it as a healthy challenge and perhaps provide more attention to the student’s educational needs (Georgiou et al., 2002).

College students seem to hold particular attribution styles that relate to their academic performance. Cortés-Suárez and Sandiford (2008) used open-ended attribution statements using the Causal Dimension Scale and examined attributions for success or failure in 410 college Algebra students. Those who passed the test attributed more internally to stable factors and to causes within their control. In contrast, the failing group attributed more externally, to unstable factors, to external controllability and to things beyond their control. A statistically significant difference between attribution statements
made by the passing and failing group was found. The passing group attributed performance to effort and ability more often than the failure group who tended to attribute to effort, ability, and task difficulty.

In another study related to student’s academic success or failure, Maidinsah, Embong, A., Wahab & Z., Wahab, (2014) evaluated the causal attributions by 482 students regarding their performance on a mathematics test. High and low achievers were recruited and given a questionnaire related to AT. The attributions were ability, effort, question difficulty and environment. Most frequently, students identified effort as the reason for success and failure in mathematics. This was followed by environment (e.g., lecturers/classroom atmosphere), question difficulty then ability. High achievers strongly agreed that ability influenced success whereas low achievers strongly agreed that all factors influenced their failures in mathematics (Maidinsah et al., 2014).

Focusing on the industrial context, Zhang, Gao & Yao, (2011) examined attributional patterns of unsafe behaviour and incidents in a mining enterprise. Results identified that managers attributed incidents to employees’ lack of knowledge, employees’ lack of understanding of risk and lack of experience and skills. Team leaders tended to believe that the key to preventing accidents was: 1) personal emergency responding ability that can be strengthened through training, 2) behavior correction, and 3) reducing fatigue. Workers believed the key to accident prevention was 1) reducing workload, 2) labor intensity, and 3) fatigue caused by working conditions. There were significant differences in attributions among stakeholders of the organization. Some consensus emerged in that work skills, individual emergency responding ability and labor
arrangement (e.g., breaks, rotations of workers, workload) were essential in preventing accidents. In this enterprise, AT was a useful tool to help determine what the stakeholders of an organization believed to be the causes of accidents and the type of changes recommended for prevention.

On the basis of previous literature (Fabiano, Curro & Pastorino, 2004; Mendeloff & Kagey, 1990 & Stevens, 1999), Hasle, Kines and Anderson (2009) argued that those who work in small enterprises are at greater risk of injury than those in larger enterprises. In Hasle et al’s (2009) study, the authors examined how small business owners attributed accidents with a view of improving accident prevention. Twenty-two case studies of injury-related work absence in construction and in metal processing were examined by way of semi-structured interviews and interpreted using thematic analysis. One-half of the owners attributed the accidents to unforeseeable circumstances. In three cases, respondents attributed the accidents to worker error as well as unforeseeable circumstances. Two owners assumed partial responsibility. Small business owners seemed ambivalent about safety, which suggested it was not a high priority area for them. While the DAT may help explain these findings, there was a tendency for small business owners to attribute accidents to unforeseen circumstances, thereby deflecting accountability. Hasle el al., (2010) encouraged educating workers on attributions/biases to assist organizations with accident prevention.

While this study suggested that smaller enterprises were more susceptible to injury, the opposite appeared to be true in the hospital setting in a study by Babcock and Fraser (2003) who examined rates of percutaneous injury (i.e., unintentional injury that
breaks the integrity of the skin) among different sized hospitals. It was found that the
annual rates of injury were higher among larger hospitals than smaller hospitals (i.e.,
larger hospitals had 22.5 injuries per 100 hospital beds yearly versus small hospitals that
had 9.5 injuries per 100 hospital beds yearly). Within the smaller hospitals investigated,
rural hospitals experienced more injuries as opposed to urban hospitals (i.e., average
annual rates of rural hospitals was 14.87 injuries per 100 hospital beds and for urban
hospitals it was 8.02 injuries per 100 beds). To complicate things further, other
researchers have found the opposite trend in the hospital setting (i.e., more injuries in
smaller hospitals) (Beekman, Yagla, Mccoy & Doebbeling, 1997). In short, more
research is needed to substantiate previous findings (Hasle et al., 2009; Babcock &
Fraser, 2003; Beekman, et al., 1997).

