EXPLORING THE IMPACT OF SIMULATION ANXIETY ON CLINICAL JUDGMENT FOR NURSING STUDENTS

A dissertation submitted to the
Kent State University College
of Education, Health, and Human Services
in partial fulfillment of the requirements
for the degree of Doctor of Philosophy

By
Janet M. Reed
May 2022

A dissertation written by

Janet M. Reed

A.D.N., Lorain County Community College, 2003

B.S.N., University of Massachusetts Amherst, 2006

M.S.N., University of Toledo, 2013

Ph.D., Kent State University, 2022

Approved by

________________________________, Director, Doctoral Dissertation Committee
Richard E. Ferdig

________________________________, Member, Doctoral Dissertation Committee
Aryn C. Karpinski

________________________________, Member, Doctoral Dissertation Committee
Debra Shelestak

Accepted by

________________________________, Director, School of Teaching, Learning, and Curriculum Studies
Martha Lash

________________________________, Dean, College of Education, Health, and Human Services
James Hannon

REED, JANET M., PhD, May 2022 Teaching Learning and Curriculum

EXPLORING THE IMPACT OF SIMULATION ANXIETY ON CLINICAL JUDGMENT FOR NURSING STUDENTS (157 pp.)

Director of Dissertation: Richard E. Ferdig, Ph.D.

Research literature provides evidence that new graduate nurses are often deficient in clinical judgment (CJ). One way to increase CJ is by using simulations. However, the literature is replete with descriptions of the high anxiety that simulation triggers. It is not currently known how anxiety in simulation affects clinical judgment for undergraduate nursing students. Therefore, the purpose of this study was to explore the effect of different types of anxiety on the clinical judgment of undergraduate nursing students in simulation.

This research project used a one-group repeated measures quantitative design to answer the research questions using the conceptual framework of Tanner's (2006) model of clinical judgment. A convenience sample of 45 sophomore-level undergraduate nursing students participated in a study to explore how state and trait anxiety impacted their clinical judgment within an introductory simulation.

The results indicated that anxiety did not have a significant impact on clinical judgment. When controlling for baseline state and trait anxiety, pre-simulation anxiety level did not significantly predict scores on the Lasater Clinical Judgment Rubric (LCJR) within the

simulation. State anxiety did change significantly between the three time measurements, going up to significantly high levels at pre-simulation. These anxiety levels remained high at post-simulation. The findings imply a changed focus to reframe how anxiety is thought about and its effects. Some anxiety is good and facilitative, and therefore, faculty should not be so worried about reducing anxiety for all students. Rather, nursing educators should help students function despite anxiety, in order to prepare them for real world nursing practice.

ACKNOWLEDGEMENTS

This research project would not have been possible without the direction, support, and guidance of my advisor and dissertation director, Dr. Rick Ferdig. Thank you for investing so much time in me and allowing me to pursue my goals. I truly appreciate your support, mentoring, and encouragement over the past several years. I am forever grateful for you. Also, a big thank you to my committee members: Dr. Aryn Karpinski and Dr. Debra Shelestak. Your advice and direction have been essential in completing this research. Thanks for being readily available to help me with my questions. Dr. Shelestak is the one who first encouraged me to start this Ph.D. journey, and I am so grateful she did. Thanks, as well to Dr. Gandolfi, my graduate faculty representative, for the support you provided in the early and late stages of this project.

This research would not have been possible without the support from several research assistants who happened to be my colleagues: Loretta, Lisa, Cherie, and Chrissy. I am very grateful for the time and support you gave to this research project in order to make it happen. To my husband Matt: Thank you for believing in me, praying for me, and for picking up so many of the chores while I sat at the computer working. Thanks for your patience and enduring love, without which I could not have done this. To my children, thanks for persevering with me through many hours of work at my computer. I want you to know that you too can accomplish your dreams and goals with God's help.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Table Page

CHAPTER I

INTRODUCTION

Background and Significance

Nurses are required to possess and use clinical judgment for safe patient care (Dickison et al., 2019; Kavanagh & Szweda, 2017). Clinical judgment (CJ) can broadly be defined as the observed outcome of cognitive, psychomotor, and affective processes demonstrated through a nurse's actions and behaviors (Victor-Chmil, 2013). According to Tanner's (2006) model, clinical judgment can be further broken into four phases: noticing, interpreting, responding, and reflecting. With CJ, nurses do not simply follow physicians' orders; rather, they independently assess, analyze, synthesize, make decisions about complex information, and communicate with the entire healthcare team.

Unfortunately, research has provided evidence that new nurses lack sufficient CJ skills (Nielsen et al., 2016). This problem has worsened over the past decade and was exacerbated by the COVID-19 pandemic (del Bueno, 2005; Kavanagh & Sharpnack, 2021). Healthcare today has become increasingly complex, demanding a nurse who can perform competently through the use of CJ. Despite the need for nurses to possess safe clinical judgment, the majority of employers of newly graduated nurses are not satisfied with the entry-level CJ skills of graduate nurses (Saintsing et al., 2011). The situations where nurses need to use CJ are usually ambiguous and laden with value conflicts among stakeholders with competing interests, making this skill difficult for new and inexperienced nurses (Manetti, 2019). This has led national healthcare organizations to develop initiatives challenging nursing education to better prepare practice-ready graduates (Dickison et al., 2019; IOM, 2010).

There are several potential causes for the noted deficiencies in CJ. For example, learning CJ can be an arduous process for nursing students; it often concurrently includes low levels of self-confidence and high levels of anxiety while learning to make clinical decisions (Aller, 2020; White et al., 2019). Additionally, although CJ is a skill gained through experiential learning activities where learners are active participants, nursing education continues to use lecture as the primary classroom teaching activity despite questions about its effectiveness (Lee et al., 2019; Reed, 2020). Finally, with limited clinical sites, students are often only allowed to perform trivial aid tasks compared to gaining experience and practice in nursing decision making in its entirety in order to build CJ (Hayden et al., 2014b). One technique used to give students experiences they cannot get during clinical rotations is simulation.

Research has provided evidence of the potential effectiveness of using simulation in nursing education to improve clinical judgment skills (Hayden et al., 2014b; Klenke-Borgmann et al., 2021; Lawrence et al., 2018). Even before the COVID-19 pandemic, simulation was increasingly being used in nursing education to replace clinical experiences due to reduced numbers of clinical sites and limits in what student nurses are permitted do in their clinical practice. Both face-to-face and virtual simulation modalities provide an adjunct to clinical learning in which students can have standardized practice in developing clinical judgment in a safe environment without risk of patient harm (Fogg et al., 2020). The value of simulation has been extensively researched over the past two decades, showing its ability to increase the competency, teamwork, safety, and self-confidence of student nurses (Hayden et al., 2014b; Zapko et al., 2018). Although most research has been done using high-fidelity manikins for nursing simulation, research on the effectiveness of virtual simulation has linked it with higher knowledge, skill performance, and student satisfaction (Foronda et al., 2020; Gu et al., 2017).

Although other educational interventions such as case studies can also assist in developing CJ, simulation is especially effective due to its immersive, real-world replication of clinical scenarios (Klenke-Borgmann et al., 2020).

One potential barrier to simulation effectiveness is student anxiety which can interfere with learning outcomes. Spielberger et al. (1970) described two types of anxiety: state and trait anxiety. State anxiety is situational anxiety that comes due to circumstances, whereas trait anxiety is an underlying personality trait (Spielberger et al., 1970). In a survey of American college students from 140 different schools, the American College Health Association found that 26.5% of college students reported anxiety as a factor impacting their academic performance (ACHA, 2018). Furthermore, over 63% of college students reported feeling overwhelming anxiety within the prior 12 months (ACHA, 2018). Although anxiety is a serious problem for college students in general, the Bachelor of Science in Nursing (BSN) degree has been reported as one of the most demanding and stressful college degrees of all available majors (Shukman, 2017; Wickline, 2021). Within the nursing major, students experience significantly higher state and trait anxiety than the general college student population, with disturbingly high anxiety around the time they start clinical rotations (Wedgeworth, 2016). Moreover, students have described nursing simulation as a terrifying experience, and they are especially fearful of both *the unknown* and making mistakes in front of others who are watching (Mills et al., 2016).

The complex relationship between anxiety and student performance has been studied with mixed results. While moderate levels of anxiety may improve performance, excessive anxiety can hinder learning and lead to low self-confidence and performance issues (Al-Ghareeb et al., 2017). Excessively high levels of anxiety can also impede students from making appropriate clinical decisions by creating cognitive interference, thus creating patient safety issues such as medication errors (Hollenbach, 2016; Mills et al., 2016). Many interventions for reducing student anxiety during simulation have been suggested in the literature for nurse educators to implement (Turner & McCarthy, 2017). However, scant research addresses how anxiety affects clinical judgment, both overall and within each of its four phases (Tanner, 2006). As nurse educators increasingly use simulation in order to increase CJ in students, it is unknown how anxiety-reducing interventions will affect CJ, as this relationship has not been well examined.

Purpose of the Study

Therefore, the purpose of this study is to examine what relationships exist between anxiety and clinical judgment within simulation. Understanding these relationships will allow nursing educators to know when and how to apply anxiety-reducing interventions that have been suggested for helping students with simulation anxiety. Moreover, although there are a variety of anxiety measurement tools used in research on simulation anxiety for nursing students, the field lacks a valid, reliable, and open-access short form for self-reported state and trait anxiety experienced over the short duration of time spent in simulations (Burbach et al. 2019; Reed & Ferdig, 2021). Therefore, a second goal of this research is to test a 5-item short-scale of the *Spielberger State-Trait Anxiety Inventory* (STAI) developed by Zsido et al. (2020) for novel use in nursing simulation.

Research Questions

RQ1: What are the psychometric properties for the main instruments used in the study (Zsido 5-item STAI and LCJR) when used with undergraduate nursing students in simulation?

RQ2: What is the relationship, if any, between state and trait anxiety and overall clinical judgment among undergraduate nursing students in simulation?

RQ3: What is the relationship, if any, between state and trait anxiety and the four phases of clinical judgment (noticing, interpreting, responding, and reflecting) among undergraduate nursing students in simulation?

RQ4: How do state and trait anxiety change over a semester from baseline to pre-simulation to post-simulation for undergraduate nursing students participating in simulation?

Definition of Terms

Anxiety- An emotional state which includes an individual's perceived feelings of tension, apprehension, and nervousness accompanied by activation of the autonomic nervous system (Spielberger et al., 1970).

Clinical Judgment- The observed outcome of critical thinking and clinical decision-making (NCSBN, 2018). CJ involves making an interpretation or conclusion about a patient's needs and then deciding to take action as deemed appropriate (Tanner, 2006).

State Anxiety- A transient and temporary reaction to adverse events (Spielberger et al., 1970).

Simulations- A technique used to immerse students in complex situations that mimic real life, utilizing either live actors, high, medium, or low-fidelity manikins, or computer/screen-based programs in a fully interactive scenario (Gaba, 2004).

Trait Anxiety- A chronic feature of one's personality or can be related to psychopathological conditions which create continuous high arousal levels (Saviola et al., 2020; Spielberger et al., 1970).

CHAPTER II

REVIEW OF THE LITERATURE

This chapter reviews the literature related to clinical judgment within nursing simulation, the pedagogical effectiveness of simulation, student anxiety during simulations, and the relationship between anxiety and clinical judgment.

Clinical Judgment

Clinical judgment (CJ) is an ambiguous term, and it is often confused with the concepts of critical thinking, clinical reasoning, and clinical decision making (Manetti, 2019). As a matter of fact, nurse scholars have struggled for decades to establish a clear and comprehensive definition for clinical judgment (Gordon et al., 1994; Regan-Kubinski, 1991). In her concept analysis on clinical judgment, Manetti (2019) claims that CJ has been widely researched and written about as a complex phenomenon—a factor that has contributed to the large range of definitions and misunderstanding of terminology. Manetti (2019) concluded that clinical decision-making (CDM) is a surrogate term for clinical judgment, yet others have claimed that CJ is the observed outcome of CDM (NCSBN, 2018). Outside of healthcare, other disciplines such as psychology and counseling have defined CJ similarly by focusing on the actions and outcomes of decision making (Bierman et al., 2006; Rosenthal, 2004).

The American Association of Colleges of Nursing (AACN, 2021) defined CJ using Manetti's (2009) concept analysis as the "process by which nurses make decisions based on nursing knowledge (evidence, theories, ways/patterns of knowing), other disciplinary knowledge, critical thinking, and clinical reasoning" (p.12). The reasoning used for CJ can vary by being inherently intuitive and automatic to more analytic and reflective in its nature. Novice nurses—including student nurses—often rely more on analytic reasoning, whereas experienced nurses are more likely to use intuitive reasoning based on their past experiences (Tanner, 2006). Klenke-Borgmann et al. (2020) explained that critical thinking is a broad term, clinical reasoning is a specific term about reasoning at the point of care, and clinical judgment is the end result or outcome of that reasoning.

The National Council of State Boards of Nursing (NCSBN, 2018) defined CJ as a skill involving the recognition of clues, creation and weighing of hypotheses, action taking, and evaluation of outcomes for patient care. They explained that CJ is the observed outcome of two cognitive processes: critical thinking and clinical decision making. The National League for Nursing (NLN)—in coordination with the NCSBN—worked together to design a valid, defendable model called the *NCSBN Clinical Judgment Measurement Model* in order to integrate testing of clinical judgment into the National Council Licensure Examination (NCLEX) questions. The NCSBN CJ Measurement Model describes the cognitive operations for CJ as recognizing cues, analyzing cues, prioritizing hypotheses, generating solutions, taking actions, and evaluating outcomes (Dickison et al., 2019; Dickison et al., 2020). Because multiple-choice test questions on the NCLEX have failed to properly assess clinical judgment, the NCSBN CJ Model is being used to develop new *Next-Generation NCLEX* assessment techniques for the licensure exam to more properly measure CJ (Dickison et al., 2019). Though there are slight variations in the different definitions for CJ, CJ is well recognized as an important and often missing component in the evaluation of nursing students (Dickison et al., 2019).

One of the leading frameworks for understanding CJ in nursing is Tanner's (2006) conceptual model of CJ. According to Tanner (2006), CJ is defined as "an interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response" (p. 204). Tanner (2006) reviewed over 200 studies on CJ and developed five assumptions about clinical judgment in nursing:

1. Clinical judgments are more influenced by what nurses bring to the situation than the objective data about the situation at hand.
2. Sound clinical judgment rests to some degree on knowing the patient and his/her typical pattern of responses, as well as an engagement with the patient and his/her concerns.
3. Clinical judgments are influenced by the context in which the situation occurs and the culture of the nursing care unit.
4. Nurses use a variety of reasoning patterns alone or in combination.
5. Reflection on practice is often triggered by a breakdown in clinical judgment and is critical for the development of knowledge and improvement in clinical reasoning. (Tanner, 2006, p. 205-207)

Because of the variations and confusion surrounding the concept of CJ, it has been proposed that a standardized language and tool is needed within nursing education (Lasater, 2011; Lee, 2021). To help build this language, it has been suggested to use Tanner's (2006) model of CJ as the emerging theory and the evaluation tool associated with it —the *Lasater Clinical Judgment Rubric* (LCJR) (Lee, 2021). The selections of Tanner's CJ model and LCJR have been chosen for several reasons. First, Tanner's definition of clinical judgment differentiates from other definitions because it focuses not only on the cognitive processes of thinking and reasoning, but also on the psychomotor actions and affective processes of the caregiver (Victor-Chmil, 2013). Tanner's model assumes that CJ is not only influenced by the nurse's knowledge and reasoning, but also contextual factors such as the nurse's background (e.g., ethics, values, biases), relationship with the patient, and environmental factors. These changes provide for a holistic definition of CJ which can be tied to *thinking like a nurse* (Etheridge, 2007). Tanner's model is also based on research from nurses across all specialties, whereas the earlier Regan-Kubinski (1991) model of CJ was based only on psychiatric nurses. Additionally, only Tanner's (2006) model has an associated rubric, the LCJR (Lasater, 2007)—which can objectively quantify CJ scores.

Phases of Clinical Judgment

According to Tanner's (2006) CJ model, there are four phases of clinical judgment: noticing, interpreting, responding, and reflecting. These phases do not happen linearly but circularly; they may involve repeated iterations. It is important to explore each of these phases in more detail to best understand CJ.

Noticing

Noticing is the first stage of clinical judgment; it is where the nurse collects both subjective and objective assessment data on the patient. This involves collecting physical assessment data as well as noticing clues in the environment. It also requires the ability to ask the right questions of the patient/family to elicit needed information. Noticing is an art and a complex phenomenon that is often taken for granted (Watson & Rebair, 2014). It involves focused observation, differentiating between expected patterns and significant deviations, and seeking additional information (Lasater, 2011). According to Tanner (2006), noticing involves obtaining "a perceptual grasp of the situation at hand" (p. 208). Mason (2002) differentiates between ordinary noticing (i.e., what we can recall if asked to remember) and *marking*—a heightened form of noticing where significance is assigned to data. Marking is a trait essential to professional nursing practice, as it allows them to notice subtle changes in a patient's condition in order to detect complications as early as possible. Other professions such as teacher education have also emphasized the importance of professional noticing; researchers have described how novices often notice things differently than experienced professionals (Ferdig & Kosko, 2020; Kosko et al., 2021; Rooney & Boud, 2019). There are three forms of professional noticing that need to be developed in students: noticing in context, noticing of significance, and noticing learning itself (Rooney & Boud, 2019). Noticing is an important skill for educators to teach, as novice students often struggle with cue recognition and the determination of what is important and what is not (Burbach & Thompson, 2014).

For nurses, a lack of noticing or delay in noticing can cause serious consequences, including patient death. Evidence shows that a large number of patients suffer from missed or omitted care as a result of lack of attentiveness (Kalisch et al., 2009). Failure to notice has been linked to modern culture's increased reliance on technology (Watson & Rebair, 2014). An example of this is *alarm fatigue*, when nurses experience sensory overload due to an excessive number of alarms. For example, a nurse who is desensitized to alarms, might fail to notice when a heart rate alarm is significant. Contextual factors which can affect a nurse's ability to notice include the nurse's relationship with the patient, the context of care, staffing shortages, and the nurse's past experiences (Lasater et al., 2019; Shinnick & Cabrera-Mino, 2021). Ashley & Stamp (2014) founds that junior nursing students—having one additional year of experience over sophomore students—were much better at recognizing salient cues in simulation.

Nurses' values and beliefs, as well as personal biases can also affect what it noticed (Watson & Rebair, 2014). An example of this would be if a nurse believes a patient is attention-seeking or manipulative, they might not pay close enough attention to notice significant patient issues. The expectations that the nurse brings to the clinical situation and the nurse's knowledge of typical patient response patterns can also affect the ability to notice (Daley et al., 2017). Shelestak et al. (2015) found that correctly identifying or noticing cues during simulation was foundational for students being able to make correct nursing decisions later. In short, improved patient outcomes in healthcare must start with improved noticing.

Interpreting

The second phase of Tanner's (2006) CJ model is *interpreting*. In this phase, the nurse uses various reasoning patterns, such as analytic, intuitive, or narrative reasoning—depending on the clinical situation—in order to form a conclusion for diagnostic purposes. These reasoning patterns are used to assign meaning to what was noticed and guide the nurse to an appropriate course of action (Tanner, 2006). Deductive reasoning may be used to form hypotheses which are weighed and considered. More assessment data might also be collected by the nurse to confirm hypotheses and reach an interpretation. Developing hypotheses is similar to developing nursing diagnoses within the nursing process.

Both prioritization and making sense of data are tasks within the interpreting phase (Lasater, 2007; Tanner, 2006). Prioritizing data involves evaluating a group of items and arranging them in order of importance or urgency at a given time. Interpreting cannot happen if the nurse fails to first notice cues. New nurses also struggle with this phase of CJ. For instance, Berkow et al. (2008) surveyed more than 5,700 nurse leaders and educators of new graduate nurses. They found that one of the lowest scoring competencies for new nurses was interpretation of assessment data. Being able to properly interpret and prioritize data allows the nurse to move forward to the next phase of selecting the correct actions to take, which is a marker of competency (Kavanaugh & & Szweda, 2017).

Responding

Tanner (2006) labeled the third phase of CJ as *responding;* it is where the nurse intervenes by acting on the patient's behalf. In this phase, clear communication with providers is essential in order to obtain new orders for the patient. The nurse must also use skillfulness to carry out interventions. According to Lasater (2007), the responding phase includes having a calm, confident demeanor, using clear communication, implementing well-planned interventions, being flexible, and being skillful. Responding occurs when the nurse acts (or fails to act) upon the formulated hypotheses. There is a timeliness that is required within this phase, as well as psychomotor skills to complete nursing tasks (i.e., medication administration, tube insertion, etc.) based on best practices (Lasater, 2011).

Reflecting

The final stage of CJ according to Tanner (2006) is *reflecting.* In this phase, the nurse evaluates behavioral choices and explores the decisions that were made. After reflecting, nurses adjust actions based on patient responses and assess the efficacy of their nursing actions. According to Tanner (2006), this phase includes two different types of reflection: reflection *in-action* and reflection *on-action*. Reflection in-action describes the nurses' ability to *read* the patient—their responses to interventions—and adjust the plan based on that reflection. Sometimes reflection in-action is intuitive and not obvious while it is happening. At other times, there might be clear indication of the need for reflection if the desired patient outcomes were not achieved (Tanner, 2006).

Reflection on-action describes what nurses learn and gain from their experience that contributes to their ongoing clinical judgment. Within nursing simulations, the reflecting phase corresponds with *debriefing* which should happen immediately after the simulation (INACSL, 2016). Debriefing is said to be where the majority of student learning happens for building CJ (Al Sabei & Lasater, 2016). In an experimental study of 60 intensive care unit nurses, Razieh et al. (2018) found that reflection could improve nurses' clinical decision making. It is not only important for students to reflect on simulations, but also upon their clinical experiences, as this can facilitate growth of CJ (Nielsen et al., 2016). For CJ to improve over time, reflection must become a habit of the mind to learn from one's clinical encounters with patients.