One of the only studies found in this review that assessed nurses’ causal
attributions in response to failure was by Meurier, Vincent and Parmar (1998). Based on
previous literature (Arndt, 1994), the authors postulated that attributions of nurses toward
errors might be more external. In Meurier et al’s (1998) study, 60 nurses were divided
into two groups of 30 participants. A questionnaire was provided to both groups to assess
causal attributions and participants were provided with a fictional error scenario. The first
group received a scenario that described a non-serious outcome (i.e., a medical error
noticed by another healthcare professional but brought no harm to the patient). The
second group received a scenario that described a serious outcome (i.e., medical error
resulting in patient harm). Contrary to the author’s expectations, both groups made
internal attributions and assumed responsibility for their error. However, those who
received the description of the serious outcome assumed more responsibility for the error. The authors derived three main implications from this internal attribution style tendency.

First, this led authors to believe that because nurses accepted more responsibility, they might be more receptive to change (i.e., with appropriate managerial involvement) after an accident/error. It was also noted that the attribution style might be related to the profession’s strong professional ethics (ANA, 2010; 2014), which encourages practitioners to take responsibility for their actions (Meurier et al., 1998). Reconciling a study by Dejoy (1990), the authors did note some limitations to assuming full responsibility for failure such as discounting other important factors that may have also played a role (e.g., environmental influences).

A second finding of this study is that nurses had a tendency to attribute less importance to near-misses or non-serious outcomes. This may lead to the underestimation of risks and a failure to take appropriate precautions/preventative measures.

Third, nurses seemed to judge errors more harshly when the patient is harmed, a finding that has been documented in other studies (Mitchell & Kalb, 1981). Meurier et al., (1998) emphasized that whether harm comes to the patient or not, safety standards/practices should be carefully evaluated in order to foster a better hazard management climate and prevent accidents in the future. This study was limited because it used questionnaires and fictional accident scenarios, which may have had a significant influence on attributions and will be further discussed at the end of this paper. The authors also did not seem to specify the type of nurses assessed in this study.
In terms of accident prevention in the industrial setting, Gyekye (2010) emphasized the important role of causal attributions in occupational and industrial accident analyses and the subsequent implementation of safety interventions. Expert opinions were found to be subject to bias. For instance, engineers seemed to attribute accidents to abnormal events resulting from a violation of safety rules (Gherardi, Nicolini & Odella, 1998). Those knowledgeable about safety and accidents, on the other hand, seemed to have a multifaceted way of explaining causality (Gherardi et al., 1998). Finally, it was found that organizations with strong safety cultures tend to be more knowledgeable of accidents and attribute in a more complex manner (Hofmann & Stetzer, 1998). Gyekye (2010) also emphasized that objective risk-assessments are crucial in causal analysis if successful safety interventions are to be implemented. With this in mind, the next section will focus on the role of human error in accident appraisals.

**Analysis of Accidents and Identification of Human Error**

Understanding attributions can help researchers gain insight into conflicting perceptions during accident analyses and the extent to which human error is involved. Although there appears to be a lack of studies related to nursing, one study related to healthcare will be presented in this section. The following studies serve to demonstrate that accidents are complex and the way they are interpreted can have a significant effect on an organization’s performance and/or reputation.

Salminen (1992) evaluated 99 serious occupational accidents in Finland and highlighted different attribution patterns among 73 victims, 65 coworkers and 71 supervisors. With particular interest to this author was the DAT. Providing some support
for this, the results showed that victims tended to attribute externally and thus minimize
the contribution of their own behaviour. Supervisors tended to be of the view that victims
deviated from safety protocol, which minimized the contribution of their own behaviour.
Moreover, they would tend to refute any accusations that they tolerated risk taking on the
job, emphasizing the company’s strong safety practice. Coworkers tended to attribute to
the victim and they evaluated the accident as less dangerous than victims or supervisors.
They emphasized that the tasks that had resulted in injury were a part of everyday work.
This study underlines that different stakeholders of an organization attribute differently
and are vulnerable to subjective error (e.g., biases) in their appraisals of accidents.

Aquino, Tripp and Bies (2001) examined the relationship between blame, victim,
offender status and the pursuit of revenge or reconciliation after a personal offense.
Questionnaires were distributed to 141 government workers and results showed a positive
correlation between blame and revenge. Not surprisingly, blame was negatively
correlated with reconciliation. Victims who blamed wanted revenge more often when the
offender’s position in an organization’s hierarchy was lower than their own. In addition,
those of lower hierarchical status who blamed wanted revenge more often. Evidently,
blame attributions are not healthy for an organization and can impact safety culture (e.g.,
through retributional behaviour).