Clinical Judgment Development in New Nurses

The development of sound clinical judgment (CJ) is an essential skill for professional nurses and allows for the delivery of safe patient care. The AACN (2021) calls clinical judgment the basis for professional nursing practice and labels it a core competency for undergraduate nursing students. However, the process of developing CJ takes time and experience; the fact that new graduate nurses are lacking in clinical judgment has been a well-recognized problem for several decades (del Bueno, 2005; Dickison et al., 2019; Nielsen et al., 2016). Lasater et al. (2015) found that even nurses in their second years of practice were still lacking fully developed clinical judgment. In a large study of over 5,000 newly graduated nurses from 21 states, Kavanagh & Szweda (2017) found that only 23% were considered *safe-to-practice* in clinical judgment and decision making. This appears to have gotten worse since del Bueno (2005) reported a decade earlier that 35% of new graduate RNs were in the safe/acceptable range for the thought processes needed for clinical practice. The problem of new nurses lacking clinical judgment may have worsened due to setbacks from the COVID-19 pandemic and its impact on missed clinical and hands-on experiences (Kavanagh & Sharpnack, 2021).

Hospitals and employers have also recognized the deficit in CJ in new nurses. Berkow et al. (2008) reported that only 10% of hospital executives believed that new graduate nurses were ready for the demands of clinical practice. Some of these demands include higher patient acuities, staff shortages, and reduced lengths of stays in the hospital. This disconnect between what new nurses need to be able to do and what they are functionally capable of doing out of nursing school is often termed the *academic-practice gap* (Huston et al., 2018). This is a costly problem in healthcare which is also known as the *preparation-practice gap* (Hickerson et al., 2016). Many hospitals have tried to tackle this problem by creating nurse-residency programs to assist in helping new nurses gain CJ needed for safe practice. One reason that this is such an essential problem to address is that lack of CJ in nurses can lead to serious errors and liability. Research has shown that being a new nurse is a contributing factor in medication errors (Berkow et al., 2008; Tang et al., 2007). According to Saintsing et al (2011), 50% of new nurses made errors in delivering nursing care and only 20% of employers were pleased with the decision-making abilities of new nurses. In summary, the lack of CJ in new nurses has been a well-recognized problem facing the profession for many years. Nursing education has been called upon to reform and to find new ways to develop clinical judgment in undergraduate nursing students to help address this problem (Benner, 2020).

Measurement of Clinical Judgment

Clinical judgment is a complex phenomenon that is inherently difficult to measure without a valid, reliable tool (Victor-Chmil & Larew, 2013). One challenge in evaluating CJ is that many of the underlying cognitive processes being examined are not readily observed by evaluators (Dickison et al., 2019). The ongoing confusion with definitions and terminology also makes it difficult to distinguish what exactly is being evaluated and measured in simulation—whether one is measuring competence, performance of action, or clinical judgment (Manetti, 2019). There have been a variety of tools reported in the literature to judge nursing students' simulation performance. These tools vary from faculty-developed action checklists to more formal competency evaluations such as the *Creighton Competency Evaluation Instrument* (CCEI) (Hayden et al., 2014a). The CCEI was formerly called *Creighton's Simulation Evaluation Instrument* (CSEI) and was developed by Todd et al. (2008). However, it was later revised with some terminology changes for use in the landmark NCSBN study (Hayden et al, 2014a, 2014b). One significant change was the replacement of the term *critical thinking* with *clinical judgment*.

In the CCEI, clinical judgment is only one of the four categories which measure 23 expected nursing behaviors (Todd et al., 2015). The CCEI component on clinical judgment includes a range of actions including interpreting and prioritizing information during the simulation (e.g., vital signs, assessment findings, laboratory results), performing interventions, delegating appropriately, and critically reflecting on the simulation experience. Students are assigned a numeric score of zero or one for each of the 23 nursing behaviors, based on whether competency was demonstrated or not. CCEI measures the overall concepts of performance and competency and is used both in simulated and clinical learning environments (Hayden et al., 2014b).

Another widely used tool for examining clinical judgment during nursing simulation is the Lasater Clinical Judgment Rubric (LCJR) (Lasater, 2007). Unlike the CCEI in which CJ is only one of four components, the Lasater Clinical Judgment Rubric (LCJR) was built specifically to measure the singular concept of clinical judgment based on the conceptual framework of Tanner's (2006) Model of CJ in nursing. The LCJR was intended as an instrument to describe the course of students' CJ development over time by providing formative guidance and feedback (Lasater, 2007, 2011). The LCJR breaks down each of Tanner's phases of clinical judgment into

11 dimensions that were developed based on qualitative and quantitative research with nursing students (Lasater, 2007, 2011). The rubric provides standardized language that can be used to evaluate performance within each phase and dimension; evaluators assign a score for each dimension as either 1 (beginning), 2 (developing), 3 (accomplished), or 4 (exemplary). A final noteworthy difference between the two major instruments is that while the CCEI is typically used in group settings, the LCJR was intended to be used for evaluating the development of CJ among individual students (Lee, 2021).

Summary of Clinical Judgment

Alarming research has demonstrated that new graduate nurses lack the clinical judgment skills needed for safe patient care in a complex and fast-paced healthcare environment (Kavanagh & Sharpnack, 2021). Because of this problem, it is essential for nursing education to provide educational experiences that build and develop clinical judgment in undergraduate nursing students. The Lasater Clinical Judgment Rubric (Lasater, 2007)—based on Tanner's (2006) Clinical Judgment Model—is a well-researched and evidence-based, valid and reliable tool to describe clinical judgment using observation during simulation.

Simulation in Nursing Education

One potential educational intervention that can assist students in development of clinical judgment is simulation (Bussard, 2018). Simulation can be defined as "a technique, not a technology, to replace or amplify real experiences with guided experiences, often immersive in nature, that evoke or replicate substantial aspects of the real world in a fully interactive fashion" (Gaba, 2004, p. i2). Simulation is meant to be immersive with its intention to develop competence, skills, clinical judgment, and application of knowledge to real-life situations

(Aebersold, 2016). To fully understand simulation in nursing education, it is helpful to first consider its history.

History of Nursing Simulation

Simulation has a long history of use in human training going back as far as the Roman Empire when generals simulated army moves (Smith, 2010). Simulation use exploded in the aviation field in the United States as early as the 1920s. The US Army later started using simulators to teach pilots how to fly in hazardous conditions, with commercial simulators gaining popularity around World War II (Aebersold, 2016). In the United States, nursing simulation has been documented as early as 1874 when nursing schools were advised to have a mechanical dummy for use in a *Handbook for Hospital Sisters* published in 1874 (Owen, 2016).

The first official nursing education life-sized simulator was called *Mrs. Chase*; it was developed by Martha Jenkins Chase in 1911 in order to teach nurses how to dress, turn, and transfer patients (Nehring & Lashley, 2009). By 1960, Laerdal Medical, a Norwegian company that has since dominated the healthcare manikin market, created a commercial product named *Rescue Annie*—a manikin to be used for CPR training (Rosen, 2008). Specialized high-fidelity computerized manikins with realistic breathing and heartbeats began being used for nursing simulation in the late 1990s and early 2000s (Aebersold, 2016). These computer-controlled simulators could talk, bleed, blink, cry, sweat, and react in real time. The number of nursing schools using medium or high-fidelity simulators exploded from 2000-2010 as faculty realized the learning benefits of simulation (Owen, 2016).

In response to this surge in simulation development and use, the *International Nursing Association for Clinical Simulation and Learning* (INACSL) was formed in 2002 with its mission to promote the development and advancement for clinical simulation in nursing

(INACSL, n.d.). Currently, the third edition of the *INACSL Standards of Best Practice in Simulation* has been published and is widely used to support best practices in simulation education across the world (INACSL, 2016). Pamela Jeffries (2005, 2016) developed the first model for simulation which was later developed into a theory of simulation-based learning. Her model describes best practices for simulation design including learning objectives, fidelity, cueing, feedback, and debriefing to guide educators.

In recent years, nursing education has seen massive growth in the use of simulation for several reasons. First, similar to the field of aviation, healthcare is also driven by safety. The link between simulation and patient safety has become increasingly obvious as more research has been published on simulation outcomes (Shearer, 2013). Second, limited availability of clinical sites for students has created the need to give student experiential learning experiences in which they can practice clinical decision making and learn clinical judgment in safe spaces (Aller, 2020). Students are severely restricted in what they can do at hospitals and clinical sites, often being only allowed to perform nurses' aide duties. These restrictions inhibit nursing students from getting full exposure to functioning as a registered nurse (Hayden et al., 2014b). Simulation allows them opportunities to do this. Finally, a plethora of educational research in the past decade has confirmed that simulation can lead to improved learning outcomes for student nurses, such as increased confidence, knowledge, teamwork, and self-efficacy (Dunn et al., 2014; Hayden et al., 2014b; Lee et al., 2019; Zapko et al., 2018). Research also supports the idea that simulation can be used to increase clinical judgment and decision-making skills in nursing students (Ashcraft et al., 2013; Shelestak et al., 2015).

Modalities of Simulation

There are various methods or modalities of simulations, including face-to-face and virtual simulations. Face-to-face simulations can range from using task trainers, role playing, or live actors called *standardized patients* to high, medium, or low-fidelity manikins (Nehring & Lashley, 2009). *High-fidelity* simulations have a high degree of believability or realism and use computerized manikins. *Mid-fidelity* simulations are considered those that utilize standardized patients, computer programs or video games. *Low-fidelity* simulations can utilize role play, non-computerized manikins or task trainers to practice a skill such as an IV arm that is used to practice IV insertions skills (Aebersold & Tschannen, 2013). It is worth noting that Kardong-Edgren et al. (2019) claim that these terms for labeling types of simulations are outdated and insufficient for adequately describing realism and presence in simulation. They argue that new terminology is needed which can provide specifications for the various levels of immersion and presence.

Another emerging modality is virtual simulation, which has increased substantially since the COVID-19 pandemic (Aebersold & Dunbar, 2021). Virtual simulation is defined as a computer-based recreation of reality that puts students in an autonomous role with control over the environment and outcomes (Lopreiato, 2016). Virtual simulation can encompass a plethora of delivery methods that are often confused, such as web-based simulation, virtual reality, virtual patients, and serious games (Cant et al., 2019; Kardong-Edgren et al, 2019). For instance, virtual reality which immerses learners in interactive 3D virtual worlds often focuses on procedural skills and is used to supplement conventional teaching methods (Plotzky et al., 2021; Rourke, 2020). Since virtual reality is fairly new, there is a need to strengthen the evidence about its effectiveness (Woon et al., 2021). Although the educational research on the pedagogical effectiveness of virtual simulation is very much in infancy, some emerging research has linked it with higher knowledge, engagement, skill performance, self-confidence, critical thinking, and student satisfaction (Chen et al., 2020; Cobbett & Snelgrove-Clarke, 2016; Cook & Triola, 2009; Everett-Thomas et al., 2021; Foronda et al., 2020; Gu et al., 2017; Kononowicz et al., 2019; Plotzky et al., 2021; Verkuyl & Hughes, 2019).

Some research has compared the different modalities of simulation and their effectiveness with mixed results. Ignacio et al. (2015) compared standardized patients (actors) with high-fidelity manikins and performance outcomes and found no significant difference between the two modalities. Data from focus group interviews, however, suggested that students preferred using standardized patients, as they were perceived to be valuable in preparing students for actual patient management (Ignacio et al., 2015). Standardized patients can be a very effective mode for nursing simulations; however, challenges in recruiting and compensating actors can prevent this from being a feasible option for many nurse educators. Kim et al. (2016) examined the effect size for simulation-based interventions in the literature and reported that high-fidelity simulation and standardized patients had larger effect sizes when compared to low-fidelity simulations. A study by Cobbett and Snelgrove-Clarke (2016) found that students preferred face-to-face simulation over virtual simulation due to higher anxiety in the virtual environment, technological issues, and lack of hands-on practice. Widespread adoption and implementation of virtual simulation has been slower than predicted from a development and affordability perspective but is predicted to increase in the future digital age (Kardon-Edgren et al., 2019).

Simulation and Clinical Judgment

High levels of student satisfaction and increases in self-confidence related to simulation have been well-documented in the literature (Bambini et al., 2009; Hayden et al., 2014b; Mariani & Doolen, 2016). However, CJ and its relationship with simulation have only been studied more recently since the American Association of Colleges of Nursing (AACN, 2008) named CJ as an essential outcome of baccalaureate nursing education. For instance, a descriptive study of 70 junior level medical surgical undergraduate nursing students by Bussard (2018) examined the differences in CJ of students across four simulation scenarios using LCJR. The author found a statistically significant progression of CJ between LCJR scores at the first simulation to the fourth simulation. It is worth noting that these students were not only participating in simulation, but also in clinical practice during the course; as such, it is difficult to determine if the growth of CJ was specific to the simulation activities performed or a combination of experience in the clinical setting and simulation.

These findings mirror work completed by Ashcraft et al. (2013) who using a modified version of the LCJR and also found similar significant increases in CJ with simulation. They used a modified version of the LCJR, which changed the scoring of the tool for students who violated patient safety actions (ex. failing to wash hands or properly identify a patient). In her grounded theory study on the development of undergraduate nursing students, Aller (2020) proposed a new model in which clinical decision-making increases over time as anxiety and paralyzing emotions decrease, and self-efficacy and confidence increase. These studies provide evidence that simulation assists nursing students in gaining more active learning experiences which contributes to achievement of higher levels of CJ over time.

Research has also found that the design and theory used to guide simulations may influence the amount of clinical judgment students gain from the experience. For instance, Victor (2017) conducted a retrospective study that found a significant increase in clinical nursing judgment for nursing students at both the beginning and end of a baccalaureate nursing program in which all simulations used an experiential learning theory-based design (n=204). Based on her findings, she concluded that the use of simulation-based learning can improve student outcomes and foster the development of clinical nursing judgment.

Chmil et al. (2015) examined CJ between traditionally designed simulations and simulations designed based on Kolb's *Experiential Learning Model* (1984) in individually conducted simulations. They found higher CJ scores for the experimental group (n=144). Within the experimental group, the authors also examined the relationship between simulation performance (using CSEI) and CJ (using LCJR). They found this relationship to be positive (r = 0.69) and significant, showing that higher levels of CJ led to improved simulation performance. The regression model showed that 47% of the variance in simulation performance (CSEI score) was associated with clinical nursing judgment development indicated by the LCJR score (Chmil et al., 2015). The use of experiential theory-based simulations, in contrast to traditional simulations based on Jeffries (2005, 2016) framework may improve students' development of CJ during simulation by increasing learners' metacognition, or conscious awareness of their own learning.

One potential confounding factor for discovering the true impact of simulation on CJ is that students are concurrently exposed to hospital-based clinical practice (Bussard, 2018). Victor et. al. (2017) examined the relationship between CJ and clinical competency by comparing scores of LCJR with Creighton's (CSEI) within simulations and clinical experiences.

Interestingly, they found a significant positive relationship between clinical nursing judgment development within the simulation setting even before clinicals had started for the semester (r = 0.43). At the end of clinical experiences later in the semester, there was an even stronger significant positive relationship between clinical nursing judgment development through simulation and clinical performance (r = 0.79). This research demonstrated that simulation experiences, when planned concurrently with clinical experiences, can accelerate the rate of CJ development.

In sum, there is research evidence to support nurse educators implementing simulation in nursing curricula, where it can bridge the gap between theory and nursing practice, enhance critical thinking and reasoning, and promote the needed growth of clinical judgment. Research findings have shown that simulation can enhance CJ by providing a safe, supportive educational environment which allows students from various levels to develop knowledge and decision-making skills without risk of patient harm. It can also provide new experiences in a realistic environment that allows for reflection on one's own performance. Individual learning styles can be accommodated, and students can role-model and learn from others in a team. Simulation also has the potential to be a valuable formative and summative assessment tool (Nicholas & Sanko, 2020). Both students and faculty believe simulation enhances development of CJ (Lawrence et al., 2018). However, additional work remains in how to best integrate clinical judgment development into everyday educational practices (Albaqawi, 2018; Dillard et al., 2009; Fawaz & Hamdan-Mansour, 2016; Yuan et al., 2014).

Challenges and Barriers with Simulations

Simulation has been increasingly used in the education of healthcare workers in the past 20 years. There have been calls from national organizations (Institute of Medicine, 2010) to increase simulation, and there has been a growing body of empirical evidence to support its outcomes. However, it is still not fully being utilized due to existing structural barriers. For instance, national, state, and local policies impact the amount of simulation practice students receive. One major policy factor limiting the usage of simulation is the varying state rules and regulations that determine how many clinical hours must happen for nursing students (Cipher et al., 2021). Only 15 states currently provide guidance on the amount of simulation allowed to count towards required clinical hours (Cipher et al., 2021). Despite the plethora of research showing the effectiveness of simulation for learning, many states still have laws favoring traditional clinical experiences and limiting or outlawing simulation to count towards clinical hours (INACSL, 2020). After the COVID-19 pandemic closed schools, many state boards of nursing allowed virtual simulations temporarily for the first time to replace traditional clinical hours when students were no longer allowed to go into hospitals and facilities (Dolan et al., 2021). Whether virtual simulation will be incorporated into states' allowances for simulation remains to be seen.

There are also existing structural barriers within educational institutions which prevent simulations from being fully utilized to support student learning. Al-Ghareeb and Cooper (2016) did an integrative review on barriers to implementation of simulation in nursing and identified key factors such as lack of time, technostress, lack of human resources, manikin maintenance, and additional workload. The lack of faculty training or technological support can also pose barriers to implementation, especially for schools of nursing that do not have a dedicated simulation coordinator on site. For both virtual and manikin-based simulations, the high monetary cost of commercial products continues to limit and restrict many from having access to high-quality simulation experiences. For instance, SimMan 3G, a high-fidelity simulation manikin manufactured by Laerdal, can have an annual cost of $23,500 with the needed computer software and accessories to run it (Haerling, 2018). Some virtual reality simulations that use immersive head-mounted displays like the *Oculus Rift* for virtual reality in surgery training can cost up to $100,000. The costs can vary greatly depending on the mode and program used.

Haerling (2018) did a cost-utility analysis comparing the manikin-based and virtual simulation activities in terms of costs and measures of effectiveness. There were no significant differences found in learning outcomes between the two modalities, but the cost of the virtual simulation activity had a more favorable cost-utility ratio of US $1.08 versus the manikin-based simulation activity's ratio of US $3.62. Haerling (2018) calculated that manikin-based simulation costs per student were US $36.55, whereas virtual simulation costs were US $10.89 per student. More research into the cost benefit of different types of simulation is needed, especially considering the Institute of Medicine's (2010) call for research priorities for cost-effective teaching strategies. Virtual simulations can be cost-effective and reduce the need for expensive manikins and maintenance, particularly if faculty can learn to create and share their own virtual simulations across universities, potentially reducing reliance on expensive external commercial suppliers.

Remaining Research Gaps in Simulation

A large amount of research has emerged in the past 10 years on simulation effectiveness and learning outcomes for simulation. However, several gaps in simulation research still exist. Mariani and Doolen (2016) interviewed 90 simulation experts affiliated with INACSL in order to determine perceived gaps in the research of simulation. They found that a few areas were well studied and considered saturated areas. These saturated research areas included students' self-reported satisfaction with simulation (and faculty's self-reported satisfaction), simulation's effect on self-confidence levels, and self-efficacy as related to simulation. However, one area identified by participants was the need for more research linking simulation with actual patient outcomes such as communication, interprofessionalism, and patient safety (Mariani & Doolen, 2016). A second gap was exploring how clinical judgment gained through simulation impacts patient outcomes and safety—a research-based outcome that could potentially break through some of the institutional barriers limiting simulation by providing return on investment details to stakeholders. Finally, they argued that more longitudinal studies were needed to follow the effects of simulation over time for nursing students and to follow these effects into new nurses' early careers. Klenke-Borgmann et al. (2020) also identified the need for research showing the transferability of simulation outcomes within the nursing classroom (and not just the simulation laboratory) to the practice environment.

Finally, there is a strong need for studies which use reliable and valid measurement tools, multiple sites, and randomized trials (Mariani & Doolen, 2016). Single sites with small convenience samples have been the norm in simulation research. However, as the field grows, higher quality in rigor and methodology is needed to advance the credibility of simulation research (Mariani & Doolen, 2016). Though barriers prevent it from being utilized to its full potential, research has provided evidenced that simulation holds the potential to increase CJ in nursing students.

Anxiety in Nursing Simulation

One factor that can influence the learning gained from simulation is anxiety. Anxiety can be defined as an emotional state which includes an individual's perceived feelings of tension, apprehension, and nervousness accompanied by activation of the autonomic nervous system

(Spielberger et al., 1970). Riskind and Calvete (2019) describe anxiety as a "looming vulnerability" to an approaching threat (p.31).

The terms stress and anxiety are often confused and used interchangeably in the healthcare literature, though they are different concepts. Stress differs from anxiety in that stress is an *objective* response to an external threat, whereas anxiety is a *subjective* response that happens internally when one cognitively appraises or perceives a threat (Al-Ghareeb et al., 2017). Anxiety creates feelings of uneasiness from an undefined future threat; anxiety itself can be a response to stress. Anxiety can be characterized by symptoms such as worrisome thoughts, bodily tension, hypervigilance, irrelevant thinking which can distract and consume working memory, and bothersome physical symptoms from activation of the sympathetic nervous system such as tremors, headache, nausea, difficult breathing, sweating, and a racing heartbeat (Wildenhaus, 2019).

Anxiety can be further separated into trait and state anxiety. State anxiety can be defined as a transient and temporary reaction to a specific situation or event. In contrast, trait anxiety is a chronic personality feature associated with some mental health conditions which cause continuous high arousal levels (Saviola et al., 2020; Spielberger et al., 1970). Although both state and trait anxiety result in unpleasant emotional responses, trait anxiety is greater in intensity and lasts longer, happening in a broader range of situations.

Anxiety is a serious problem for college students in general, and particularly nursing students (ACHA, 2018; Kachaturoff et al., 2020). Anxiety is now the most common mental disorder worldwide with over 11% of adults having trait anxiety with regular feelings of worry, nervousness, or anxiety (CDC, 2021). Wildenhaus (2019) asserts that the recent rise in anxiety in children and teens is related to technology, social media, cultural trends, and increased academic pressures. Anxiety often has both physiological and psychological components when experienced. When the amygdala in the brain senses danger (real or perceived), the prefrontal cortex of the brain which controls rational thought and regulates emotions shuts down, pushing one into fight-or-flight response. Wildenhaus (2019) describes how an anxious person usually tries to get away from the anxiety-inducing event or freezes in paralysis. Highly anxious students begin avoiding the situation that might cause them anxiety, further weakening their self-confidence and ability to function (Wildenhaus, 2019). In the long term, anxious individuals can learn unhealthy coping mechanisms, such as severe avoidance and seeking constant reassurance. Long-term trait anxiety also signals the hypothalamus in the brain to release cortisol and adrenaline which can disrupt body systems and suppress the immune system, causing health problems.