Walton and Hume (2012) considered consumer response to public hospital service
failure based on service type, service expectation and post failure attributions. Three
hundred participants responded to written scenarios and the researchers measured
attitudes. When an organization had a strong reputation, a service failure (e.g., wait
times) was attributed to temporary or unstable factors and expectations for the future
were maintained. In contrast, stable causes were attributed to organizations with poor
reputations (i.e., Kelley’s covariation model). The authors suggested that in order to
reassure consumers that public hospital failure is unlikely to recur the explanation offered
by the organization should focus on stability (e.g., this type of event was rare and is
unlikely to reoccur) and not uncontrollable factors (e.g., the occurrence of the event was
beyond our control). The two following sections will present a summary of the current
review as well as propose future methodology.
Summary and Future Considerations

Themes, trends and gaps have emerged from the current review. Certainly, AT has attracted considerable interest, which has led to several, published studies that have incorporated a variety of applications and methods to explore accidents/failures through this unique lens.

Themes

Some researchers have emphasized the DAT, which states that observers will assign more responsibility to the harm-doer when the outcome is severe and when personal/situational relevancy for the victim increases (Dejoy 1989; Salminen 1992). With accident victims, this tendency was the opposite. That is, victims tended to assign greater responsibility to external factors and deny personal responsibility as accident severity increased (Stewart, 2005). This merits further investigation in other occupations (e.g., healthcare) or in other areas where DAT has yet to be applied, as there is insufficient work in this area.

Furthermore, Hofmann and Stetzer (1998) demonstrated that safety climate and communication could influence how attributions are made. Education/training was thought to influence attributions of employees in organizations who have strong safety cultures (Gonçalves et al., 2008) and with safety experts who attributed accidents to multiple causes (Gherardi et al., 1998). A more objective and comprehensive view of accidents was proposed for individuals who attributed in this multifaceted manner. With external attributions, self-protecting mechanisms that enhance self-esteem appear to be involved in order to avoid the negative consequence of assuming responsibility (Hyland
& Cooper, 1976; Salminen, 1992; Zuckerman, 1979). In the group context, Bazarova et
al’s (2012) study demonstrated mixed results. It has also been posited by Hyland and
Cooper (1976) that externals might provide a more objective view than internals but
when judging oneself, taking credit for pleasant experience is more important. This is
important for safety inspectors or those responsible for objectively evaluating the work of
others. Depending on internal/external orientation, objectivity may be enhanced or
compromised.

Controversial findings were found in this review with regard to whether assuming
full responsibility (i.e., internal attributions) for accidents is beneficial or not. Some
researchers found that the assumption of responsibility resulted in positive outcomes such
as better coping (Nickerson et al., 2013; Stewart, 2005; Thompson et al., 2014), better
mood (Brewin, 1984) and that job satisfaction was associated with this internal attribution
style (Gyekye & Salminen, 2006). Other researchers have indicated that internal
attributions can lead to depressive symptoms, lower self-esteem, and other negative
psychological states (Miller & Norman, 1979; Peterson, 1984). It may be the case that the
assumption of responsibility affects individuals differently (e.g., high achievers versus
those with low self-esteem) such as Falbo et al., (2001) have suggested with the tendency
of high achievers to attribute more readily to effort and ability. Shaw and Breed (1977)
also suggested encouraging attribution styles that were appropriate to a client’s needs. In
any case, poor mental health is a barrier to a successful return to work and practitioners as
well as personal injury compensation systems need to assure that attention is placed not
only on physical workplace issues but mental health issues as well (Thompson et al., 2014).

Furthermore, it has been emphasized that assuming full responsibility for an accident/failure may result in disregarding other important factors involved in an accident/failure (Dejoy, 1990; Meurier et al., 1998). Therefore, assuming some degree of responsibility and attributing to multiple causes appears to be the most promising approach for prevention. That is, in terms of personal growth, behaviour change and having an objective comprehensive view of accidents.

In addition, the role of emotion has been shown to influence the way individuals interpret accident/failure situations (Averill et al., 1977; Coleman, 2013). The role of emotion should be further investigated in the context of healthcare, as there appears to be a general lack of studies that have acknowledged this important influence in this area.