Cognitive Interference Theory by Sarason et al. (1996) explains how anxiety can affect cognitive functioning by creating interfering negative self-talk which consumes attention, drains working memory, and results in poorer performance. Higher cognitive load and anxiety in simulation can be due to pretend realism (fidelity), time pressure, dual-tasking, interruptions, task complexity, and distractions during the simulation (Rogers & Franklin, 2021). With the proper tools and support, however, anxious learners can “move into challenges rather than avoid them through behaviors/experiences that create new positive memories for the brain” (Wildenhaus, 2019, p. 26-27). This can help create new brain habits in the amygdala, which must be re-trained to fire only with real danger, not just perceived danger.

Nevertheless, not all anxiety is bad; a moderate amount of anxiety (e.g., that which does not overwhelm coping mechanisms) can lead to improved learning and performance (Al-Ghareeb et al., 2017). Selye (1985) describes the concept of *eustress*, which is a controlled and manageable type of stress. Similarly, a controlled and manageable form of anxiety can actually help students learn better and remember things longer. The phenomenon of *hot cognition* explains that emotionally charged material is likely to increase long-term memory storage if it isn't too overwhelming or distressful (Ormrod, 2020). Accordingly, the Yerkes-Dodson law states that stress and anxiety affect learning in a curvilinear pattern with moderately high levels of anxiety serving as a *sweet spot* to promote maximal learning and performance (Ormrod, 2020; Yerkes & Dodson, 1908). The *Comfort-Stretch-Panic model* —which is based on the Yerkes-Dodson law—also supports the idea that a moderate amount of pressure supports peak performance (Ormrod, 2020). Palethorpe and Wilson (2011) found that learning happened best when in the stretch zone, not the comfort zone. In short, having too little anxiety or too much anxiety will impair both learning and performance. The "sweet spot" for anxiety hasn't been yet identified for nursing simulations; this may be due in part to the level varying between individuals.

Sources of Student Anxiety in Simulation

Nursing students often perceive simulation as a threatening activity; the academic literature describes the high degree of anxiety experienced in both simulation and clinical learning environments (Cantrell et al., 2017; George et al., 2020; Shearer, 2016; Sun et al., 2016; Yockey & Henry, 2019). In qualitative studies, nursing students have reported simulation stress as being higher than clinical stress with real patients (Cantrell et al., 2017). This is ironic because simulation has been shown to decrease future anxiety when working with real patients (Gore et al., 2011; Hollenbach, 2016; Kameg et al., 2014). There are a variety of factors related to simulation that are reported in the literature which cause student anxiety (see Table 1) which will each be discussed.

Since simulation often involves new technology, technology-related anxiety can also occur in the interaction with a computer, program, or high-fidelity manikin that does not present an actual threat, but the student cognitively appraises it as a perceived threat. When an unfamiliar new technology takes center stage in the learning activity, this situation can induce anxiety symptoms in students who might not otherwise experience anxiety. This experience is termed *technostress* (Weil & Rosen, 1997). Technostress is a phenomenon in which the technology itself causes apprehension, fear, and frustration due to a variety of factors. The term technostress was first coined by the American psychologist Craig Brod (1984). Individuals' learning style, lack of competence in use, and physical factors can make some students more prone to technostress (Weil & Rosen, 1997). Nursing students using simulation technology, both face to face, and in virtual environments must become technologically literate, learning to manage device-specific operations in order to perform effectively while being evaluated. Technology-problems may cause anxiety which can result in dissatisfaction and disengagement with the learning activity and reduced learning outcomes.

Table 1

Sources of Simulation Anxiety for Nursing Students

• Technostress/ unfamiliar novel technology	• Pretend realism
• Pediophobia	• Being labeled the primary nurse
• Student learning styles	• Video-recording and playback
• Fear of the unknown, making mistakes, or critique	• Social evaluation anxiety
• Lack of experience in handling patient deterioration	• Competitive nature of nursing school

A rare but serious cause of anxiety that can occur during simulation is students who have a specific phobia—pediophobia or the fear of dolls (Macy & Schrader, 2008). These students experience paralyzing anxiety from the manikins used in simulations. Cognitive behavioral therapy may be required in consultation with mental health professionals to meet the course objectives (Macy & Schrader, 2008). Anxiety from pediophobia may be manifested by intense fear, crying, increased heart rate, shortness of breath, panic, and possible fainting. Although pediophobia is a rare and extreme exhibit of anxiety with nursing simulation, many students may experience anxiety at levels high enough to cause bothersome symptoms which may interfere with their learning during their simulation (Al-Ghareeb et al., 2017).

Both student and simulation specific characteristics can affect student anxiety in simulation. For example, Nielson and Harder (2013) linked student anxiety with learning style, being observed by others, and not knowing what to expect. Yockey (2015) researched causes of anxiety between students at different levels (first-year versus seniors) and different learning styles. She found that anxiety themes between first-year and senior nursing students did not change; moreover, certain learning styles (such as verbal, sequential, and reflective learners) had more anxiety than other learning styles (such as visual and global learners). Shearer (2016) identified several themes which trigger student anxiety in simulation: "The Unknown," "Critique by Peers/Instructor," and "The Experience of Making Mistakes" (p.552).

Students may feel a sense of panic and not knowing what to do when a patient deteriorates in simulation, which may also lead to anxiety (Ignacio et al., 2016). The pretend realism of the simulation was a contributing factor to student anxiety identified by the thematic analysis of focus groups in a mixed method study by Ignacio et al. (2015). The pressure of being labeled as the primary nurse in group simulations has been linked to higher anxiety levels as well as the use of video camera for recording the simulation (Elfrink et al., 2009; Yockey & Henry, 2019). There were no differences in student anxiety between high-fidelity simulations and standardized patients in a randomized controlled trial by Ignacio et al. (2015). Even in low-stakes simulations, students describe having anxiety, although high-stakes simulations may be even more anxiety-inducing (Burbach et al., 2019).

Fear of failure or making mistakes in front of peers and instructors (termed *social evaluation anxiety*) contributes to the threatening nature of the phenomenon of student anxiety in nursing simulation (Mills et al., 2016; Shearer, 2016). Social evaluation anxiety (SEA) is a factor during face-to-face simulations which are usually conducted in small groups of students. Mills et al. (2016) studied SEA with nursing simulation and found that anxiety was positively correlated with the number of people in the room watching. When the number of people in the simulation room went from one to three, there were significant increases in stress markers in students such as heart rate and cortisol levels, which led to a noted decrease in student performance. Anxiety with simulation was a major theme identified in the grounded theory study on students' simulation experience by Najjar et al. (2015). The need to perform in front of others led to a universal experience of anxiety during simulation, but students also identified that this anxiety led to greater learning (Najjar et al., 2015). The highly competitive nature of nursing school can also be a source of anxiety (Kachaturoff et al., 2020).

Anxiety specifically in virtual simulations has limited research available. Cobbett and Snelgrove-Clarke (2016) compared virtual simulation to face-to-face clinical simulation in relation to student knowledge, anxiety, and self-confidence with clinical decision making (CDM) in maternal-newborn nursing. They used the *Nursing Anxiety and Self-Confidence with Clinical Decision Making* (NASC-CDM) (White, 2014) tool and a knowledge assessment tool to measure students' knowledge, anxiety, and self-confidence with CDM before and after face-to-face and virtual clinical simulation experiences in fifty-six BSN students. They found no differences in students' knowledge or self-confidence levels between the groups; however, they did find a significantly higher level of student anxiety in the virtual simulation group. Students specifically cited technological problems with the virtual simulation which might have led to their increased anxiety.

Interventions for Student Simulation Anxiety

Because simulation can provoke anxiety for nursing students, educators have sought to develop and test appropriate, evidence-based interventions to limit anxiety. There has been a marked increase in studies in the past decade addressing potential interventions for simulation anxiety for nursing students; however, many of them lack rigor due to their use of small convenience samples. Interventions that have been researched for anxiety reduction during simulation can be grouped into pre-simulation, during simulation, and post-simulation interventions.

Pre-Simulation

There are two main interventions in the period before the start of simulation which can help to adequately prepare nursing students and reduce their anxiety: preparatory assignments and orientation to the simulation setting. Preparatory assignments (including textbook readings a few weeks before simulation) can assist students in obtaining the necessary didactic knowledge ahead of time (Dodson & Ferdig, 2021; Gantt, 2013). Preparatory assignments can also include pre-simulation assessments to quantify students' readiness for the learning experience (Burbach et al., 2019). Orientation to the simulation room technology and setting prior to students participating in a patient scenario is termed *pre-briefing* and is a standard for best-practices in simulation (INACSL, 2016). Victor-Chmil (2016) notes that there is no agreed-upon definition of what should be included in pre-briefing, but it generally involves an environmental orientation, discussion of roles and expectations in simulation, and the specific learning outcomes and details of the patient scenario. In pre-briefing, students have the opportunity for hands-on orientation to the manikin, doing such things as listening to lung and heart sounds, being informed of the capabilities of the system, viewing the bedside computer display, and identifying the location of supplies and equipment within the environment. Instructors should set the tone in pre-briefing with a supportive demeanor, explaining that simulation is error-tolerant, and attempting to provide a psychologically safe setting (Kang & Min, 2019). Allowing students enough time before the simulation starts to discuss/plan as a group and ask questions can help lower anxiety (Elfrink et al., 2009). A pre-simulation skills practice session has also been suggested to alleviate some performance anxiety (Cato, 2013). Using a structured and standardized pre-briefing has been found to be successful in decreasing students' anxiety before simulation in several research studies (Barber, 2016; Kim et al., 2019).

During Simulation

Several types of relaxation methods have been studied for use during simulations. These are best taught to students in advance and practiced before the simulation begins. Autogenic training is a relaxation technique that can be used to help students deal with anxiety in simulation and clinical practice. It involves progressive muscle relaxation, heart rate stabilization, and deep breathing. Holland et al. (2017) studied *autogenic training* as an intervention and found it was effective for reducing students' simulation anxiety and increasing their simulation performance. Autogenic training may be especially effective for students with known trait anxiety or anxiety in the panic zone.

Using mental rehearsal techniques in order to cognitively visualize a skill in the mind has also been researched as an intervention for managing anxiety with deteriorating patients. Ignacio et al. (2016; 2017) performed two subsequent studies on the use of mental rehearsal on anxiety and student performance. Although neither study found an effect on anxiety, one study found significance in improving student performance; the authors concluded that this intervention may affect long-term memory storage (Ignacio et al., 2016; Ignacio et al., 2017). Gosselin et al. (2016) studied music as an intervention for reducing anxiety during simulation for nursing students using classical music in a randomized controlled study. They found statistically significant decreases in anxiety and improvements in performance when music was listened to 30 minutes before simulation.

Nursing faculty have some control over situational factors which can exacerbate or lesson student anxiety during simulations. One potential intervention mentioned in the literature is limiting the number of other students observing in the room, and instead utilizing live streaming when possible, especially for inexperienced students (Mills et al., 2016). Another faculty strategy that may reduce student anxiety is reassuring students that anxiety during simulations is to be expected and reminding students that it is safe to make mistakes in simulation (Cantrell et al., 2017). Faculty may consider allowing the student functioning as the primary nurse to consult the expert once during the simulation, to lessen the pressure of that role (Yockey & Henry, 2019). Faculty should follow the INASCL guidelines for best practices of creating a safe, confidential environment during simulation and maintain a supportive, friendly presence to best assist students in overcoming their anxiety during simulation (Kang & Min, 2019).

Post-Simulation

After a simulation ends, debriefing happens, and this is thought to be the place where a large amount of learning happens through reflection (Sherwood & Horton-Deutsch, 2017). In debriefing, students are asked to reflect on their simulation performance, and this process often includes a discussion with the whole group about any errors or omissions which were made during the simulation. This experience can create social anxiety and if the simulation was video-taped, this playback can be a significant source of anxiety for students (Al-Ghareeb et al., 2017). It is recommended that faculty give meaningful feedback in debriefing without blame or ridicule and consider giving feedback privately to students (Cato, 2013). A good debriefing gives students the chance to self-reflect and reappraise the stressors. Interventions such as humor and mindfulness can be helpful during the debriefing time (Moscaritolo, 2009).

Implications for Anxiety-Reducing Interventions

Though many interventions exist in the literature, is not known whether nursing faculty are using them on a regular basis in nursing simulations. Turner and McCarthy (2017) reviewed intervention strategies for decreasing nursing anxiety in simulation and concluded that there are too many inconsistent and mixed results from variations in study design and lack of methodological rigor. This may be one reason why anxiety-reducing interventions may not be regularly implemented in simulation by faculty.

Many nursing faculty, knowing the highly stressful settings of clinical practice, believe nursing students should be deliberatively challenged beyond their coping mechanisms in nursing school in order to assist them in preparing for real life. Ross and Carney (2017) suggest that the clinical environment is even more stressful than the classroom or simulation for students. They found that student anxiety levels during clinical experiences could be lowered by simulation and their self-confidence levels improved (Ross & Carney, 2017). Some nursing faculty may not implement anxiety-reducing interventions because there is a mentality of "pull yourself up by your bootstraps or you're not meant to be a nurse." Some have postulated that the high anxiety with simulation is the precise reason why it is so effective for learning. Perhaps nursing students should be purposely exposed to anxiety-provoking simulation during their education in order to prepare them for professional clinical practice.

Although simulation may be uncomfortable for students due to anxiety, several studies found high levels of student satisfaction with the learning experience in simulation (Kameg et al., 2014; Turner & McCarthy, 2017). Reed and Ferdig (2021) found that students were highly anxious both before and after an escape room simulation, yet the students highly enjoyed their experience and wanted more simulations. With students still enjoying their experiences in simulation despite high anxiety levels, it is important for nursing education to better understand how student anxiety affects CJ development, which is one of the essential goals of simulation. By understanding the relationship between student anxiety in simulation and CJ, nursing faculty will be better able to determine how and when to best apply these anxiety-reducing interventions in practice.

Measurement of Anxiety within Nursing Simulations

Tools used for the quantitative measurement of anxiety include psychological (self-report) and physiological markers of the sympathetic nervous system activation. Biometric physical markers that have been used to measure stress and anxiety in nursing simulation research include heart rate reactivity, salivary cortisol, alpha-amylase levels, and pupil dilation (Ignacio et al., 2015; Mills et al., 2016; Shinnick & Cabrera-Mino, 2021) However, the most common tool for measuring anxiety in nursing simulations is the Spielberger (1970) State-Trait

Anxiety Inventory (STAI) (Burbach et al., 2019; Hollenbach, 2016; Kameg et al., 2014; Kenny et al., 2020; Megel et al., 2012). The STAI has become the standard quantitative measurement tool across disciplines due to its widespread use and validation as a reliable tool for measuring anxiety in clinical and academic settings (Spielberger et al., 1970). The STAI contains 40 items, with 20 items used for assessing trait anxiety and 20 items for determining state anxiety. All items are rated on a 4-point Likert scale with higher scores indicative of greater anxiety levels. Cronbach alpha for reliability has been reported at 0.92 for state anxiety and 0.90 for trait anxiety (Spielberger et al., 1983). Scores on STAI range from 20-80; normed STAI mean levels for state anxiety of college students ranges from 36.47 for males to 38.76 for females (Spielberger et al., 1970). For nursing students, though, several research studies on nursing student anxiety report levels much higher, in the range of 40-50 during face-to-face simulations (Ross & Carney, 2017, Smith et al., 2019). Unlike biometric markers, STAI has been shown to effectively measure anxiety both for healthy individuals and those with an anxiety disorder (Shioiri et al., 2006).

One newer psychological tool for anxiety measurement that is specific to nursing is the *Nursing Anxiety and Self-Confidence with Clinical Decision Making* (NASC-CDM) scale by White (2014). The 27-item NASC-CDM scale a uses a six-point Likert-scale with two subscales—one for self-confidence and one for anxiety specifically related to clinical decision-making. However, because the literature confirms that anxiety in simulations can come from a wide variety of sources and not just clinical decision making (CDM), the STAI is better suited to measure anxiety broadly (e.g., since its questions are not specifically linked to tasks within CDM). For instance, STAI would capture technostress or social evaluation anxiety, whereas NASC-CDM would not.

Both the full STAI and NASC-CDM are lengthy assessments. For this reason, researchers have tried to create short forms that can be completed more quickly for fast-paced settings. Short forms can also reduce test-taking fatigue for participants while still maintaining similar validity and reliability (Abed et al., 2011; Chlan et al., 2003; Marteau & Bekker, 1992; Reed & Ferdig, 2021; Tluczek et al., 2009; Zsido et al., 2020). Moreover, researchers have attempted to create short assessments that are open access for cost-effective implementation in education.

One such short assessment is the 5-item STAI created by Zsido et al. (2020). The Zsido et al. (2020) 5-item STAI short forms include 2 scales—one to measure state anxiety (STAIS-5) and one to measure trait anxiety (STAIT-5). One benefit of Zsido et al.'s (2020) STAI (besides the value of it being openly accessible) is that it does not include any reverse-scored items—something that can cause confusion for participants who find them unclear (Rodebaugh et al., 2007; Thomas & Cassady, 2021). Using a large sample size (n=2227), the psychometric properties of STAIS-5 and STAIT-5 were determined by Zsido et al. (2020) to show good reliability and internal consistency (Cronbach's alpha 0.86-0.91), as well as high correlations with the full STAI (0.88 for trait; 0.86 for state). Since its inception, Zsido's short versions of STAI have been mainly tested in psychology (Omar et al., 2021; Zsido et al., 2021); however, they hold promise for quick evaluation of student anxiety within nursing simulations where time is limited. Several researchers studying anxiety in nursing simulation have pointed out the need to have a sensitive, reliable instrument to measure simulation-related anxiety over a short period of time (Burbach et al., 2019; Reed & Ferdig, 2021).

Anxiety and Clinical Judgment

Both high-stakes and low-stakes patient care activities in clinical and simulation are common causes of student anxiety, perhaps because student nurses have not yet developed effective CJ skills (Al-Ghareeb et al., 2017). Nursing education simulation scenarios are often high-risk situations that are not often experienced during clinical; they are used to help students prepare for these situations and know how to respond to emergencies in real life. Several studies discuss the link between anxiety and clinical decision making (CDM)—a term some believe is synonymous with clinical judgment (Manetti, 2019). Ross and Carney (2017) used a one group pretest-posttest design to compare anxiety and self-confidence with CDM before and after a capstone simulation scenario using the STAI State Form Y (Spielberger, 1970) and the NASC-CDM (White, 2014). The authors found a statistically significant decrease in anxiety with CDM after the capstone simulations compared to before the initial simulation. Additionally, Ross and Carney (2017) found a statistically significant increase in self-confidence with CDM after completing the capstone simulations. Although implications of this study have limitations (e.g., no control group, single site, and variations in simulation group sizes), the authors concluded that simulation was effective for reducing the anxiety students have with CDM as well as increasing nursing student self-confidence.

Espinosa-River et al. (2019) conducted a descriptive, comparative, and cross-sectional study to examine the levels of self-confidence and anxiety with CDM in new nursing BSN graduates in Mexico. Using a convenience sample of 162 newly graduated nurses, the researchers found that once the participants finished their nursing education, they had developed high levels of self-confidence and low levels of anxiety with CDM. The authors concluded that educational experiences over the course of the nursing program contributed to the development of increased self-confidence and decreased anxiety with CDM. Moreover, clinical simulation was one way to foster development of self-confidence and lowered anxiety with CDM within a safe and supervised environment (Espinosa-River et al., 2019).

The sequence and timing of when educators use simulations in nursing education may make a difference in outcomes. For instance, Woda et al. (2017) conducted a quasi-experimental study to explore differences in students' anxiety and self-confidence with CDM based on the order in which they participated in hospital-based learning experiences versus high-fidelity simulations. A convenience sample of 117 junior baccalaureate nursing students in a medical-surgical course were randomly assigned to two study groups. One group contained students who experienced the simulation first before clinical experiences; the second group had clinical experiences first prior to simulation. They used two instruments to collect data: The *Clinical Decision Making in Nursing Scale* (CDMNS) (Jenkins, 1985) and the NASC-CDM (White, 2014) scale. They found both groups to be similarly anxious at the beginning of the semester; however, the group going to simulation first had higher self-confidence than the group going to clinical first. The group that completed simulation first also had a significant decrease in anxiety with CDM at the end of the semester. These findings support literature suggesting that simulation works to decrease future anxiety for nursing students in practice, and that CDM or CJ increases over time with simulation experiences.

There is very limited research, however, on the direct relationship between anxiety and CJ in simulation. It is important to determine this relationship so that nurse educators can understand how anxiety may affect CJ and how to best apply anxiety-reducing interventions to support CJ development. Determining this relationship may also help convince some educators to start using anxiety-reducing interventions for students if it is determined that their CJ is negatively affected by anxiety.

Although there is a dearth of studies in nursing on this relationship, research in other fields such as psychology hold clues to uncovering this relationship. For instance, Brailsford et al. (2014) examined the fear of spiders and how anxiety could cause attentional bias to what was noticed. They suggested that anxiety resulted in a changed focus, which shaped the processing of perceptual and attentional systems. This can result in someone paying attention only to threatening things, but not other things. An example of this might be a student nurse who feels unprepared or socially threatened during nursing simulation might pay attention only to their peers or instructor and fail to notice important patient objects or details in the simulation. This is termed *inattentional blindness*, a concept referring to when objects appear within a person's visual field but "go undetected when a person is engaged on a concurrent but unrelated visual task" (Brailsford et al., 2014, p.204). Bednarczuk et al. (2020) studied the interaction between anxiety and time pressure and found that individuals with high trait anxiety had differential task performance during spatial orientation judgments when under time pressure.

There is also a body of evidence from psychology to suggest that anxiety can cause poor attention. However, it is not yet known how anxiety experienced in nursing simulation affects the noticing phase of CJ (Cherry, 2020). Moreover, anxiety during simulations has the potential to affect any of the stages of CJ by causing cognitive interference (Sarason et al., 1996). If the source of students' anxiety in simulation is mainly related to developing CJ or new technology, then one would expect students to have less anxiety as they progress in the nursing program. However, Yockey and Henry (2019) found in their research that seniors had the same high amount of anxiety as sophomores, especially when labeled the primary nurse. From the literature review, it is clear that anxiety is complex and can be related to a variety of highly individualized factors. The issue of how anxiety affects the various phases of clinical judgment in nursing simulation is an area that has not been studied yet.

Only one study found specifically examined the relationship between CJ (rather than clinical decision making) and students' stress response in simulation. Shinnick and Cabrera-Mino (2021) looked to see what factors might predict changes in CJ using LCJR scores within simulation. They measured pupil dilation using eyeglasses with pupil tracking technology during individual simulations scored on LCJR for a group of novice nurses and a group of experienced nurses. As expected, expert nurses scored higher on LCJR in simulation. Within the linear regression, only years of RN experience was a significant predictor for CJ. Shinnick and Cabrera-Mino (2021) concluded that stress does not seem to impact CJ for either novice or expert nurses. It is important to note that they specifically discussed stress and not anxiety, since they only measured physiological measures of the body's stress response.

It is worth noting that this was a very small study (n=28) from a single site, and it only examined total LCJR scores, not within each of the four phases of CJ. Moreover, this study also did not correlate pupil measurements with any other measure. Although pupil abnormalities can be seen with anxiety, other factors and co-morbidities can also vary the pupil response. For instance, changes in pupil size can occur whenever emotionally arousing stimuli are present, regardless of whether they are positively or negatively experienced (Graur & Siegle, 2013). Shioiri et al. (2006) reported that there was no significant relationship between pupillary function and state/trait anxiety (STAI) in those with panic disorders. Individuals with autonomic nervous system dysfunction may not respond to pupillary dilation the same as a healthy person. Anxiety has a subjectively experienced component that requires self-report when using the definition by Spielberger (1970) that anxiety is an individual's *perceived* feelings of tension, apprehension, and nervousness. For this reason, using multiple measures for anxiety is recommended if using biometric markers.

Summary of Literature/ Gap

Clinical judgment (CJ) is a complex and essential skill for nurses; unfortunately, many newly graduated nurses lack it. This gap for new nurses—noted by both researchers and employers—is problematic for patient safety. It has implications for nursing education with a specific call to improve CJ development for pre-licensure nursing students. Tanner's (2006) model of CJ describes four phases of CJ (noticing, interpreting, responding, and reflecting); these phases provide a standardized language for describing and evaluating CJ.

One way to develop CJ is by using simulation in nursing education. Despite barriers, simulation has a long history of use in healthcare education. Research has linked it with higher knowledge, self-confidence, and CJ development over time. Unfortunately, high levels of anxiety are reported by nursing students in simulation, yet it remains unclear how exactly anxiety affects performance, which may greatly vary between individuals. A large body of quantitative and qualitative research has identified multiple factors that contribute to our understanding of the complexity of student anxiety during simulation (e.g., student dread of the unknown, students experiencing technostress, and social evaluation anxiety). High levels of anxiety during simulation may also be due to low levels of CJ and/or underlying trait anxiety.

Though much has been written about the problem of simulation anxiety, as well as potential interventions to tackle it, limited research exists that examines the relationship between student anxiety in simulation and CJ, both for overall CJ and within each of Tanner's (2006) four phases (i.e., noticing, interpreting, responding, and reflecting). Without better understanding this relationship between anxiety and CJ within simulation, nurse educators do not know how, when, and with whom to apply anxiety-reducing interventions. Therefore, this study seeks to examine the relationship between trait and state student anxiety in nursing simulation and its relationship with CJ to add to the profession's knowledge in order to fill this gap.

Research Questions

RQ1: What are the psychometric properties for the main instruments used in the study (Zsido 5-item STAI and LCJR) when used with undergraduate nursing students in simulation?

RQ2: What is the relationship, if any, between state and trait anxiety and overall clinical judgment among undergraduate nursing students in simulation?

> H_0: There is no statistically significant relationship between state or trait anxiety and clinical judgment in undergraduate nursing students in simulation.
>
> H_1: There is a statistically significant relationship between state or trait anxiety and clinical judgment in an undergraduate nursing students in simulation.

RQ3: What is the relationship, if any, between state and trait anxiety and the four phases of clinical judgment (noticing, interpreting, responding, and reflecting) among undergraduate nursing students in simulation?

> H_0: There is no statistically significant relationship between state or trait anxiety and any of the four phases of CJ in undergraduate nursing simulation.
>
> H_1: There is a statistically significant relationship between state or trait anxiety and at least one of the four phases of CJ in undergraduate nursing simulation.

RQ4: How do state and trait anxiety change over a semester from baseline to pre-simulation to post-simulation for undergraduate nursing students participating in simulation?

> H_0: There is no statistically significant change between state or trait anxiety from baseline measurement to pre-simulation to post-simulation measurements.

H_1: There is a statistically significant change between state or trait anxiety from baseline measurement to pre-simulation to post-simulation measurements.

CHAPTER III

METHODOLOGY

This chapter introduces the research methodology for studying the relationship between student anxiety and clinical judgment (CJ) within nursing simulation. The theoretical framework, design, participants, sampling, setting, variables, measurement tools, procedures for data collection, and data analysis are included in this chapter.

Theoretical Framework

The theoretical framework for this study is Tanner's (2006) *Clinical Judgment Model* —a model that addresses the CJ process that nurses follow in clinical situations. Within this framework, Tanner (2006) defined CJ as the "interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response" (p. 204).

Tanner's (2006) model of CJ includes four phases─ noticing, interpreting, responding and reflecting. First, the *noticing* phase includes gathering patient data and allows the nurse to have an initial grasp of a situation (Tanner, 2006). Once noticing has taken place, the process of *interpreting* the data follows. Nurses then form interpretations of the meaning of the data using narrative, or intuitive reasoning patterns. During *responding*, an appropriate course of action is completed based upon the conclusions from the previous two phases. Finally*, reflecting* constitutes the final phase of the Clinical Judgment Model. Within the reflecting phase, nurses evaluate the success of the actions completed and adjust based on the expected outcomes (Tanner, 2006).

Spielberger's (1970) theories on anxiety provided the basis for understanding anxiety in this study. Anxiety can be defined as an emotional state of distress from an individual's perceived feelings of tension, apprehension, and nervousness which is accompanied by activation of the autonomic nervous system (Spielberger et al., 1970). Two unique types of anxiety exist as constructs according to Spielberger (1970): state and trait anxiety. State anxiety results from a temporary state or stressor in a current situation, whereas trait anxiety indicates a general propensity or chronic personality trend towards high levels of arousal (Saviola et al., 2020).

Study Design

This quantitative study used a one-group repeated measures research design to examine relationships between variables. Repeated measures designs involve measuring an individual multiple times on a dependent variable, and these scores are considered dependent samples (Wiersma & Jurs, 2009). Participants were measured multiple times on state and trait anxiety to compare their anxiety scores with clinical judgment scores within a simulation. Clinical judgment was evaluated using the *Lasater Clinical Judgment Rubric* (Lasater, 2007). State and trait anxiety were measured with the Zsido et al. (2020) short forms of STAI. There was not a control group since the goal of this study was to examine relationships between variables without manipulation.

Participants, Sampling, and Setting

After university Institutional Review Board (IRB) approval, participants were recruited from one undergraduate (sophomore level) *Foundations of Assessment and Communication in Nursing* (NURS 20020) course at a large Midwestern university. Students were invited personally by the researcher (who does not teach this course) during a face-to-face class session.

Students were told that there were no consequences for choosing not to participate and that their current instructors would not know who consented to have their data included in the study. There were no foreseen risks to participants and benefits included the opportunity to gain experience with simulation, since at this point in their studies, students do not normally participate in nursing simulations. Students were given a copy of the IRB-approved consent form. Participants had the chance to ask questions at the initial face-to-face meeting. All students participated in the simulation experience as part of regularly scheduled class activities, but only those students who consented had their data included in the research. Fifty-one students consented to participate in the research at the beginning of the semester recruitment; however, six were lost due to attrition by the time the simulation was completed later in the semester.

Using G*power with an a priori power analysis for a linear multiple regression, a power of .80, and significance set at .05 (medium effect size 0.15), an estimated sample size was set at 55 participants. Inclusion criteria to participate was any student enrolled in sophomore level *Foundations of Assessment and Communication in Nursing* (NURS 20020) course at a public university in the Midwest. Exclusion criteria was any student who currently or previously had a license to practice as any type of nurse (ex. LPN)—data that was collected in the demographics.

Demographics were collected on the participants to ensure the sample was representative of the population. Fifty-one students had demographics collected at the baseline measurement at the beginning of the semester after informed consent was received. Ages ranged from 19-35 years with the mean age at 20.7 years. Gender was a dichotomous variable as only males and females were self-reported. There were 45 females (88.2%) and 6 males (11.8%). Ethnicities identified were Caucasian (n = 46; 90%), Hispanic (n = 2; 4%), Black (n = 1; 2%), Asian (n = 1; 2%), & American Indian (n = 1; 2%). The average GPA was 3.55. None of the participants had ever been licensed as an LPN, but 41% of them (n = 21) had experience as a State-Tested Nursing Aide (STNA) with a range of experience from 4- 36 months. See Table 2 for demographics summary. Although ethnic and minority groups make up over a third of the US population, they continue to be underrepresented in the nursing profession, and a nationwide goal has been to increase racial diversity in nursing (AACN, 2019). Nationwide, men make up 9% of the RN workforce and minorities 18.2% (AACN, 2019). This sample was determined to be representative of the nursing student population in the geographic area.

Variables and Tools for Measurement

Variables of interest included clinical judgment and anxiety which was measured across three time points. Anxiety was defined as an emotional state which includes an individual's perceived feelings of tension, apprehension, and nervousness accompanied by activation of the autonomic nervous system (Spielberger et al., 1970). Clinical judgment was defined as the "an interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response" (Tanner, 2006, p.204). Two tools were used with the authors' permission to measure each of these constructs: the *Lasater Clinical Judgment Rubric* for clinical judgment (LCJR) (Lasater, 2007) and Zsido's (2020) short form STAI for state (*STAIS-5*) and trait (*STAIT-5*) anxiety (see Appendix G for Permissions).

Table 2

Sample Demographics

Student Characteristic	Total N = 51	
Age	Range 19-35	Mean age = 20.7
Gender	Female = 45 (88.2%) Male = 6 (11.8%) Other = 0	
Ethnicity	White/Caucasian = 46 (90%) Hispanic = 2 (4%) Black = 1 (2%) Asian = 1 (2%) American Indian = 1 (2%)	
STNA experience	None = 30 (59%) Yes = 21 (41%) Average STNA experience = 19 months (Range from 4 months to 36 months)	

Lasater Clinical Judgment Rubric (LCJR)

Since its inception in 2007 (Lasater, 2007), the LCJR has been widely used and tested in nursing education research (Lee, 2021). The LCJR breaks down each of Tanner's (2006) four phases of clinical judgment into 11 dimensions that were developed based on qualitative and quantitative research (Lasater, 2007; Lasater, 2011). The rubric provides standardized language that can be used to evaluate performance within each phase and dimension; evaluators assign a score for each dimension as either 1 (beginning), 2 (developing), 3 (accomplished), or 4 (exemplary). Each action rated as beginning earns the student 1 point, developing earns 2 points, accomplished earns 3 points, and exemplary earns 4 points. The total possible scores on the LCJR range from 11 to 44 and assist in identifying progress towards overall clinical judgment development.

The LCJR was chosen as the tool to measure CJ for this study for several reasons. First, it has well-documented validity and reliability for use in undergraduate, pre-licensure, nursing students in simulation (Victor-Chmil & Larew, 2013). After an in-depth literature review of the psychometric properties for the LCJR, Victor-Chmil and Larew (2013) noted that the content validity of the LCJR is well established, with inter-rater reliability reported at 0.89 and internal consistency (Cronbach’s alpha) at 0.974 (Adamson et al., 2012; Adamson & Kardong-Edgren, 2012). Another reason the LCJR was chosen was due to the underlying theoretical framework of Tanner’s (2006) model of CJ. Since the LCJR was built specifically from that model, it allowed congruency in being able to examine both overall CJ scores and scores within each of the four phases. A final reason is that the LCJR was built for individual simulation evaluations rather than groups. Although group simulations are often used in nursing education for the sake of faculty time and to promote teamwork, rarely in real-life nursing practice do multiple nurses collect assessment data and do care planning as a group. Lee (2021) points out that many research studies that have used LCJR in group simulations could potentially have falsely inflated CJ scores, since one student will undoubtedly influence others in a group setting. For this study, individual simulations were needed to be able to correlate individual’s anxiety scores with LCJR scores in simulation.

The exact way to apply and use the LCJR for measurement of CJ during nursing simulation has varied in the literature. For example, although the majority of research using LCJR has used direct observation during simulation for scoring, some non-direct activities such as reflective journals, case studies, and self-assessment have also been reported (Bussard, 2015; Fogg et al., 2020; Johnson et al., 2012; Lasater & Nielson, 2009; Lasater et al., 2014; Yuan et al., 2014). While the LCJR has been used primarily as a tool to evaluate students' CJ during simulation, it has also been used for testing other educational interventions such as expert role-modeling, and grand rounds (Kelly et al., 2020; Lee, 2021). Evaluation of students' CJ through the use of the LCJR is most commonly done by expert faculty. However, there are instances where the LCJR has been used to allow students to self-assess. The issue found with novice students is that they often overestimate their abilities when compared to an expert nurse scoring of LCJR (Coram, 2016; Fenske et al., 2013). Although the versatility of the LCJR allows for a variety of techniques for application, it was originally intended for use with direct observation during simulation (Lee, 2021).

There are several limitations noted in the literature on the LCJR. First, when using a rubric such as the LCJR, poor inter-rater training can result in inconsistent scores. Lee (2021) reported that many of the research studies using multiple raters for the LCJR failed to report on interrater reliability scores. In order to ensure strong inter-rater reliabilities, it is recommended that raters receive appropriate training on the LCJR before scoring it (Victor-Chmil, 2013). To address this limitation, this study used only one trained faculty rater to ensure consistency in scoring. This rater also completed training from Dr. Lasater on how to score LCJR and intra-rater reliability was reported using intra-class correlation coefficients. Intra-rater reliability shows the level of agreement or consistency that a singular judge or evaluator has measuring the variable of interest repeatedly free from systematic error (Koo & Li, 2016). The intra-class correlation coefficient (ICC) was used for intra-rater reliability because in this study, one rater's ratings were compared at one point in time to the same rater's ratings at another point in time (Koo & Li, 2016). The ICC for this study was 0.977 showing consistent rating on LCJR.

Another potential limitation of the LCJR is that LCJR is not solely focused on observable actions. Fedko and Dreifuerst (2017) pointed out that within the *responding* phase of LCJR, the ability for an individual to remain calm, confident, skillful, and flexible does not necessarily reveal whether the appropriate nursing actions were actually taken in a simulation. Fedko and Dreifuerst (2017) conducted a pilot study to examine whether there was relationship between scores on the LCJR and the demonstration of the required nursing actions within a simulation. They reported that there was a statistically significant moderate correlation ($r = 0.36$) between students' total LCJR score and indicated actions in the simulation (Fedko & Dreifuerst, 2017). The *responding* phase was the only phase out of the four phases showing a significant correlation with completion of intended actions. Others have linked LCJR scores more with students' confidence levels in making judgments (Fedko & Dreifuerst, 2017; Fenske et al., 2013). Therefore, a limitation of the LCJR is that it is possible for students to have exemplary CJ scores on the total LCJR score, but not perform many important nursing actions. In other words, thinking like a nurse needs to connect with acting like a nurse. For this reason, Ashcraft et al. (2013) modified the LCJR to include the appraisal of critical nursing actions. Since in this study LCJR was used to make conclusions about students' performance in simulation, the researcher used a simulation-specific action checklist and a simulation-scoring-guide in order to consistently score LCJR for each student based on the intended actions within the simulation (see Appendix D and Appendix E).

STAIS-5 and STAIT-5

Anxiety can be defined as an unpleasant emotional state which includes an individual's perceived feelings of tension, apprehension, and nervousness accompanied by activation of the autonomic nervous system (Spielberger et al., 1970). Anxiety can be further separated into trait and state anxiety. State anxiety can be defined as a temporary response to a specific situation or event, while trait anxiety is a longer lasting anxiety that is rather related to a chronic personality feature which causes continuous high arousal levels (Saviola et al., 2020; Spielberger et al., 1970). For the measurement of anxiety, there are both psychological (self-report) tools and biophysical markers that can be used. The most common and standard quantitative tool for measuring anxiety in nursing simulations is the State-Trait Anxiety Inventory (STAI) (Spielberger et al., 1970). The STAI consists of 40 items, with 20 items used for assessing trait anxiety and 20 items created for determining state anxiety. All items are rated on a 4-point Likert scale with higher scores indicative of greater anxiety levels. Cronbach alpha for reliability has been reported at 0.92 for state anxiety and 0.90 for trait anxiety (Spielberger et al., 1983). Unlike biometric markers, STAI has been shown to effectively measure anxiety both for healthy individuals and those with an underlying anxiety disorder (Shioiri et al., 2006).

Since the STAI is a lengthy and costly assessment, many researchers have tried to create short forms that can be administered more quickly and reduce test-taking fatigue for participants while still maintaining similar validity and reliability (Abed et al., 2011; Chlan et al., 2003; Marteau & Bekker, 1992; Reed & Ferdig, 2021; Tluczek et al., 2009; Zsido et al., 2020). Moreover, researchers have attempted to create short assessments that are open access for cost-effective implementation within educational settings. One such short-form instrument is the 5-item STAI created by Zsido et al. (2020). The Zsido et al. (2020) 5-item STAI short forms include 2 scales—one to measure state anxiety (*STAIS-5*) and one to measure trait anxiety (*STAIT-5*). One additional benefit of Zsido et al.'s (2020) STAI is that it does not include any reverse-scored items—something that can cause confusion for participants who find them unclear (Rodebaugh et al., 2007; Thomas & Cassady, 2021). Using a large sample size (n=2227), the psychometric properties of STAIS-5 and STAIT-5 were determined by Zsido et al. (2020) to show good reliability and internal consistency (Cronbach's alpha 0.86-0.91), as well as high correlations with the full STAI (0.88 for trait; 0.86 for state). Since its creation, Zsido's short versions of STAI have been mainly tested in psychology (Omar et al., 2021; Zsido et al., 2021); however, they hold promise for quick evaluation of student anxiety within nursing simulations where time is limited. Several researchers studying anxiety in nursing simulation have pointed out the future need to have a sensitive, reliable instrument to measure simulation-related anxiety over a shorter period of time (Burbach et al., 2019; Reed & Ferdig, 2021).

Controlling Confounds

There are several possible confounding variables which could affect study results. First, if students had previous clinical experience as a nurse (such as LPN), it could alter their anxiety in clinical situations as well as their level of CJ, since experience is a known regulator and predictor of CJ (Lasater et al., 2019; Shinnick & Cabrera-Mino, 2021). For this reason, students who were currently or previous licensed as a nurse were planned to be excluded from the study. However, no participants met this criteria. Another possible confound was the curricular design of the simulation. Because sophomores are novices in their nursing knowledge and experience, a developmentally appropriate simulation that would not exceed their abilities was created. If the simulation was too complex for sophomores, CJ scores would be universally low. As such, the simulation was created to be reflective of what sophomore level nursing students could realistically be expected to do based on the knowledge and training they had received at that point in their education.

Content validity for the simulation design was checked by two outside independent expert nursing faculty who were not involved in the research. Edits were made based on their feedback to ensure the simulation was developmentally appropriate. The newly designed sophomore level simulation was also pilot tested with junior nursing students before the research was conducted to test the flow and process. This allowed the researcher to gain realistic impressions of what beginning sophomore nursing students could do, and the simulation was tweaked and simplified based on the pilot runs. INACSL recommends pilot testing any newly created simulation before full implementation to optimize achievement of learning outcomes (INACSL, 2016).

Data Collection/ Procedures

At the start of the semester, participants were recruited, and consent was obtained (Appendix A). Participants were asked to complete a demographics survey (Appendix B) which included age, gender, ethnicity, GPA, and if they currently or have ever had healthcare experience (e.g., STNA or LPN). State and trait anxiety surveys using the STAIT-5 and STAIS-5 were also administered at the beginning of the semester to determine baseline anxiety using Zsido's (2020) short forms (Appendix C).

A sophomore level introductory simulation experience was planned using Jeffries (2005; 2016) simulation framework, which details how to best design learning outcomes, student feedback, and debriefing practices. While simulation is often completed in groups, this study chose to have students complete the simulation individually in order to answer the research questions. This was due to the need to link individual students' CJ scores with their anxiety scores. Accordingly, the LCJR was designed for examining the CJ of individual students (Lasater, 2007; Lee, 2021). Other simulation research has also used individual simulations (Chmil et al., 2015; Shinnick & Cabrera-Mino, 2021). The simulation scenario designed used a high-fidelity simulator manikin to mimic an elderly hospitalized patient with respiratory system alterations. The patient demonstrated abnormal lung sounds, changes in oxygen saturation, altered vital signs, dyspnea, and a harsh cough. Students were expected to receive a verbal and written report from the facilitator, complete a focused assessment, notice and document important findings, communicate effectively with the patient, take at least one action step such as applying oxygen or calling the provider, and reflect on the simulation (see Appendix D and E). The simulation was checked for content validity by two expert nursing faculty who were not involved in the research prior to use. In accordance with other simulation research using individual simulations (Shinnick & Cabrera-Mino, 2021), each individual simulation took about 10-12 minutes with an additional 10 minutes for debriefing and reflection immediately following the scenario. See the simulation script in Appendix F. The simulation learning objectives were as follows:

1. Perform a focused respiratory assessment on a patient with respiratory alterations.
2. Cluster clues to interpret and prioritize assessment data.
3. Identify appropriate interventions to take for the client having dyspnea and respiratory compromise.
4. Communicate effectively with the patient using therapeutic communication and provide appropriate patient teaching.
5. Demonstrate a safe environment with attention to environmental hazards.

6. Demonstrate attention to national patient safety goals such as patient identification standards and effective communication among healthcare providers.
7. Identify personal feelings in delivering care to a patient with dyspnea.
8. Identify factors that worked well during the simulation of care of a patient.
9. Identify factors that need improvement during the simulation of care with the patient.