**Trends**

Researchers have used a variety of quantitative and qualitative methodologies to facilitate a better understanding of attributions. In terms of methodology, questionnaires are frequently used (Aquino et al., 2001; Brewin, 1984; Georgiou et al., 2002; Meurier, et al., 1998; Stewart, 2005). Studies that use this method along with other highly structured methods (e.g., structured interviews) are believed to be limited because they restrict the breadth of participants’ subjective responses. Other methods such as semi-structured individual interviews (Hasle et al., 2009) might yield a more accurate representation of participants’ attributions and minimize leading/close-ended questions.
Furthermore, Dejoy (1987b) has emphasized the importance of accurate accident appraisals in accident prevention. Researchers have demonstrated that attributions are vulnerable to subjective error, which can be detrimental to organizations. That is, voluntary/involuntary distortions of information can be detrimental to accident investigations (Kouabenan, 2001). For instance, Gyekye (2003) emphasized that punitive measures and greater responsibility are typically assigned to workers when supervisors assigned internal causes (e.g., lack of effort) than when they assigned external causes (e.g., bad luck). Due to this tendency, the causal attributions from accident victims seem to have been distorted with self-protective causal attributions to avoid reprisals (Gyekye & Salminen, 2006; Salminen, 1992). Whether a voluntary distortion or not, it seems that the ability to recognize that we are vulnerable to error and bias in our appraisal of accidents is vital to occupational health and safety. Some researchers (Hofman & Stetzer, 1998; Rasmussen, 1990) suggest this self-awareness is not only important for those directly involved in accidents but also for those responsible for the investigation of these accidents (e.g., safety inspectors).

Moreover, some types of attributions might suggest that behaviour change is unlikely (e.g., defensive attributions). External attributions have been related to protecting one’s self-esteem (Jong, Koomen, & Mellenbergh, 1988) and they make the learning from an accident/failure as well as personal growth less likely (Meurier et al., 1998). If this is the case, it may be more effective to prescribe policy changes that target the work environment. Alternatively, organizations may wish to educate workers on accident causation and their associated attributions. It has also been suggested that
accident severity is related to stronger internal attributions from the part of the observer. This is important for prevention. If poor performances with non-serious outcomes are likely to be overlooked, this might result in future negative consequences and is not effective in providing feedback to employees (Mitchell & Wood, 1980), as this approach is reactive rather than proactive.

This review has demonstrated the importance of studying accident interpretation with the aim of preventing and reducing accidents and injuries. In fact, Dejoy (1989) argued that the key to any program (e.g., safety/health) is that the audience acknowledges relevancy to themselves. However, accident situations elicit defensive mechanisms and a denial of relevancy. It then becomes important to understand why people choose to engage in certain behaviours and perception of responsibility for such.

**Gaps**

A good portion of the literature reviewed on AT with respect to accident interpretation is dated and there appears to be a hiatus in research production. Moreover, few studies in this review utilized Weiner’s full attribution model (i.e., stability, controllability and locus). Most often, the locus dimension was used (Davis & Davis, 1971; Kouabenan, 1998). Stability and controllability were emphasized less (Lacroix & Dejoy, 1989). Many studies made no references to biases. Also, there was little differentiation of the multiple actors that are usually involved in accidents.
Furthermore, as Buss’s (1978) critique has emphasized, there seems to be an insufficient vocabulary differentiation between cause and reason in the attribution literature. Future researchers may wish to differentiate this type of terminology in order to offer a better understanding of participant attributions.

The application of AT to accidents in healthcare occupations is scarce. Although there were some studies that have investigated mining (Brewin, 1984; Gyekye, 2003; Gyekye & Salminen, 2006) there still seems to be a lack of studies that have investigated occupations with a higher prevalence of accidents, disability rates and/or lost time. With the nursing profession representing one of the most stressful healthcare occupations (Berrios et al., 2015; Wilkins, 2007) and psychiatric nurses facing considerable challenges (i.e., patient aggression/violence), this increases their chances of experiencing occupational accidents. Therefore, this population, along with others facing similar challenges such emergency nurses (Gacki, et al., 2009; Gillespie, Gates & Berry, 2013; Luck, Jackson & Usher, 2007) require particular attention from researchers.

Peterson, (1984) suggested psychiatric nurses require training to recognize counterproductive attributions in their patients. This therapeutic strategy has been referred to as the “retribution process” and involves encouraging patients to seek alternative explanations for their observations. To this writer’s knowledge, no study has examined the attributions and biases (or lack of) offered by mental health workers for the occupational accidents they have experienced.
Research with this population merits investigation as the findings could help develop targeted preventions and facilitate change in occupational health and safety practice for nursing and potentially other occupations. This could translate into improvements in workplace safety, productivity, and health. It could also result in organizational safety culture growth, the prevention of occupational injuries, the improvement in lost time and associated consequences (e.g., stress leave). Previous research with nurses has suggested that this population might be more likely to assume responsibility and this is especially true when harm comes to a patient (Meurier et al., 1998). This suggests nurses might be receptive to change and that studying them might help guide interventions.