Following INACSL best practice guidelines, students were provided with pre-simulation activities including a pre-briefing orientation. The week prior to the simulation, students were prompted to review didactic textbook readings previously assigned within the course to refresh on the foundational knowledge necessary for use within the simulation (Dodson & Ferdig, 2021). This review of textbook readings was optional since these readings had previously been assigned within the course. Students were given a pre-briefing orientation in the simulation room with faculty before the simulations started. The pre-briefing included a demonstration of how to use the equipment and technology in the room to collect vital signs, how to use the phone in the room to call the provider, and a discussion of confidentiality, psychological safety in simulation, and the learning objectives of the simulation. Students were given the opportunity to ask any questions during the pre-briefing.

Immediately following pre-briefing and prior to the beginning of the simulation scenario, students were asked to complete the state and trait anxiety measures using *STAIT-5* and *STAIS-5*. Then, students were brought into the simulation room individually and given a verbal and written patient report with physician orders. Each participant's performance was viewed live from behind a one-way mirror. The researcher scored each participant's performance with the LCJR (see Appendix E) based on observations made during the simulation. An action checklist was used for quick notations of student performance which was later scored using a standardized *Simulation Scoring Guide* to consistently score LCJR (see Appendix D and E). Using only one person as rater for the LCJR reduced threats to internal validity by ensuring consistency in student evaluation. Simulations were recorded to allow the researcher to review scoring of the LCJR and then were deleted. Once the simulation ended, students were taken to a quiet reflection room and asked to write a written self-reflection. Students were asked to reflect and answer the following prompts: "Evaluate your own performance; consider strengths and weaknesses, and decision points during the simulation," and "Describe how you will grow from this experience." These written reflections were later used to score the reflecting phase of LCJR. At the end of this reflection time, students' state and trait anxiety measurements were again assessed using *STAIT-5* and *STAIS-5* to measure post-simulation anxiety. Debriefing happened once all students had finished individual simulations in order to prevent students from sharing exactly what they were supposed to do with other students who had not yet participated, which could have skewed results. The researcher conducted debriefing with all students once all had finished with the simulation experience, sharing formative observations from LCJR to improve their practice as was suggested by Lasater (2011). An expert modeling video demonstrating an exemplar performance of the desired actions during the simulation was provided to students in the debriefing period. Table 3 lists the phases of data collection for this study and what tools were used at what times.

Table 3

Phases of Data Collection

Phase 1- Beginning of semester	Demographics STAIT-5, STAIS-5
Phase 2- Pre-Simulation	STAIT-5, STAIS-5
Phase 3- During individual simulations	Faculty observation and scoring of Lasater Clinical Judgment Rubric (LCJR)
Phase 4- Post simulation	Written self-reflections STAIT-5, STAIS-5

Data Analysis

All data were analyzed for statistics using *IBM Statistical Package for Social Science* (*SPSS Version 28*). Student names were changed to unique numerical identifiers to maintain confidentiality. The data were first examined using descriptive statistics for age, gender, ethnicity, and healthcare experience. The researcher kept all non-electronic data secured in a locked cabinet in her office. Electronic data stored on the researcher's computer were password protected for security. All data were collected via paper and de-identified once entered into electronic format; paper copies were then shredded.

For the first research question regarding the psychometric properties of the instruments used, Classical Test Theory served as the framework for the reliability analysis (Crocker & Algina, 1986). In classical test theory, the observed score on any test is a result of a combination of the true score, along with any error in measurement (Crocker & Algina, 1986). Systematic error can affect someone's scores due to a characteristic of the individual, the test itself, or random error when "an individual's score is affected by purely chance happenings" (Crocker & Algina, 1986, p. 106). Test theory is the study of how measurement problems "may influence psychological measurements and how to devise methods to minimize or overcome these problems" (Crocker & Algina, 1986, p. 13). For the Zsido et al. (2020) STAI short forms used to measure anxiety in this study, the reliability analysis used Cronbach's alpha to compare internal consistency of the scale between the three data collection time points. For LCJR measurement, there were several sources of potential variability: (1) rater consistency, (2) the simulation case and whether it varied between individuals, and (3) the learner's unique performance. To obtain a true measurement of the learners' performance, intra-rater reliability was calculated for LCJR using the intra-class correlation coefficient as delineated by Koo & Li (2016) and was determined to be 0.977.

For the second and third research questions, multiple linear regression was used to explore the relationships between the dependent variable (LCJR scores) and independent variables (state versus trait anxiety). Multiple regression is used when there is more than one independent variable to examine relationships with a continuous dependent variable (Norman & Streiner, 2008). Significance was set at $p < 0.05$ to minimize the probability of a Type 1 error. The data was assessed for outliers and assumptions to minimize probability of a Type 1 or Type 2 error. Assumptions checked for multiple linear regression included linearity, independence, normality, homoscedasticity, and collinearity that could affect results (Hahs-Vaughn & Lomax, 2020).

For research question four, repeated measures testing was conducted to determine if there were significant changes in state or trait anxiety over the three time points. Both the Shapiro-Wilk and the K-S Tests were evaluated to determine if the assumption of normality was assumed for the data (Wiersma & Jurs, 2009). Mauchly's test of sphericity provided information on whether sphericity was assumed to be tenable. Descriptive statistics were examined for the means and standard deviations of anxiety changes over the three time points. Post hoc analysis was completed to show which of the times, if any, differed significantly from others (Wiersma & Jurs, 2009). Effect size was determined for practical significance using partial eta squared.

Conclusion

This quantitative research study used a one group repeated measures design to add to the current knowledge about undergraduate nursing student anxiety and its relationship with clinical judgment within a simulation. The goal of this study was to understand how pre-existing state and trait anxiety would affect students' clinical judgment overall and within the four phases of CJ (noticing, interpreting responding, reflecting). This is a needed addition to the field in order to better understand when to apply anxiety-reducing interventions within nursing simulations.

CHAPTER IV

FINDINGS AND RESULTS

Introduction

The results of the analyses of this study are presented in this chapter. This chapter will describe the descriptive data. It will also present the findings for the following four research questions:

RQ1: What are the psychometric properties for the main instruments used in the study (Zsido 5-item STAI and LCJR) when used with undergraduate nursing students in simulation?

RQ2: What is the relationship, if any, between state and trait anxiety and overall clinical judgment (CJ) among undergraduate nursing students in simulation?

H0: There is no statistically significant relationship between state or trait anxiety and clinical judgment in undergraduate nursing students in simulation.

H1: There is a statistically significant relationship between state or trait anxiety and clinical judgment in an undergraduate nursing students in simulation.

RQ3: What is the relationship, if any, between state and trait anxiety and the four phases of clinical judgment (noticing, interpreting, responding, and reflecting) among undergraduate nursing students in simulation?

H0: There is no statistically significant relationship between state or trait anxiety and any of the four phases of CJ in undergraduate nursing simulation.

H1: There is a statistically significant relationship between state or trait anxiety and at least one of the four phases of CJ in undergraduate nursing simulation.

RQ4: How do state and trait anxiety change over a semester from baseline to pre-simulation to post-simulation for undergraduate nursing students participating in simulation?

H0: There is no statistically significant change between state or trait anxiety from baseline measurement to pre-simulation to post-simulation measurements.

H1: There is a statistically significant change between state or trait anxiety from baseline measurement to pre-simulation to post-simulation measurements.

Descriptive Data

In Zsido et al.'s (2020) STAIS-5 for state anxiety measure, there are five questions to self-report anxiety, which are scored on a Likert scale ranging from 1-4 with 1 being 'Not at all' and 4 being 'Very much.' Table 4 displays the means and standard deviations for each of the five questions on state anxiety for the three time points of data collection. Table 5 displays the means and standard deviation for the five questions on trait anxiety. The question on the STAIS-5 scoring the highest at baseline and pre-simulation was the third question: '*I feel nervous*.' However, at post-simulation, the highest mean was the fourth question: '*I feel jittery*.' So, students were more likely to feel jittery at post-simulation. The highest scoring item on the STAIT-5 for trait anxiety for all three time points was the second question: '*I worry too much over something that really doesn't matter'*.

Table 4

Means & St. Deviations for STAIS-5 questions (State Anxiety)

	Baseline	Pre-simulation	Post-Simulation
1. I feel upset.	1.1373 / 0.40	1.5333/0.75	1.6667/0.82
2. I feel frightened.	1.1176 / 0.32	2.2444/1.02	1.5778/0.75
3. I feel nervous.	1.8235 / 0.79	3.1111/0.91	2.1556/1.08
4. I am jittery.	1.4314 / 0.70	2.5556/0.94	2.2444/1.04
5. I feel confused.	1.1569 / 0.36	2.1111/0.83	1.9111/0.84

Table 5

Means & St. Deviations for STAIT-5 questions (Trait Anxiety)

	Baseline	Pre-simulation	Post-Simulation
1. I feel that difficulties are piling up so that I cannot overcome them.	1.8431/0.75	1.9778/0.78	1.9333/0.72
2. I worry too much over something that really doesn't matter.	2.5686/0.92	2.4667/0.86	2.3778/0.80
3. Some unimportant thoughts run through my mind and bother me.	2.1373/0.80	2.2444/0.90	2.0889/0.82
4. I take disappointments so keenly that I can't put them out of my mind.	1.8824/0.81	2.1333/0.94	2.0000/0.85
5. I get in a state of tension or turmoil as I think over my recent concerns and interests.	1.8824/0.81	2.0222/0.86	2.0667/0.91

The total means and standard deviations for state and trait anxiety scores for each measurement in this study are described in Table 6. Fifty-one students participated in the baseline data collection; however, six were lost to attrition throughout the semester, leaving 45 for the pre-simulation and post-simulation anxiety measurements. The data were examined for skewness and kurtosis. Skewness refers to the symmetry of a frequency distribution and kurtosis measures whether the scores are clustered in the tails, resulting in a peaked or flat distribution (Hinkle et al., 2002). Only one variable displayed significant skewness or kurtosis: *Baseline state anxiety* (STAIS-5) had a significantly positive skew (1.179) as many students had very low levels of state anxiety at this measurement time.

Zsido et al. (2020) suggested that someone scoring ≥10 on STAIS-5 (state anxiety) or ≥13.5 on the STAIT-5 (trait anxiety) should be considered potentially clinically anxious. At baseline, 9 students (17.6%) out of 51 were found to have high trait anxiety (above 13), which is higher than the CDC (2021) reports of 11% of adults having high trait anxiety. At the pre-simulation time, 9 of 45 students had high trait anxiety (20%), and post-simulation 8 of 45 (17.8%) had trait anxiety at or above 13.

The means for state and trait anxiety were the highest at the pre-simulation measurement. State anxiety peaked at pre-simulation with a mean of 11.47. The state anxiety levels at baseline for nursing students in this study were 6.61 for females and 6.16 for males; these were noticeably lower than the average state anxiety levels reported by Zsido et al. (2020): 8.31 for females and 7.09 for males. So, at baseline, state anxiety was lower than average in this study. The mean trait anxiety for nursing students in this study was between 10.31 and 10.82 for all three times (baseline, pre-simulation, and post-simulation). Zsido et al. (2020) reported that the mean trait anxiety scores were 11.7 for females and 9.9 for men, so this sample of nursing students does not seem to be particularly trait anxious at baseline since their mean trait anxiety scores were 10.5

for females and 7.66 for males. State anxiety did go above Zsido et. al.'s (2020) cut-off for clinically significant anxiety at the pre-simulation and post-simulation measurement times.

Table 6

Means & St. Deviations for Total Anxiety Scores

	Baseline	Pre-simulation	Post-Simulation
State Anxiety (STAIS-5)	6.67/ 1.77	11.47/ 3.06	9.56/ 3.18
Trait Anxiety (STAIT-5)	10.31/ 3.23	10.82/ 3.58	10.47/ 3.31

The mean LCJR score for all students in simulation was $\overline{x} = 23.53$ with a standard deviation of 5.83. LCJR scores in this study ranged from 12 to 33 (possible scores on LCJR could range from 11- 44). See Figure 1 for the histogram displaying overall LCJR scores. Mean scores for each of Tanner's (2006) phases within LCJR were as follows: *Noticing* $\overline{x}$ = 6.62; *Interpreting* $\overline{x}$ = 4.31; *Responding* $\overline{x}$ = 8.37; *Reflecting* $\overline{x}$ = 4.22. Table 7 shows the means and standard deviations for LCJR, both overall and within each of Tanners (2006) four phases. Each phase within LCJR differs in the number of dimensions evaluated and thus the number of potential points. For example, noticing has three dimensions and a range of 3-12 possible points; whereas interpreting has two dimensions so a possible range of 2-8 points (see Table 7).

Figure 1

LCJR Scores Histogram

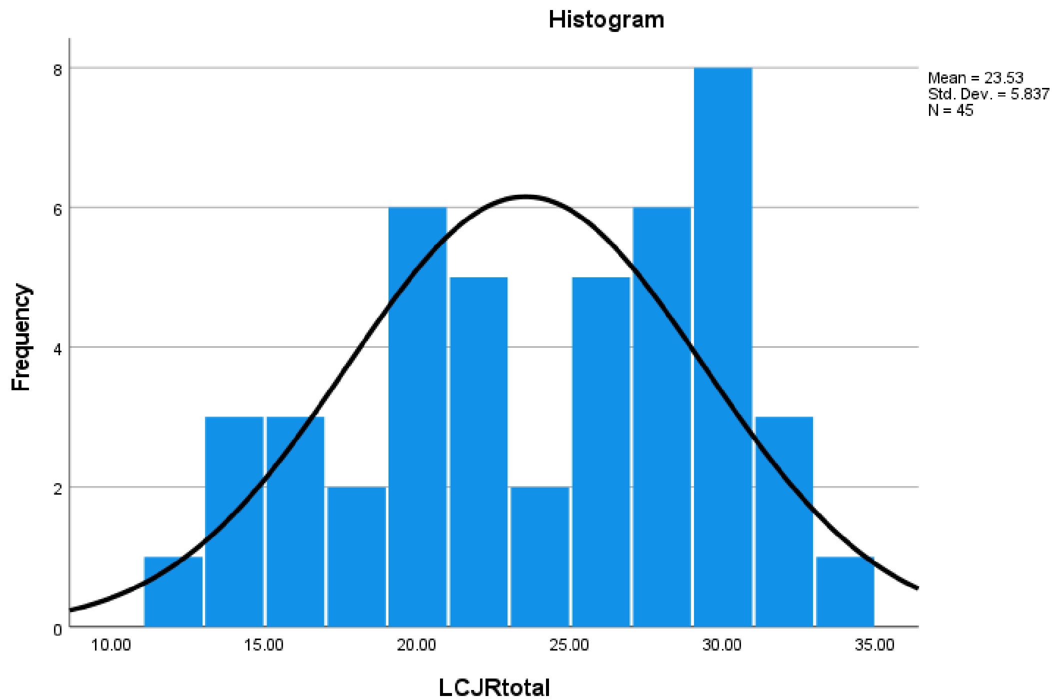


Table 7

Means and St. Deviations for LCJR

Measurement	Range	Mean	SD
Total LCJR	11-44	23.53	5.837
Noticing	3-12	6.62	1.13
Interpreting	2-8	4.31	1.29
Responding	4-16	8.37	2.39
Reflecting	2-8	4.22	1.13

Research Question One Findings

The first research question asked in this study was: *What are the psychometric properties for the main instruments used in the study when used with undergraduate nursing students in simulation?* Classical Test Theory (Crocker & Algina, 1986) was used as a framework for the reliability analysis. There were two tools used in this study. First was Zsido et al.'s (2020) short form STAI anxiety measures for state and trait anxiety. Table 8 shows the Cronbach's alpha for each time the measures were used in this study: at baseline, just before the simulation, and after the simulation. In Zsido et al.'s (2020) original study using over 2,000 adults, they found a Cronbach's alpha of .91 for state anxiety and .86 for trait anxiety. In this study, internal consistency reliabilities ranged from .65 to .88 (see Table 4). Although the reliability was slightly lower for state anxiety at baseline (.65), it did increase in the two subsequent measurements (.72- .73). No large changes were found in reliability if any items were deleted from the scale.

Table 8

Reliability Analysis for Zsido's STAI State and Trait Short Forms

Measurement	State Anxiety	Trait Anxiety
Baseline	0.65	0.84
Pre-Simulation	0.72	0.88
Post-Simulation	0.73	0.86
Zsido et al. (2020) original study	0.91	0.86

The *Lasater Clinical Judgment Rubric* (LCJR) by Lasater (2007) was used to examine the four phases clinical judgment according to Tanner's (2006) model of clinical judgment. The

Cronbach's alpha for overall LCJR in this study was 0.922 (see Table 9). Adamson's (2011) dissertation reported 0.974 for overall reliability on LCJR, and Blum et al (2010) found 0.810 for LCJR. Each of the four phases within LCJR was also examined for internal consistency within this study using Cronbach's alpha: *Noticing* (.831), *Interpreting* (.801) *Responding* (.833), and *Reflecting* (.725). Jensen (2010) reported above 0.8 for all of the four phases, but many studies have not reported the psychometric properties for phases within LCJR. Intra-rater reliability was calculated to show the amount of agreement or consistency for a single evaluator in this study (Koo & Li, 2016). The intraclass correlation coefficient (ICC) was used to compare one rater's ratings at one point in time to the same rater's ratings at another point in time (Koo & Li, 2016). The ICC for this study was 0.977 showing consistent rating on LCJR between cases by a single rater.

Table 9

LCJR Reliability Analysis

Internal Consistency Measurement	Cronbach's Alpha in this study	Cronbach's Alpha reported in the literature
LCJR total	0.922	0.810-0.974
Noticing	0.831	0.88
Interpreting	0.801	0.88
Responding	0.883	0.88
Reflecting	0.725	0.86
Intra-rater Reliability	**Interclass Correlation Coefficient**	
LCJR	0.977	

Summary of RQ1

The psychometric properties of Zsido et al.'s (2020) short forms STAI-5 for both state and trait anxiety showed that there was evidence of reliability in this study. The reliability outcomes of LCJR exhibited good internal consistency overall and within each of the four phases of noticing, interpreting, responding, and reflecting.

Research Question Two Findings

The second research question asked in this study was: *What is the relationship, if any, between state and trait anxiety and overall clinical judgment among undergraduate nursing students in simulation?* Multiple linear regression was run to determine the relationship between the outcome variable (total LCJR score) and predictor variables (state and trait anxiety). Baseline state and trait anxiety were used as control variables in the model; pre-simulation state and trait anxiety scores were used as independent variables (n=45). The data were checked for outliers, and then assumptions were checked including the following: (a) independence, (b) homoscedasticity, (c) normality, (d) linearity, and (e) collinearity (Hahs-Vaughn & Lomax, 2020).

Outliers

The residual statistics were examined to determine any extreme cases or outliers which could impact the regression model. None of the cases had a Cook's distance greater than 1, which would be problematic (Field, 2013). High leverage values can indicate unusual or extreme influence within the data. However, all cases were within the limits (<0.5) (Hahs-Vaughn & Lomax, 2020). Mahalanobis distances were also examined for all cases based on the calculated chi-squared critical value ($p < .001$). The Mahalanobis distances showed only two cases above the criterion level. Since these values were within expected value range for Cook's distance and leverage values, it was determined to leave these cases within the regression model.

Independence

The assumption of independence is met when the observations of data collected are independent or uncorrelated from one another (Field, 2013). To determine this assumption, studentized residual plots were examined for a random distribution of scores above and below the zero line. This assumption was met as a randomized pattern was observed.

Homoscedasticity

The assumption of homoscedasticity, or homogeneity of variance, is present when "when the spread of residuals is fairly constant over the range of unstandardized predicted values and observed values of the independent variables" (Hahs-Vaughn & Lomax, 2020, p.971). The homoscedasticity assumption was determined to be met by examining plots of the residuals against predicted values.

Normality

The assumption of normality for multiple regression assumes "that the residuals in the model are random, normally distributed variables with a mean of zero" (Field, 2013, p.311). This assumption asserts that data are not highly skewed, which could distort the significance tests of the regression model. Normality was checked by examining the standardized residual plots and histograms for a normal distribution, as well as any skewness or kurtosis. The normality assumption was determined to not be violated.

Linearity

The assumption of linearity is met when the outcome variable or dependent is linearly related to any predictor or independent variable (Hahs-Vaughn & Lomax, 2020). The linear regression model is invalid without this assumption being met (Field, 2013). Partial regression plots were examined for a random pattern, indicating evidence of linearity (Hahs-Vaughn &

Lomax, 2020). Correlations were also examined showing a medium and negative relationship between the outcome variable and predictor variables.

Collinearity

The assumption of collinearity is violated when there are highly correlated independent variables used as predictors. This violation is termed *multicollinearity*, and this can make it difficult to assess the individual importance of variables in the model (Hahs-Vaughn & Lomax, 2020). Multicollinearity was checked by examining the tolerance and variance inflation factors (VIF). A tolerance value below 0.1 is problematic, or a VIF above 10 shows cause for concern of multicollinearity (Hahs-Vaughn & Lomax, 2020). All variables in the model had tolerance levels above 0.1, and VIFs were within expected ranges. Under collinearity diagnostics, several of the dimensions' Eigenvalues were low (0.22, 0.24) indicating possible intercorrelations between variables, and two condition indices were also in the concerning range of 10-30 (Hahs-Vaughn & Lomax, 2020). Due to this possible violation of collinearity, separate regressions were run since the independent variables (state and trait anxiety) were moderately correlated.

Correlations and Regression

Small negative correlations were found between LCJR scores and pre-simulation anxiety; however, the correlations were not statistically significant. Table 10 displays the Pearson correlations for baseline and pre-simulation state and trait anxiety with LCJR scores. The small negative correlations indicated that as one variable (anxiety) increased, the other variable (LCJR) decreased and vice versa. However, data analysis from the multiple linear regression showed that anxiety did not significantly predict LCJR scores: (F [4,44] = .770, p = .551). Therefore, the null hypothesis failed to be rejected. See Figure 2 for the curve estimation of the model for pre-simulation state anxiety's effect on LCJR. The R^2, also called the coefficient of multiple determination for the model was .072 indicating a small effect size for the proportion of variation in the dependent variable that was predicted from the predictor variables (Hahs-Vaughn & Lomax, 2020).

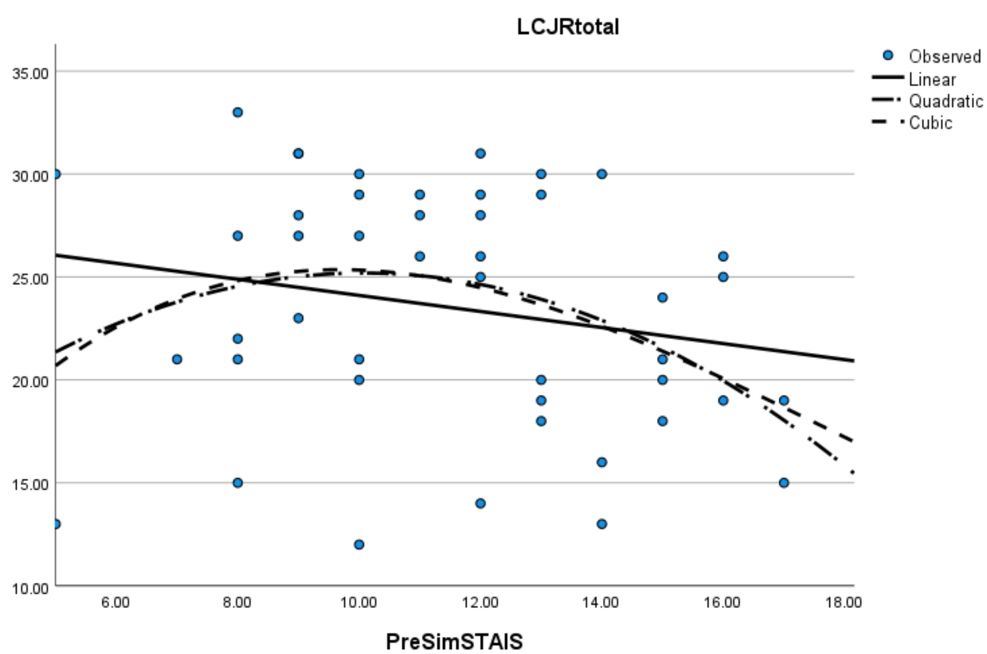
Table 10

Correlations between Anxiety & LCJR

Correlation with LCJR	Pearson's
Baseline State Anxiety STAIS-5	- .153 (p= .158)
Baseline Trait Anxiety STAIT-5	- .178 (p = .122)
Pre-Simulation State Anxiety STAIS-5	- .205 (p= .089)
Pre-Simulation Trait Anxiety STAIT-5	- .225 (p= .069)

Figure 2

Curve Estimation Model of Pre-Simulation State Anxiety on LCJR



Summary of RQ2

The second research question examined the relationship between state and trait anxiety and overall scores on LCJR. No statistically significant relationship was found when using multiple regression, controlling for baseline state and trait anxiety, and using a significance value of .05.

Research Question Three Findings

The third research question asked in this study was*: What is the relationship, if any, between state and trait anxiety and the four phases of clinical judgment (noticing, interpreting, responding, and reflecting) among undergraduate nursing students in simulation?* Multiple linear regressions were run for each of the four phases within LCJR to test if pre-simulation state or trait anxiety significantly affected any of the individual phases when using baseline state and trait anxiety as control variables. The null hypothesis was that there was no statistically significant relationship between state or trait anxiety and any of the four phases of CJ. Using the same processes delineated for RQ2, the data was checked for outliers and the assumptions of independence, homoscedasticity, normality, linearity, and collinearity (Hahs-Vaughn & Lomax, 2020). Data analysis from this study showed that anxiety did not significantly predict any of the scores of the four phases of Tanner's (2006) model: Noticing (F [4,44] = .523 , p = .719); Interpreting (F [4,44] = .366 , p = .831); Responding (F [4,44] = .1.01 , p = .412); Reflecting (F [4,44] = .913 , p = .466). Therefore, there was failure to reject the null hypothesis. Correlations for state and trait anxiety on the four specific phases are listed in Table 11. Only pre-simulation trait anxiety had a significant small correlation with performance scores during the reflecting phase. So, students with higher trait anxiety at pre-simulation scored significantly lower for reflection.

Table 11

Pearson's Correlations of Anxiety with Tanner's Four Phases

	Noticing	Interpreting	Responding	Reflecting
Baseline State	-.125 (p= .206)	.033 (p= .415)	-.219 (p= .075)	- .136 (p=.186)
Baseline Trait	-.087 (p= .285)	-.126 (p= .204)	-.198 (p= .097)	- .195 (p=.100)
Pre-Sim State	-.133 (p= .192)	-.095 (p= .268)	-.238 (p= .058)	- .202 (p=.092)
Pre-Sim Trait	-.199 (p= .095)	-.101 (p= .255)	-.196 (p= .097)	**- .266 (p= .039)**

Summary of RQ3

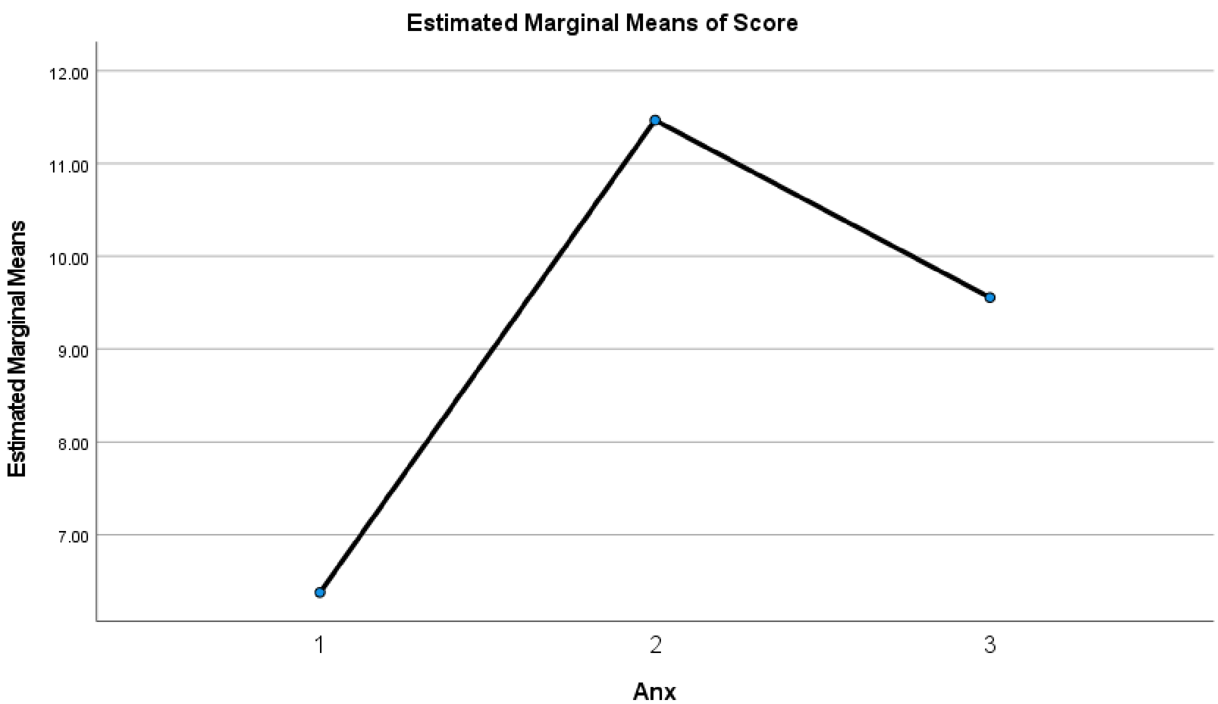
The third research question examined the relationship between state and trait anxiety and the four phases of clinical judgment (noticing, interpreting, responding, and reflecting) among undergraduate nursing students in simulation. No statistically significant relationship was found with any of the four phases when using multiple regression, controlling for baseline state and trait anxiety, and using a significance value of .05.

Research Question Four Findings

The fourth research question asked in this study was: *How do state and trait anxiety change over a semester from baseline to pre-simulation to post-simulation for undergraduate nursing students participating in simulation?* The null hypothesis was that there was no statistically significant change in anxiety between the three time points. The assumption of normality on the Shapiro-Wilk test was met, as well as the assumption of sphericity on Mauchly's test. The repeated measures ANOVA indicated a statistically significant difference in *state anxiety* across the three time points (F [2, 88] = 48.22, $p < .001$). This led to rejection of the null hypothesis. Trait anxiety did not significantly change over the three time points. Post hoc tests included pairwise comparisons showing time 1 significantly differed from time 2 ($p < .001$); time 2 significantly differed from time 3 ($p = .003$); and time 3 significantly differed from time 1 ($p < .001$). See Figure 3 for line chart demonstrating this change. Partial eta squared value was .523, indicating a large effect size, showing the strength of association between variables.

Figure 3

Change in State Anxiety over Three Time Points



Summary of RQ4

The fourth research question examined how state and trait anxiety changed over a semester for sophomore nursing students participating in a simulation. Trait anxiety levels did not change significantly over the three time points; however, state anxiety levels showed a statistically significant change between all three time points, so the null hypothesis was rejected. State anxiety increased significantly from baseline to pre-simulation ($p < .001$) and from pre-simulation to post-simulation it significantly decreased ($p = .003$) yet remained significantly higher at post-simulation when compared to baseline ($p < .001$).

Other Data Findings

This dissertation study aimed to examine the relationship between state and trait anxiety and LCJR, however other data emerged which were not directly tied to the four research questions of this study. Several findings emerged that may have implications for future research. First, the data was examined to determine the relationships between state and trait anxiety and gender. Second, LCJR scores were examined to see if they could be used to predict students' post-simulation anxiety. Third, anxiety levels at baseline were examined to determine if they were different for the six students who dropped the course. Finally, anxiety and LCJR scores were compared for those students with STNA experience versus those without.

Correlations between state and trait anxiety scores collected at various measurement points in this study are displayed in Table 12. Significant correlations were found between baseline trait and pre-simulation trait anxiety ($r = .575$, $p <.001$), baseline trait anxiety and post-simulation trait anxiety ($r = .471$, $p <.001$), and pre-simulation trait anxiety and post-simulation trait anxiety ($r = .775$, $p <.001$). Baseline state anxiety was moderately correlated with baseline trait anxiety ($r = .465$, $p <.001$). Baseline state anxiety was also significantly correlated with pre-simulation state anxiety ($r = .328$, $p = .028$). Post-simulation state anxiety was moderately correlated significantly with post-simulation trait anxiety ($r = .381$, $p = .010$).

In examining whether gender had any correlation with anxiety levels, point-biserial correlations were used. Point-biserial correlations are used when one of the two variables are dichotomous (i.e., gender). A point-biserial correlation is a Pearson's correlation with the dichotomous variable coded with 0 for one category and 1 for the other (Field, 2013). Data analyses showed that gender had a statistically significant correlation at the 0.05 level for a two-tailed test on trait anxiety at baseline. The point-biserial correlation coefficient for gender and baseline trait anxiety was -.302 (p = .031), showing females had significantly higher trait anxiety than males at baseline.

Table 12

Correlations between State & Trait Anxiety Scores

	Baseline State		**Pre-Simulation State**		**Post-Simulation State**	
	Pearson's Correlation	**P-value**	**Pearson's Correlation**	**P-value**	**Pearson's Correlation**	**P-value**
Baseline State	**-**	**-**	**.328**	**.028**	.086	.572
Baseline Trait	**.465**	**<.001**	.168	.270	- .037	.807
Pre-Sim State	**.328**	**.028**	**-**	**-**	.129	.398
Pre-Sim Trait	.254	.093	**.463**	**<.001**	.178	.241
Post-Sim State	.086	.572	.129	.398	**-**	**-**
Post-Sim Trait	.195	.200	.193	.203	**.381**	**.010**
	Baseline Trait		**Pre-Simulation Trait**		**Post-Simulation Trait**	
Baseline Trait	**-**	**-**	**.575**	**<.001**	**.471**	**.001**
Pre-Sim Trait	**.575**	**<.001**	**-**	**-**	**.775**	**<.001**
Post-Sim Trait	**.471**	**.001**	**.775**	**<.001**	**-**	**-**

Another finding that emerged from this study which was not tied to a research question was related to whether LCJR scores could be used to predict students' post-simulation anxiety levels. In other words, did those who did poorly in the simulation feel more post-simulation state anxiety afterwards? Results from data analyses showed that post-simulation state anxiety was significantly negatively correlated with the *Noticing* phase within LCJR (r = -.385, p = .005). Also, total LCJR scores were significantly negatively correlated with post-simulation state anxiety (r = -.292, p = .026). The implications of these findings will be further explored in chapter five.

Baseline anxiety levels were higher for the six students who dropped the course mid-semester. Mean baseline anxiety for all 51 students was 6.67 for state and 10.31 for trait anxiety. For the six students who completed the baseline anxiety measurement, but later dropped the course, their mean anxiety was 8.83 for state anxiety, and 12.0 for trait anxiety. The implications of this will be further discussed in chapter five.

Finally, this study provided insight into how anxiety and LCJR scores compared for those with STNA experience (N = 21) versus those without (N = 30). Although STNAs had slightly higher means for state and trait anxiety at baseline (mean state = 6.86; mean trait = 10.81), an independent samples t-test revealed no statistically significant differences (p = .527 for state; p = .365 for trait). In examining performance in simulation, STNA's had a slightly higher mean LCJR score for simulation (mean for those without STNA= 23.14; mean for those with STNA experience= 24.11). However, an independent samples t-test revealed no statistically significant differences in LCJR scores based on STNA classification (p= .594).

Summary

This chapter provided the results from this exploratory quantitative descriptive study on anxiety and clinical judgment within simulation for undergraduate sophomore nursing students. Table 13 displays a summary of main findings by research question. Zsido et al.'s (2020) short forms (*STAIS-5, STAIT-5*) demonstrated validity and reliability for measurement of state and trait anxiety surrounding nursing simulations. LCJR demonstrated good psychometric properties in this study such as internal consistency and intra-rater reliability. Although state anxiety went up significantly from baseline to just before the simulation, this did not result in a significant effect to LCJR scores within the multiple regression model. No significant relationships were found in this study between state or trait anxiety as predictors for LCJR, both overall and within each of the four phases, resulting in failure to reject the null hypothesis. Additional findings of this study included significant correlations highlighting the relationship between state and trait anxiety. Females in this study had significantly higher trait anxiety than males. The students who dropped the course had statistically significant higher levels of state anxiety at baseline, and STNAs did not have significantly different anxiety or LCJR scores. The following chapter discusses the meaning of these findings and provides implications and recommendations for future research.

Table 13

Summary of Findings

RQ1	Zsido et al.'s (2020) short form STAI-5 is a valid, reliable way to quickly measure state and trait anxiety surrounding nursing simulations. LCJR demonstrated good internal consistency.
RQ2	State or trait anxiety did not show any significant relationship to overall LCJR scores in this study.
RQ3	State or trait anxiety did not show any significant relationship to any of the four phases of CJ in this study.
RQ4	State anxiety showed significant changes from baseline to pre-simulation to post-simulation. Trait anxiety remained consistent and did not change significantly.
Other 1	Significant correlations were found between state and trait anxiety.
Other 2	Females had significantly higher trait anxiety than males.
Other 3	Significant negative correlations found between total LCJR with post-simulation anxiety, and with noticing and post-simulation anxiety.
Other 4	Students who dropped the course had higher mean state and trait anxiety at baseline.
Other 5	STNA experience did not make a significant difference in anxiety levels or LCJR scores in simulation.

CHAPTER V

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

In this final chapter, the findings are explained and integrated with existing literature. Implications of this research are also discussed with an emphasis on future work in nursing education and simulation. Finally, this chapter explains some of the limitations of this study and broader recommendations for future research.

This study focused on determining the impact, if any, of anxiety on sophomore nursing students' clinical judgment (CJ) in a simulation experience. At the beginning of the semester, both state and trait anxiety were measured using a short-form 5-item version of the STAI by Zsido et al. (2020). Later in the semester, these anxiety tools were repeated for measuring anxiety once before and once after the simulation. The simulation was an introductory experience using a high-fidelity simulator manikin; it was completed by individual students over a 10 to 15-minute time period. Students were asked to reflect on the experience and once finished, all students were given debriefing using an expert model video. During the simulation, students' CJ was evaluated within Tanner's (2006) four phases using the *Lasater Clinical Judgment Rubric* (LCJR). Multiple regression, repeated measures, and psychometric analysis of the instruments were completed in SPSS in order to answer the four research questions.

Discussion and Implications of Research Question 1

Research question one asked: *What are the psychometric properties for the main instruments used in the study (Zsido 5-item STAI and LCJR) when used with undergraduate nursing students in simulation?* Zsido et al.'s (2020) *STAIS-5* (state anxiety), *STAIT-5* (trait anxiety), and the *Lasater Clinical Judgment Rubric* (LCJR) (Lasater, 2007) were examined for psychometric properties. Classical test theory (Crocker & Algina, 1986) was used as a framework for the reliability analysis.

STAIS-5 and STAIT-5

Zsido et al.'s (2020) *STAIS-5* and *STAIT-5* were found to be valid and reliable with Cronbach's alpha ranging from .65 to.88 in this study. The STAIS-5 for state anxiety was lowest at the baseline measurement (.65). This may have been due to contextualized factors at the beginning of the semester (i.e., students were asked to rate their state anxiety on the second day of class). Low alpha values may also have been due to the low number of items in the survey, as shorter surveys typically have lower alphas (Wiersma & Jurs, 2009). Field (2013) specifically noted that "when dealing with psychological constructs, values below .7 can, realistically, be expected because of the diversity of the constructs being measured" (p. 709). STAIS-5 reliability did increase the second and third times it was given at pre- (.72) and post-simulation (.73).

STAIT-5 for trait anxiety had higher Cronbach's alpha scores than state anxiety in this study with scores ranging from .84 to .88. Seok et al. (2018) also found state anxiety had a slightly lower reliability when using a two-factor model of the full STAI (.732 for state anxiety; .858 for trait anxiety). Gore et al. (2011) reported that "because of situational factors that exist with state anxiety, the median reliability ranged from 0.16 to 0.62 among college and high school students" (p.3). Zsido et al.'s (2020) original research on the tools found .91 alpha for the state anxiety short-form STAI compared to .86 for the trait anxiety STAIT-5. The findings of this study confirm reliability for use of Zsido et al.'s (2020) short form versions of STAI when used with undergraduate nursing students in simulation.

This is important for two reasons. First, the field of nursing education currently lacks an open-access and free short form of the STAI for measuring anxiety that is valid and reliable (Reed & Ferdig, 2021). Second, Zsido et al.'s (2020) short forms of the STAI have mainly been used and studied in psychology and behavioral studies, but they have not yet been studied for reliability with undergraduate nursing students.

The results of this study lend to several implications for practical use of these measurement tools in the future. As demonstrated in this study, Zsido et al.'s (2020) short forms can be reliably used to measure anxiety surrounding nursing simulations, but they also hold potential for use in other nursing contexts (i.e., before starting clinical, after a stressful clinical event, or in the skills laboratory). They are practical for use by educators and researchers because they are easy to implement and not time consuming.

Moreover, these tools could be useful for helping nursing students to be more self-aware or mindful of their own emotional state—a quality that has been written about extensively in self-care for nurses (Wu et al., 2021). Mindfulness is being self-aware and nonjudgmental towards one's emotions, including anxiety. It has been shown to help decrease burnout in nurses by increasing resiliency and emotional regulation (Green & Kinchen, 2021; Wu et al., 2021).

Another practical implication is that Zsido et al.'s (2020) short form STAI tools could be effective for screening students at the beginning of the semester to early identify those with high anxiety who may need intervention (Kucirka, 2017). Helping students and faculty differentiate between the type of anxiety (i.e., state or trait) is also a useful aim in order to guide interventions. Nursing faculty often help students who are struggling with anxiety but have not had free tools at their fingertips to easily distinguish between state and trait anxiety types. Additional research is needed because Zsido et al.'s (2020) short forms of the STAI are fairly new. Future research should examine the use of STAIS-5 and STAIT-5 in other nursing educational contexts (e.g., clinicals) and include a broader sample of nursing students across different levels and sites. For simulation specifically, future research could examine modifications to the STAIS-5 to be more specific to the nuances of nursing simulation itself. For instance, rather than just stating "I feel upset," the STAIS-5 could be modified to say: "I feel upset when thinking about the simulation."

Lasater Clinical Judgment Rubric

LCJR was another instrument examined for its psychometric properties in this study. Cronbach's alpha for the total LCJR score was .922 in this study, which is similar to the .974 reported by Adamson (2011). Each of the four phases within Tanner's (2006) Model of Clinical Judgment were also examined for internal consistency within LCJR using Cronbach's alpha: *Noticing* (.831), *Interpreting* (.801) *Responding* (.833), and *Reflecting* (.725). The reflecting phase might have been slightly lower than the other phases since students were asked to reflect on simulation before full debriefing was completed. This is not the typical simulation practice, but it was contextualized to this specific study. Validating the internal consistency of LCJR is essential if the profession considers using it as a standardized tool for objectively quantifying CJ evaluation in nursing students.

Intra-rater reliability for LCJR was calculated using the intra-class correlation coefficient for a singular evaluator in this study and was 0.977. Adamson (2011) reported a similar intra-rater reliability of 0.908 for LCJR. This demonstrated that consistent ratings on LCJR can be achieved using a singular rater of individual students. This is important because LCJR has been suggested as a standardized tool for evaluating CJ in nursing education (Lee, 2021). Such environments may involve only one faculty at a time with individual students in lab, simulation, or clinical. Having sufficient intra-rater reliability speaks not only to the rater's consistency, but also to the tool itself. In other words, the LCJR provides both clarity and an ability to consistently differentiate between different levels of expected performance. Seldom is intra-rater reliability reported for LCJR; as such, this study adds to the research supporting the psychometric properties of LCJR when used by one rater with individual students.

The LCJR findings in this study are also important for several other reasons. First, many studies have not reported the psychometric properties for the four phases within LCJR. This is essential, considering a researcher may wish to focus in on only one of the phases (e.g., noticing). Also, several studies have only used a few of the phases within LCJR for research purposes (e.g., eliminating the reflection phase; see Kubin & Wilson, 2017). This can make comparisons difficult as total point values may differ (Lee, 2021). There has also been inconsistency (methodologically speaking) in how LCJR scoring is done and whether group or individual simulations are used (Lee, 2021). Understanding the psychometric properties within each of the individual phases is important, considering these methodological irregularities.