**Proposed Methodology for Future Studies**

The findings from this review may encourage researchers to explore the interpretation of accident causation in healthcare occupations with special attention to nurses and nursing specialties (e.g., psychiatric nurses). The theoretical framework should draw from AT and consider every dimension of Weiner’s (1985; 2010) model. Moreover, researchers could take advantage of various tools that have been created to better understand worker attributions for accidents. In this regard, Martinko et al., (2006) have emphasized the usefulness of the Revised Occupational Attributional Style Questionnaire (ROASQ) by Furnham, Brewin and O’Kelly (1994).

Additional qualitative methodologies are encouraged in future studies in order to offer participants opportunities to elaborate on the occupational accidents they have experienced. Various types of analyses are available in this regard (e.g., thematic analysis
or interpretive description analysis). When analyzing participant responses, it is recommended that researchers work in interdisciplinary teams. An interdisciplinary research approach might be useful in identifying/minimizing personal biases and strengthening objectivity. Multiple perspectives could also potentially help capture a more comprehensive view of attributions by participants.

Researchers may want to de-emphasize hypothetical accident/failure scenarios (Cox, 2014; Meurier et al., 1998; Rickard, 2014) to explore accident interpretation as previous authors (Kouabenan, 1985; Salminen, 1992) have suggested that attributions from a real accident might differ from fictional accidents. That is, there is more personal involvement in a real accident as opposed to a fictional one (Kouabenan, 1985).

Moreover, in order to better understand the interpretations offered and the biases that may emerge by participants, it is recommended that the attributions of actors and witnesses be compared during analyses. This would allow the researcher(s) to discover perception themes and/or differences among subjects.

It is also recommended that semi-structured individual interviews be used as opposed to other methods (e.g., focus groups) to fully capture the interpretations offered by each participant. Leung and Savithiri (2009) have emphasized that while focus groups carry many advantages (e.g., participants can build on each other’s thoughts), they also carry some limitations. Outspoken individuals have been known to “dominate” focus group discussion (Leung & Savithiri, 2009), which is evidently troublesome for the analysis of multiple participant attributions. The best strategy seems to be finding a method that is not so structured that it limits the breadth of participants responses, but has
enough structure to guide the researcher in gaining a deep understanding of participant attributions (e.g., stability, controllability and locus of control factors). Semi-structured interviews seem to fit this description.

In conclusion, researchers have compiled significant work to better understand occupational accidents and determining appropriate strategies for prevention. Kelloway, Francis and Gatien (2014) define due diligence as “an expected standard of conduct that requires us to take every reasonable precaution to ensure safety” (Kelloway et al., 2014, p.10). If due diligence is to be satisfied, researchers must further investigate accident interpretation with particular attention placed on populations vulnerable to accidents. It is also suggested that instead of simply testing new prevention initiatives, these initiatives can be created according to the needs of a population. That is, researchers can use AT as a tool to investigate why individuals believe the accident/failure has occurred and create targeted preventions according to the needs identified. Ultimately, since those at the frontline may be directly experiencing accidents, they can and should be valuable and insightful contributors of knowledge in this area. Abood (2007) states that nurses should be proactively involved in the creation/decision-making of new policies (e.g., safety, health). He further emphasized “nurses are often the first providers to see clearly when and how the healthcare system is not effectively meeting patient needs” (Abood, 2007, p.1). That being said, this review has highlighted various attribution tendencies/patterns in a variety of individuals and contexts. However, it is likely the case that studying specific worker populations will most facilitate targeted preventions.
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APPENDICES


Appendix 2: Comparison of OSHA-recordable workplace violence injury incidence rates per 10,000 worker-months by year among 112 U.S. health care facilities (Centre for Disease Control and Prevention, 2015).
Appendix 3: Incidence of injuries in the U.S. health care facilities by occupation type (Center for Disease Control and Prevention, 2015).

<table>
<thead>
<tr>
<th>Broad occupation group</th>
<th>Back strain injury</th>
<th>Other injuries</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and medicine</td>
<td>33%</td>
<td>67%</td>
<td>100%</td>
</tr>
<tr>
<td>Clerical jobs</td>
<td>27%</td>
<td>73%</td>
<td>100%</td>
</tr>
<tr>
<td>Materials handling</td>
<td>27%</td>
<td>73%</td>
<td>100%</td>
</tr>
<tr>
<td>Sales jobs</td>
<td>26%</td>
<td>74%</td>
<td>100%</td>
</tr>
<tr>
<td>Social science</td>
<td>26%</td>
<td>74%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Appendix 4: Demonstrates that back strain injury with Health and Medicine are at 33% in British Columbia (WorkSafe BC, 2012).
Appendix 5: Demonstrates the percentage of injuries and illnesses involving days away from work for Nurses and aides for selected events in the United States (Bureau of Labor Statistics, 2006).