There are increasing calls in the literature and from professional organizations to increase clinical judgment (CJ) in new graduate nurses (Dickison et al., 2019; Nielsen et al., 2016). LCJR should be used more regularly in everyday educational settings to allow nursing educators to more objectively assess development of CJ. When used in simulation, a pre-determined action checklist and scoring guide can assist with consistency in evaluation as was done in this study (see Appendices E and F). A future study should examine whether LCJR could be used by an entire nursing program to track CJ development from start to graduation. If standardized simulations were used across an entire program, LCJR scores could be normed to determine acceptable scores for a sophomore, junior, or senior level nursing student. This would allow nurse educators to more objectively determine when a student's CJ has fallen below acceptable levels. Although in clinical settings, nursing instructors must stop students from potentially harming patients, in simulation, poor decisions can be played out and measured with LCJR. Using LCJR with simulations can more objectively determine what students are truly capable of in regard to their decision making. Future research should explore how LCJR could be used to early identify students with low CJ who need intervention. This may address the essential goal of preventing patient harm in future practice.

Summary of RQ1

In summary, the findings in this study highlight the utility and reliability of the STAIS-5 and STAIT-5 as measures for assessing state and trait anxiety in undergraduate nursing students in simulation. This study confirms the existing literature that suggests that LCJR can be used as a reliable tool for examining students' clinical judgment. Finally, it adds to the research field by providing evidence of internal consistency within Tanner's (2006) four phases of CJ when used by one rater and with individual students.

Discussion and Implications of Research Question 2

Research question two asked: *What is the relationship, if any, between state and trait anxiety and overall clinical judgment among undergraduate nursing students in simulation?* Linear regression in this study showed that neither state nor trait anxiety at baseline or pre-simulation measurement were statistically significant predictors of LCJR scores in simulation.

There are several factors in this research study which may have impacted students' anxiety levels. First is the occurrence of social evaluation anxiety. Students in this research study performed their simulations individually. Therefore, they would not have had social evaluation anxiety from peers watching. However, they knew the researcher was watching and evaluating them. Conducting individual simulations may have resulted in more anxiety since they were solely responsible for the patient and could not fall back on others in a group effort. Students might also have experienced higher *technostress* (Weil & Rosen, 1997) since it was their first time using the high-fidelity manikins in a simulation. Even with these possible factors, there was no statistical evidence in this study that anxiety significantly impacted overall performance as measured by LCJR. Future research should examine anxiety and outcomes between group and individual simulations for nursing students.

There were four potential categories for anxiety's effect on LCJR that students in this study could fall into based on their scores (see Figure 4). For some students, high anxiety resulted in them performing very well in simulation (case #1), whereas for others it correlated with poor performance (case #2). For students with low levels of anxiety, the same was also true. In other words, low anxiety may have helped them perform better (case #3) or may have resulted in them performing worse (case #4). This reinforces the idea from Yerkes-Dodson's law that a moderate amount of anxiety is desirable for peak performance (Ormrod, 2020; Yerkes & Dodson, 1908). These distinctions may help explain the mixed and inconsistent results of applying anxiety-reducing interventions in simulation (Turner & McCarthy, 2017). Future research should examine differences in coping mechanisms (e.g., cognitive appraisals and self-talk about students' perceived anxiety) between those experiencing positive or good effects of anxiety and those experiencing negative or bad effects.

Figure 4

Anxiety's Effects on LCJR

↑ Anxiety ↑ Performance on LCJR 1. Positive Effect of High Anxiety	↓ Anxiety ↑ Performance on LCJR 3. Positive Effect of Low Anxiety
↑ Anxiety ↓ Performance on LCJR 2. Negative Effect of High Anxiety	↓ Anxiety ↓ Performance on LCJR 4. Negative Effect of Low Anxiety

This finding is consistent with other literature. For instance, Shinnick and Cabrera-Mino (2021) examined predictors of CJ between expert and novice nurses. They used pupil dilation in a simulation to determine whether stress levels could predict scores on LCJR. The authors concluded that only years of nursing experience (not stress) was a significant predictor of CJ. Beischel (2013) also found that anxiety did not significantly affect learning outcomes in a high-fidelity simulation. Burbach et al. (2019) used the *Creighton Competency Evaluation Instrument* (CCEI) and STAI to measure anxiety and found that pre-simulation anxiety had no significant correlation with performance during simulation. These studies—and this present study—all reinforce the idea that some anxiety is good and does not impair performance. Moreover, some anxiety may actually improve simulation performance up to a certain point (Al-Ghareeb et al., 2017).

This is important for several reasons. There has been much emphasis on the need to reduce simulation anxiety for students. This often assumes that all anxiety is bad and will harm student performance—an assertion not confirmed by this study. Educators and researchers can often get caught up in this assumption that anxiety is harmful and must be reduced by any means such as classical music sessions before simulation (Gosselin et al., 2016). Alpert and Haber

(1960) differentiated anxiety into two types: *facilitating* and *debilitating* anxiety. Facilitating anxiety helps motivate learners to step into challenges and assists them in making the extra effort to overcome their anxiety. In contrast, debilitating anxiety can cause learners to flee the task or shut down in order to avoid the source of anxiety. Unfortunately, the *State-Trait Anxiety Framework* by Spielberger et al. (1970) does not provide this distinction between helpful and harmful anxiety. As such, nursing educators should not automatically assume that a student's perceived anxiety in simulation (as measured by the STAIS-5 and STAIT-5) is debilitating. Rather, they should help students to reframe their thinking about their own anxiety, knowing that some anxiety can be a good thing which motivates them to perform better. Future research should seek to identify both key distinguishing factors between facilitating and debilitating simulation anxiety and ways to measure or separate the two. If debilitating anxiety can be identified and separated from facilitating anxiety, then educators should consider ways or techniques to assist those particular students who struggle with the debilitating type.

Instead of working to decrease anxiety for all nursing students, educators should rather focus on helping students learn how to function safely and make appropriate patient decisions despite their anxiety levels. There are several techniques discussed in the literature which may help educators to do this. Helping students become mindful and self-aware of their own emotions is a start to building emotional intelligence—a process that may assist them in being successful later on in their nursing career (Simonton, 2021; Sun et al., 2021). Techniques such as mental rehearsal strategies and autogenic training (a relaxation technique) may also be useful for students who are learning to function through anxiety (Holland et al., 2017; Ignacio et al., 2016, Ignacio et al., 2017). Some of the anxiety-reducing interventions that have been suggested in the literature should be reevaluated considering the findings of this study. For example, reducing the number of observers in the simulation room (Mills et al., 2016) is not realistic of real-life practice when multiple family members and interdisciplinary team members are often in the patient's room while the nurse is interacting with the patient.

Nursing is a highly stressful and anxiety-provoking profession, and educators should be more focused on preparing students for real world practice than on preventing anxiety during nursing school. In order to prepare for the transition to practice, educators need to get students out of their comfort zone and into the *stretch zone* where more learning can happen (Palethorpe & Wilson, 2011). Learning in the stretch zone requires acceptance of the higher anxiety levels that come with it. With the crisis of new graduates lacking CJ as they enter practice, more focus needs to be put on increasing CJ regardless of anxiety levels.

An extremely high turnover of employment for new nurses should alert educators and students alike to the fact that the real world is often more stressful than nursing school (Shaffer & Curtin, 2020). Students need to recognize the realities of the anxieties they will face in the healthcare setting, especially since the COVID-19 pandemic (Zheng et al., 2021). Faculty who are always protecting students by making it anxiety-free may be setting students up for a rude awakening after graduation. There is value in exposing students to anxiety-provoking situations in simulation and helping them learn how to function through that anxiety when nobody's life is in jeopardy as a result. One way to help students and nurses alike in coping with the demands and stresses of the healthcare field is by building resilience. Resilience training for undergraduate nursing students has been proposed as a technique to decrease the attrition and burnout of nurses by teaching positive coping mechanisms for how to deal with stressful situations (Lopez et al., 2018).

There has been much emphasis in the simulation field on providing *psychological safety* to students (Kang & Min, 2019). In this study, students were given a thorough pre-briefing in a supportive environment with a discussion of psychological safety, yet they still felt highly anxious before the simulation. The term psychological safety may carry an assumption to some that students will not experience negative emotions, which is unrealistic considering what is known about simulation anxiety. Rather, psychological safety means that when students make mistakes in challenging situations, they will not be ridiculed or shamed, and that their performance remains confidential. Unfortunately, the real world of nursing practice in a complex healthcare system does not often provide psychological safety for registered nurses (RNs) who often struggle to speak up, ask for help, or voice their concerns to administration (Pfeifer & Vessey, 2019). Kang and Min (2019) called for future research into the development of an instrument to measure psychological safety. Once psychological safety can be measured, then future research could examine how it relates with anxiety and performance.

Future research should be completed on whether individual simulations can increase CJ and competency. In real life, nurses rarely perform the steps of the nursing process in groups, so a certain level of individual competency is needed to be developed while in nursing school. With only 20% percent of employers being satisfied with the entry-level abilities of new graduates (Saintsing et al., 2011), schools of nursing have an obligation to ensure individual competency for patient safety. It is challenging to ensure individual competency in group simulations, but even more challenging in the clinical setting where faculty cannot be with every student at every moment. There have been several calls in the literature for more research on using LCJR to examine CJ during individual simulations (Chmil et al., 2015; Lee, 2021). Virtual simulation and its effect on CJ development is another recommended area for future research since virtual simulation allows for individual simulation to be completed in a cost-effective setting (Haerling, 2018). A longitudinal study examining educational interventions which can improve students' CJ over time would be a welcome addition to the field.

Summary of RQ2

In summary, the findings of this study highlight that anxiety did not significantly affect CJ scores on LCJR during simulation. This may be attributed to the fact that individuals react to anxiety differently. Moreover, research has provided evidence that some anxiety is good and can facilitate improved performance. Educators should not assume that anxiety is something negative that needs eliminated; such a move may not help prepare students for real-life nursing practice. Future research could focus on the differentiation between helpful and harmful anxiety so that educators can better help students who experiencing harmful anxiety. A changed focus is also recommended for nursing education where the emphasis is placed on how to best develop CJ regardless of anxiety. Finally, more research is needed on the most effective educational interventions and simulation modalities to increase undergraduate students' CJ over time.

Discussion and Implications of Research Question 3

Research question three asked: *What is the relationship, if any, between state and trait anxiety and the four phases of clinical judgment (noticing, interpreting, responding, and reflecting) among undergraduate nursing students in simulation?* Results from multiple regression analyses in this study showed that neither state nor trait anxiety could significantly predict any of the four phases LCJR scores in simulation. This finding is important considering calls in the literature to reduce student anxiety by using anxiety-reducing interventions during simulation (Nielson & Harder, 2013; Yockey & Henry, 2019). This finding suggests the need to change the mentality of nursing education about anxiety. Rather than focusing on reducing anxiety, which was found not to impair CJ within any of the four phases of Tanner's (2006) model, educators should focus their attention on how to best teach students to perform professionally within each of these four phases of CJ, and how to best measure learning and competency within the four phases.

In this study, sophomore nursing students struggled within each of the four phases ─ *noticing, interpreting, responding, and reflecting*. During the noticing phase, they often failed to notice important assessment findings in the simulation (i.e., a call light on the floor, an elevated respiratory rate, and other associated findings). Students most commonly fell into the *Beginning* or *Developing* categories on the LCJR rubric. Both of these categories state that the student appears overwhelmed or confused by the amount of objective data and that the assessment is poorly organized (see Appendix E). The majority of students failed to seek additional information by questioning the patient to obtain subjective data; they focused solely on objective data. During the interpreting phase, information that was noticed was sometimes interpreted incorrectly by the nursing students. For example, they might not be sure about the meaning of a heart rate above 100 beats per minute; in turn, they might incorrectly verbalize that this was a low heart rate instead of a high one. For responding, they were frequently unsure how to communicate or respond to the patient's questions. At times, they carried out inappropriate actions or no actions at all. Finally, most students also fell into the *Beginning* or *Developing* categories on the LCJR rubric for the reflecting phase. Written reflections tended to be brief and simple, often simply stating the obvious. One reason for this might be that "they don't know what they don't know," as students had not completed debriefing with the expert modeling video yet.

The findings of RQ3 show that students' struggles within the four phases were not related to their anxiety, per se, but rather might be attributed to their developmental stage. Early developmental pre-novice students like sophomores are known to be task-driven and rely on rules and checklists (Aller, 2020). To accelerate their CJ development, nursing educators must help early nursing students understand that nursing practice is not a checklist but a way of thinking and acting. Ashley and Stamp (2014) reported that sophomores in simulation had a naïve view that nursing was common sense; since students were not yet able to "think like a nurse," they relied more on luck than an organized strategy for problem solving. Introducing LCJR and the four phases of CJ earlier in the curriculum holds potential for decreasing cognitive overload in early nursing students (Cason & Reibel, 2021). Nursing students could then learn what is expected of them and what nursing practice looks like in order to begin developing CJ faster.

Future research should dig deeper into what educational strategies can best help students develop CJ within each of the four phases. If anxiety does not statistically significantly affect noticing, then the field needs more research to find out what does affect noticing and how to best promote it. There are several approaches discussed in the literature that hold potential for improving students' noticing abilities. For instance, Daley et al. (2017) found that using concept maps to prepare for nursing simulation could increase noticing for students. The use of 360 immersive video have also been researched to improve professional noticing in teacher education (Ferdig & Kosko, 2020; Kosko et al., 2021). Future research could examine 360 video and virtual reality with nursing simulations to improve noticing in nursing students. Another idea suggested in teacher education but potentially useful for nursing education is *video tagging*, which can improve the relationship between noticing and interpreting data (Walkoe et al., 2020).

By improving visualization and spatial awareness, the use of mixed reality in simulation also has the potential to improve noticing (Frost et al., 2020). In sum, future research is needed to determine what educational technologies and interventions can assist nursing students with developing professional noticing skills.

One practical implication of RQ3 is that some of the anxiety-reducing interventions discussed in the literature should be re-evaluated considering the findings of this study. For example, eliminating video-recording of simulations has been suggested because it is so anxiety-provoking for students due to fear of having their mistakes exposed (Nielson & Harder, 2013). Additionally, some recent studies have been unable to find clear cut benefits to video-debriefing over debriefing without video (Hughey et al., 2020). Students in this study were video recorded; however, their high anxiety had no significant negative effect on their performance within the four phases of their CJ. Watching a video of a recorded simulation allows for subtleties and complexities that are often missed in memory to be noticed and discussed; future research is needed to determine if such a practice improves reflection.

Educators should consider innovative strategies to assist students in improving their reflection abilities as quality reflection can result in improved overall performance (Barbagallo, 2021). The use of a structured reflective debriefing guide which goes through a discussion of each of the four phases of CJ may help increase students' CJ skills (Al-Sabei & Lasater, 2016; Nielsen et al., 2007). Using a pre-recorded expert-modeling video during debriefing can get key points across without students having their mistakes replayed, and it ensures that all students receive the same standardized information. Nursing education should consider learning from the field of teacher education which frequently uses videos of student teachers in order to improve reflection on practice (Blomberg et al., 2014). Again, the focus needs to be shifted to help students develop sound self-reflection in-action and self-reflection on-action skills (Mulli et al., 2021). Future research should further examine the relationship between trait anxiety and reflection abilities, as this study found a small negative correlation between the two (- .266, p=.039). If nursing educators can assist students in developing reflection skills earlier on, this may help increase their learning gained from future clinical experiences as they will be able to more deeply reflect on them.

One thing observed anecdotally in this study was that anxiety came on very suddenly for some students in the middle of the simulation, often causing "freezing". This anxiety was not captured in the measurements in this study, as surveying anxiety levels mid-simulation would have been disruptive. Future research could use biometrics such as eye tracking goggles with pupil dilation or heart rate monitoring for anxiety measurement within the simulation to be able to passively capture this phenomenon. With increased understanding on this phenomenon, such students could be helped to be better able to function and make decisions when experiencing "freezing." Future research with biometrics could also examine whether anxiety changes within the different phases of Tanner's (2006) CJ model for students.

Summary of RQ3

In summary, the findings of this study emphasize that anxiety did not quantitatively affect any of the four phases of Tanner's (2006) model within LCJR during simulation. Rather than attempting to reduce anxiety in simulation, the focus should be placed on how to best teach the four phases of CJ. The four phases of CJ should be taught earlier in nursing curriculum so students can get a head start on *thinking like a nurse*. More research is needed on the most effective educational interventions (e.g., technology-based interventions) to assist students in developing professional noticing, interpreting, responding, and reflecting practices. Future research on simulation anxiety should consider the use of biometrics to allow anxiety to be measured within the simulation without disruption.

Discussion and Implications of Research Question 4

Research Question four asked: *How do state and trait anxiety change over a semester from baseline to pre-simulation to post-simulation for undergraduate nursing students participating in simulation?* Results from repeated measures analyses used in this study showed that only state anxiety significantly changed between all three time points. Trait anxiety did not significantly change during the study. This is consistent with Spielberger's (1970) theory that trait anxiety refers to relatively stable personality differences in how people perceive stressful events. State anxiety, according to this theory, would expectedly change based on situational factors such as the simulation environment.

Students in this study were not highly anxious at baseline for either state or trait anxiety, when comparing mean baseline scores (state = 6.67, trait = 10.31) to the cut-off points (≥10 for state anxiety or ≥13.5 for trait anxiety) as discussed by Zsido et al. (2020). However, just after the pre-briefing (and before the individual simulations commenced), the students mean state anxiety increased to clinically significant high levels (11.47). Their anxiety was high despite the anxiety-reducing interventions that were enacted such as a thorough pre-briefing, sharing of learning objectives and expectations, supportive faculty, and private debriefing. Serving as the primary nurse in an individual simulation and being video recorded might have served as factors that caused higher anxiety. For some students, their high anxiety may have facilitated improved performance and better clinical judgment; for others, the anxiety may have been debilitating.

The findings of RQ4 are consistent with what others have reported in the literature about state anxiety going up to significantly high levels just before the simulation (Cantrell et al., 2017;

Smith et al., 2019; Reed & Ferdig, 2021). Some authors have suggested the need for anxiety-reducing interventions, as this phenomenon has been assumed to be problematic and negative in nature (Gosselin et al., 2016; Nielson & Harder, 2013). The results of this study imply otherwise. In other words, high anxiety does not necessarily significantly impact performance as evidenced by the findings from research questions two and three.

Another significant finding is the nature of simulation anxiety and how it lingers for a while after the simulation is over. In this study, post-simulation anxiety measurements were taken approximately five to ten minutes after the simulation ended. Students were alone in a quiet reflection room when they evaluated their anxiety at post-simulation. Despite post-simulation state anxiety levels being significantly lower than pre-simulation, the scores remained significantly higher than baseline and near the clinical cut-off point determined by Zsido et al. (2020). This means that even when the simulation was over, nursing students continued to have high feelings of anxiety and jitteriness until their autonomic nervous system could presumably be reset to restore homoeostasis. The sympathetic nervous system causes a cascade of chemicals released in the body and coming down from the fight-or-flight response to a stressor can take 20-30 minutes for physical symptoms to resolve (Nunez, 2020). Understanding this lingering nature of simulation anxiety should cause educators to rethink the timing for debriefing. A short break after the simulation which enables time for the students to come down off the fight-or-flight response may result in more effective learning during the debriefing time.

The findings from research question four are important for several reasons. First, it shows that faculty and students should expect high levels of anxiety and not be surprised or unsettled by it, even when the simulation is over. If faculty and students accept this well-documented trajectory, then it can be reframed it in a positive light by understandings that some anxiety is good and can be facilitative (see RQ2 section previously). Educators who push students into intentionally anxiety-provoking situations to prepare them for real-life practice will have opportunities to guide students in how they think about and deal with their anxieties. Educators can encourage students to be more self-aware of their anxiety and to see it as a challenge to work through in order to improve themselves (Jack & Smith, 2007). Similarly, nursing students need to know that nursing itself is a stressful profession and learning to function through anxiety is part of the job (Bartlett et al, 2016). Real-life nursing practice will also lead to many emotionally distressing situations which can be one reason why nurses leave the field (MacKusick & Minick, 2010). Future research should examine how anxiety changes from nursing school to graduation and beyond by using a longitudinal multi-site study which would clarify how much anxiety carries over to real-world nursing practice and how much trait anxiety is a moderating factor.

There are several practice recommendations based on the results of research question four. First, faculty should consider giving students extra space and time to work through their thinking when they are frozen with high anxiety during a simulation. Consider using pauses or time-outs during the simulation in order to let highly anxious students have some *reflection in-action* time (Mulli et al., 2021). A pause in the student's action during simulation may be student-initiated or faculty-initiated so that the student has time to consider what is happening and may change their actions accordingly. Learning to reflect better within the simulation itself and not waiting until the debriefing phase may help students develop an increased adaptability to change and ability to improvise (Mulli et al., 2021). Faculty should realize that students may remain highly anxious immediately after the simulation ends and may need some quiet reflection time to process emotions before jumping right into debriefing.

Summary of RQ4

In summary, state anxiety alone (not trait anxiety) significantly changed from baseline to pre-simulation to post-simulation. This was expected and consistent with existing literature. This study adds to the understanding about the lingering nature of post-simulation anxiety and suggests recommendations for practice such as reframing the anxiety trajectory in a positive light and linking expectations to practice in the real world.

Discussion of Other Findings

The findings in this study support the existing literature on relationship between state and trait anxiety. Namely, individuals with high trait anxiety will correspondingly experience higher state anxiety because of their tendency to perceive events as excessively threatening and beyond their coping mechanisms (Spielberger et al., 1970). It is important for nursing faculty to recognize this relationship in order to best help students who believe that their anxiety is impairing them. Distinguishing between types of anxiety using a short form tool such as Zsido et al.'s (2020) STAIT-5 and STAIS-5 is a helpful practice recommendation for nursing educators when counseling students. Nursing faculty should make referrals to mental health professionals as needed for distressed students with self-reported debilitating anxiety or warning signs that anxiety may be impacting functioning (Kucirka, 2017). Promoting mindfulness, positive coping mechanisms, and cognitive appraisals while removing negative self-talk are helpful interventions that nursing faculty can discuss with students struggling with their own feelings of distress from anxiety (Simonton, 2021).

A second finding in this study that has implications for future research is the attrition of nursing students. The six students who dropped the course by mid-semester had higher mean anxiety levels at the baseline (8.83 state; 12.0 trait) than those who continued to finish the course

(6.67 state; 10.31 trait). Reasons that nursing students drop out are multifaceted and can be for academic, personal, or social reasons (Mitchell et al., 2019). The inability to complete a nursing program results in a financial toll to the individual student as well as the educational institution. Moreover, attrition of nursing students has been reported in the literature to be a concerning factor impacting the nursing shortage (Hopkins, 2008). Future research should examine whether early anxiety screening could be a predictor for retention in nursing students, and whether early intervention could help at-risk students who are experiencing high levels of anxiety at the beginning of the semester.

A third finding in this study that has implications for future research is related to the experience of nursing students who were also working concurrently as STNAs. In this study, STNA experience was not a significant predictor for anxiety level or LCJR scores; however, more research is needed on the potential benefits of STNA experience for nursing students. White et al. (2019) found similar results, suggesting that those nursing students also working as nursing assistants did not show any significant increase in self-confidence with clinical-decision-making than students not working in healthcare. This result may be attributed to nursing assistants being primarily task-oriented and not functioning or thinking like a nurse. It may also be that employment as an STNA does not allow students to interact with RNs in a way that enhances their clinical judgment abilities. Future research should examine whether any soft skills carry over for nursing students with STNA experience such as enhanced communication skills.

A final finding in this study that should be examined in future research is the relationship between the *Noticing* phase of CJ and post-simulation anxiety, as this study found significant negative correlations showing that as noticing went down, anxiety after the simulation went up and vice versa (Pearson's = -.385, p = .005). Total LCJR scores, like noticing, also had significant negative correlations with post-sim anxiety (Pearson's = .292, $p = .026$), indicating that students' anxiety was higher when they sensed they did poorly. Nursing educators working with early-nursing students such as sophomores should place extra teaching emphasis on the art of noticing in context. Noticing (as the first phase of CJ) has unique importance to forming the plan of care for the patient; future research should dig deeper into the impact of noticing.

Broader Recommendations

Nursing schools should support policy changes to bring more standardization to simulation across grade levels and between schools. As the field grows in its understanding of clinical judgment and how it develops, schools of nursing could also consider adopting an evidence-based tool such as LCJR to measure clinical judgment across the curriculum. LCJR could also be used by individual instructors in a clinical setting to provide formative feedback to students on where they need to grow and to more objectively quantify student performance. Research is needed to determine if LCJR scores in simulation carry over to clinical practice (e.g., LCJR scores could be tracked by nurse managers or peer evaluations of newly practicing nurses to compare with scores of those in nursing school).

Finally, Zsido et al.'s (2020) short form STAI tools could be implemented by an entire school of nursing to support ongoing data collection and pattern analyses of nursing students each year and even beyond graduation. Students' anxiety levels in combination with LCJR scores could be potentially used for counseling students as to what specialties they might be best suited for (e.g., exceptional and quick noticing skills are needed for emergency room nursing practice). Building prediction models of who is going to be successful in nursing is a goal for future research. Future research on anxiety is also needed on existing nurses and how additional experience impacts anxiety in nursing practice.

Limitations

There are several limitations and assumptions in the contextualizations of this study that may limit generalizability (Theofanidis & Fountouki, 2018). This study used a single site convenience sample of only sophomore level undergraduate nursing students. Sophomores were intentionally chosen due to the higher anxiety they were assumed to have given this was their first simulation experience. It was assumed that sophomores possessed some amount of clinical judgment on areas they had previously learned about.

Several limitations were related to the context of the simulation. For instance, a concurrent math quiz in the class right before the simulation may have altered some students' anxiety levels. Also, some students had a time lag between when the pre-simulation anxiety surveys were taken and when they actually did the individual simulation which could have been an hour or two later. This may have caused inaccuracies in their self-reported anxiety levels at pre-simulation, as their anxiety may have increased when their simulation was more imminent. Another limitation was that since the research was conducted over two weeks, students might have talked about the simulation to their peers. This could have influenced their anxiety levels or their LCJR scores. Technical problems with video-recording for the last few simulations resulted in the researcher having to score these solely based on notes taken on the action-checklist and by using the simulation scoring guide.

Since the Zsido et al.'s (2020) STAIT-5 and STAIS-5 were administered three times, test fatigue was also a possible confound. Zsido et al.'s (2020) anxiety tools that were used in this study were not able to determine the sources of students' anxiety— whether from technostress, unfamiliarity with the equipment, lack of skills, being labeled the primary nurse, or from the video-recording. However, regardless of the source of their anxiety, the anxiety experienced by students did not significantly affect CJ in this study. Clinical judgment was only measured once in this study and only showed one moment in time, and so generalizations as to students' future clinical judgment cannot be made. Future research should confirm this study's findings with a larger sample size and among different grade levels and courses.

Conclusion

In summary, this study explored the impact of anxiety on students' clinical judgment in simulation for undergraduate sophomore level nursing students. The STAIS-5 and STAIT-5 were found to be reliable tools for assessing and differentiating state and trait anxiety in undergraduate nursing students in simulation. Future research should differentiate not only between state and trait anxiety, but also between debilitating and facilitating anxiety types. LCJR was a valid and reliable tool for examining students' clinical judgment by one rater and with individual students in this study. One key take-away from this study is that students' anxiety did not significantly affect clinical judgment outcomes as measured by overall CJ scores on LCJR and within Tanner's (2006) four phases of CJ. This reinforces the idea that anxiety's effects are highly individualized, and that some anxiety can facilitate improved performance. Rather than assuming anxiety is bad and attempting to reduce it in simulation, nursing education should rather emphasize how to best develop CJ regardless of anxiety. More research is needed on the most effective educational interventions and simulation modalities to increase undergraduate students CJ over time so students can start *thinking like a nurse* earlier. This is critical considering the gap in CJ for new graduate nurses entering practice.

Understanding the expected trajectory for anxiety in simulation is important for educators to be able to best help students learn to deal with anxiety before they enter a highly stressful profession like nursing. As confirmed by this study and many others, high levels of state anxiety should be expected and anticipated before simulation. Therefore, students and educators should not be surprised or alarmed by this. Understanding the lingering nature of post-simulation anxiety should cause educators to rethink jumping into debriefing right after a simulation concludes. Educators can help nursing students in how they think about and deal with their anxiety in order to build self-efficacy for future nursing practice. Nursing educators must go beyond simply teaching content and seek to build resilience in future practitioners for real-world nursing practice.

APPENDICES

APPENDIX A

IRB CONSENT FORM

Appendix A

IRB Consent Form

KENT STATE UNIVERSITY

Informed Consent to Participate in a Research Study

Study Title: *Simulation anxiety and clinical judgement for undergraduate nursing students*

Principal Investigator: *Richard Ferdig*
You are being invited to participate in a research study. This consent form will provide you with information on the research project, what you will need to do, and the associated risks and benefits of the research. Your participation is voluntary. Filling out the survey implies your consent to participate and maintains anonymity.

Purpose:
The intent of this project is to gain insight into simulation anxiety and clinical judgement for undergraduate nursing students.

Procedures
You will be given an anxiety instrument at the beginning of the semester. You will be given a second anxiety instrument prior to the start of a simulation. You will go through the simulation. After the simulation, you will be given a final anxiety instrument. All students will complete the activities as this is a normal part of instruction. However, we are asking for your permission to use your data from the study. Course faculty will not know if students have or have not agreed to participate in the data collection.

Benefits
Your participation in this study will help us better understand student anxiety with simulations and will help future nursing students.

Risks and Discomforts
There are no anticipated risks beyond those encountered in everyday life.

Privacy and Confidentiality
Your email address will be collected to match pre and post-test surveys. However, your email address will then be replaced by a unique identifier and no data about you or your email address will be kept.

Voluntary Participation
Taking part in this research study is entirely up to you. You may choose not to participate, or you may discontinue your participation at any time without affecting your course grade in any way.

Contact Information
If you have any questions or concerns about this research, you may contact Dr. Richard Ferdig at (330-672-3317). This project has been approved by the Kent State University Institutional Review Board. If you have any questions about your rights as a research participant or complaints about the research, you may call the IRB at 330.672.2704.

Consent Statement and Signature
My completion of the survey will be indicative of my consent to participate in this research study.

______________________	______________________	______________________
Name	Signature	Email Address

APPENDIX B

DEMOGRAPHICS SURVEY

Appendix B

Demographics Survey

1. KSU email______________________

2. Age______

3. Gender (circle one)- Male Female Other

4. Ethnicity (circle one)

   American Indian or Alaska Native
   Asian
   Black or African American
   Hispanic or Latino
   Native Hawaiian or Other Pacific Islander
   White/ Caucasian
   Other

5. Do you currently or have you ever held a nursing license (ex. LPN) circle one- Yes No

6. Are you an STNA or currently working in a direct patient care? Circle one Yes No

   If so, how many months have you been doing this?_______

7. Current GPA ___________

APPENDIX C

STAIS-5 & STAIT-5

Appendix C

STAIS-5 & STAIT-5

STAIS-5 developed by Zsido et al. (2020)

State Anxiety Questionnaire

Circle the answer which seems to describe your present feelings best at the present.

	Not at all	Somewhat	Moderately	Very Much
1. I feel upset.	1	2	3	4
2. I feel frightened.	1	2	3	4
3. I feel nervous.	1	2	3	4
4. I am jittery.	1	2	3	4
5. I feel confused.	1	2	3	4

STAIT-5 developed by Zsido et al. (2020)

Trait Anxiety Questionnaire

	Not at all	Somewhat	Moderately	Very Much
1. I feel that difficulties are piling up so that I cannot overcome them.	1	2	3	4
2. I worry too much over something that really doesn't matter.	1	2	3	4
3. Some unimportant thoughts run through my mind and bothers me.	1	2	3	4
4. I take disappointments so keenly that I can't put them out of my mind.	1	2	3	4
5. I get in a state of tension or turmoil as I think over my recent concerns and interests.	1	2	3	4

APPENDIX D

ACTION CHECKLIST USED DURING SIMULATION

Appendix D

Action Checklist Used During Simulation

Action Checklist- SOPH E. Ferdigo SIM Student ID__________

- ☐ Wash hands
- ☐ Introduce self to patient
- ☐ Is respiratory assessment and VS complete? (missing_________________________________)
- ☐ Things to potentially notice
    - o Call light on floor
    - o Low O2 sat
    - o High RR
    - o Crackles in lungs
    - o Cough
    - o SOB dyspnea
    - o Home inhaler
    - o Cigarettes
    - o Tachycardia
    - o Poor cap refill
    - o Pale/cyanotic nailbeds and mucus membranes
    - o anxiety
- ☐ Does student ask approp. Questions to seek more information about symptoms and findings? (such as inhaler use, smoking ppd, dyspnea details, cough details, HPI, covid exposure, occupation, pain, med list?)
- ☐ Does student focus on priority respiratory findings
- ☐ Does student determine client needs resp. intervention in a timely manner?
- ☐ Calm/confident leadership demeanor? (or stressed/disorganized?)
- ☐ Clear communication?
- ☐ Educates and answers patient questions therapeutically and with confidence?
- ☐ Performs interventions timely
    - o Sits pt. up HOB
    - o Calls provider
    - o Apply O2
    - o I.S.
    - o CDB exercises
    - o Other__________________
- ☐ Are they skillful at head to toe assessment? Use of PPE? Application of NC?
- ☐ Self-reflection on good and areas to improve- thoughtful? Do they show commitment to improving?

APPENDIX E

SIMULATION SCORING GUIDE WITH LCJR

Appendix E

Simulation Scoring Guide with LCJR

SCORING GUIDE FOR SIMULATION: EUGENE F. RESPIRATORY ASSESSMENT: SOPHOMORE LEVEL SIMULATION

Lasater Clinical Judgment Rubric

Dimensions	4 Exemplary	3 Accomplished	2 Developing	1 Beginning
Noticing				
Focused observations	Focused observation appropriately; regularly observes and monitors a wide variety of objective and subjective data to uncover any useful information. Notices **all** environmental objects (cigarettes, inhaler, call light) and questions patient about them in addition to noticing **all** priority data.	Regularly observes and monitors a variety of data, including both subjective and objective; most useful information is noticed, may miss themost subtle signs. Focuses on priority resp. findings: Low O2 Sat, High RR, crackles in lungs, cough- May notice some environmental findings 1-2 but not all	Attempts to monitor a variety of subjective an objective data but is overwhelmed by the array of data; focuses on the most obvious data, missing some important information. Does not notice all important resp. findings but recognizes some of them. Notices 0-1 environmental findings	Confused by the clinical situation and the amount/type of data; observation is not organized, and important data are missed, and/or assessment errors are made. Focuses on other findings and does not notice priority respiratory findings. Assessment incomplete and/or disorganized.
Recognizing deviations from expected patterns	Recognizes subtle patterns and deviations from expected patterns in data and uses these to guide the assessment. Recognizes and notes Orthopnea, Dyspnea on exertion, Anxiety as signs of hypoxemia, as well as subtle signs such as capillary refill, skin color, mucus membranes- Actively seeks additional information to guide the assessment	Recognizes most obvious patterns anddeviations in data and uses these to continually assess. Recognizes that the patient is showing signs of resp. compromise based on VS, lung sounds, SOB, cough and focuses on these- Seeks additional information about resp. only	Identifies obvious patterns and deviations, missing some important information; unsure how to continuethe assessment. Recognizes some resp. deviations but not all- important deviations- does not seek additional assessment data	Focuses on one thing at a time and misses most patterns/deviations from expectations; misses opportunities torefine the assessment. Does not recognize most respiratory deviations and does not further assess
Information seeking	Assertively seeks information to plan intervention: carefully collectsuseful subjective data from observing the patient and from interacting with the patient and family. Asks many questions showing critical thinking- *Dyspnea details? Cigarette usage? Inhaler usage? Cough details? HPI? COVID exposure? Pain? Occupation? Med list?* Questions patient and family for useful data	Actively seeks subjective informationabout the patient's situation from the patient and family to support planning interventions; occasionally does not pursue important leads. Asks patient clarifying questions about key resp. symptoms and asks a few deeper critical thinking questions but not all.	Makes limited efforts to seek additional information from the patient/family; often seems not to know what information to seed and/or pursues unrelated information. Only asks minimal questions to seek additional information.	Is ineffective in seeking information; relies mostly on objective data; has difficulty interacting with the patient and family and fails to collect important subjective data. Does not ask patient subjective questions to obtain more info

Interpreting	4 Exemplary	3 Accomplished	2 Developing	1 Beginning
Prioritizing data	Focuses on the most relevant and important data useful for explainingthe patient's condition. Relates key resp. data to diagnosis of Pneumonia, as well as history of COPD, smoking	Generally, focuses on the most important data and seeks further relevant information, but also may tryto attend to less pertinent data. Focuses on key resp data as priorities (low O2 sat, RR, DOE, LS, cough)	Makes an effort of prioritize data andfocus on the most important, but alsoattends to less relevant/useful data. Talks about respiratory data but also brings up less relevant data (BP, HR, or others)	Has difficulty focusing and appears notto know which data are most importantto the diagnosis; attempts to attend to all available data. Does not prioritize or focus on resp. data and attempts to summarize all available data
Making sense of data	Even when facing complex, conflicting or confusing data, is able to (1) note and make sense of patterns in the client's data, (2) compare these with known patterns (from the nursing knowledge base, research, personal experience, and intuition), and (3) develop plans for interventions that can be justified in terms of their likelihood of success Determines patient needs resp. interventions quickly and other interventions such as smoking cessation	In most situations, interprets the patient's data patterns and compares with known patients to develop an intervention plan and accompanying rationale, exceptions are rare or complicated cases where it is appropriate to seek the guidance of a specialist or more experienced nurse. Determines patient needs respiratory intervention	In simple or common or familiar situations, is able to compare the patient's data patterns with those known and to develop or explain intervention plans, has difficulty, however with even moderately difficult data or situations that are within the exceptions for students, inappropriately requires advice or assistance. Needs assistance to determine that patient needs respiratory interventions based on data	Even in simple, common or familiar situations, has difficulty interpreting or making sense of data; has trouble distinguishing among competing explanations and appropriate interventions, requiring assistance both in diagnosing the problem and in developing the intervention. Does not focus on need for respiratory interventions

Responding	4 Exemplary	3 Accomplished	2 Developing	1 Beginning
Calm Confident Manner	Assumes responsibility: delegates team assignments, assess the client and reassures them and their families	Generally, displays leadership and confidence, and is able to control/calm most situations; may show stress in particularly difficult or complex situations	Is tentative in the leader's role; reassures clients/families in routine and relatively simple situations, but becomes stressed and disorganized easily	Except in simple and routine situations, is stressed and disorganized, lacks control, making clients and families anxious/less able to cooperate
Clear Communication	Communicates effectively; explains interventions; calms/reassures clients and families; directs and involves team members, explaining and giving directions; checks for understanding Introduces self, establishes rapport, answers pt. questions with therapeutic communication, educates patient in advance of all	Generally, communicates well; explains carefully to clients, gives clear directions to team; could be more effective in establishing rapport Shows some communication ability (e.g., giving directions); Introduces self, builds some rapport, gives clear directions and answers ALL pt. questions with clear communication	Communication with clients/families/team members are only partly successful; displays caring but not competence Does not answer all pt. questions with confidence or clear communication, but shows caring- May introduce self	Has difficulty communicating. explanations are confusing, directions are unclear or contradictory, and clients/families are made confused/anxious, not reassured Struggles to answer questions appropriately, unclear communication, does not introduce self or build rapport

	treatments using layman's terms, checks patient for understanding or questions	(lacking in proactive education and checking pt. for understanding)		
Well-planned intervention	Interventions are tailored for the individual client; monitors client progress closely and is able to adjust treatment as indicated by the client response Quickly implements interventions such as applying O2, sit HOB up, tries to use IS or CDB teaching, and may call provider- reassesses response	Develops interventions based on relevant patient data; monitors progress regularly but does not expect to have to change treatments Performs resp. interventions such as applying O2 and sitting HOB up - re-assesses after doing this (may or may not call provider depending on pt. response)	Develops interventions based on the most obvious data; monitors progress, but is unable to make adjustments based on the patient response Limited respiration interventions such as applying O2, sitting HOB up and or calling provider- does not assess response	Focuses on developing a single intervention addressing a likely solution, but it may be vague, confusing, and/or incomplete; some monitoring may occur Focuses on a single intervention (such as sit HOB up only without oxygen or calling provider), or takes no interventions
Being skillful	Shows mastery of necessary nursing skills Skillful resp. assessment and application of O2 N/C	Displays proficiency in the use of most nursing skills; could improve speed or accuracy Skillful resp. assessment but could improve speed, may not be skilled at O2 application	Is hesitant or ineffective in utilizing nursing skills Hesitant or unskilled at some parts of the respiratory assessment or unable to apply NC	Is unable to select and/or perform the nursing skills Unable to complete full respiratory assessment due to lack of skills and not able to apply NC
Reflecting	**4 Exemplary**	**3 Accomplished**	**2 Developing**	**1 Beginning**
Evaluation/self-analysis	Independently evaluates and analyzes personal clinical performance, noting decision points, Elaborating alternatives, and accurate evaluation of choices against alternatives. Excellent thorough self-reflection-Thinks of alternatives not yet considered in addition to strengths and weaknesses	Evaluates and analyzes personal clinical performance with minimal prompting, primarily major events or decisions; key decision points are identified, and alternatives are considered. Identifies at least 1-2 key strengths and weaknesses of performance	Even when prompted, briefly verbalizes the most obvious evaluations; has difficulty imagining alternative choices; is self-protective in evaluation personal choices. Very brief and obvious reflection-self-protective	Even prompted evaluations are brief,cursory, and not used to improve performance; justifies personal decisions/choices without evaluating them. Brief reflection which does not critically evaluate choices (I think I did good)
Commitment to improvement	Demonstrates commitment to ongoing improvement; reflects on and critically evaluates nursing experiences; accurately identifies strengths and weaknesses and develops specific plans to eliminate weakness. Identifies several key areas they wish to improve on and a plan to do so	Demonstrates a desire to improve nursing performance; reflects on and evaluates experiences; identifies strengths and weakness; could be more systematic in evaluating weakness. Identifies desire to improve and at least 1-2 key areas to improve on	Demonstrates awareness of the need for ongoing improvement and makes some effort to learn from experience and improve performance but tends to state the obvious and needs external evaluation. Only states obvious or generic areas to improve on	Appears uninterested in improving performance or unable to do so, rarely reflects; is uncritical of himself or herself or overly critical (given level of development); is unable to see flaws orneed for improvement. Unable to reflect on areas that need improvement

APPENDIX F

SIMULATION SCRIPT

Appendix F

Simulation Script

Kent State University Stark Nursing Simulation Scenario

Written Report Students will receive prior to Simulation

Eugene Ferdigo is a 67-year-old male who came to the ER with c/o increasing dyspnea with exertion and cough for past 3 days. In ER, he was given oxygen and had lab work drawn as well as a chest x-ray taken. The CXR showed COPD and possible Pneumonia in the left base. A sputum culture was sent. Vital signs have been stable, and he is alert and oriented x 3. He has an intravenous line of Normal Saline infusing at 75 mL/ hour that was started in ER in his left forearm. He is being admitted to the medical observation unit for tonight. He does have a harsh cough. He was weaned off oxygen in the ED and his breathing has improved. O2 saturations are in the mid 90's, His wife was here with him, but she went home and said she would be calling later to see how he is doing.

Physician Orders for Medical Unit (printed in Sim room on clipboard):

Diagnosis: Shortness of Breath R/O Pneumonia
Code Status: Full
Allergies: NKDA
Diet: Regular
IVF: NS @ 75 ml/hour
VS Q4hrs.
Cough and deep breathe with I.S. Q1hrs
Labs- CBC, BMP, PT/INR in AM
Consults: Medical mgmt., PCP or Hospitalist
Fall precautions
Meds:

- Oxygen nasal cannula 1-3L/min to keep SPO2 greater than 91%
- Hospitalist to order appropriate IV antibiotic to start tomorrow
- Obtain home medication list

Scenario Progression Outline/Script

Timing (Approx.)	Manikin Actions	Expected Actions & Interventions	Prompts, Questions, & Teaching Points	May Use the Following Cues
0-10 min PRE-BRIEF Group pre-briefing and patient report		Intro to SIM Equipment Setting, expectations All students take state/trait anxiety scales after pre-briefing Receive SIM and verbal report and doctor's orders in room for review	Safe learning environment Manikin capabilities, how to get vitals Verbalize findings out loud during sim, proficient communication with patient and family, how to call provider with in-room phone, share learning objectives of the simulation with students	Answer any student questions
Individual SIMs ASSESS-MENT 3-5min.	SPO2 LOW 87% on room air RR high 30 Lungs have crackles in left side Pt. coughing and lying flat, no oxygen on Pt. c/o Shortness of breath	Introduce self, wash hands, identify pt., builds rapport with questioning small talk and active listening Starts Assessment- Student will be instructed to type on the white board in room and document their respiratory assessment findings and then asked to circle the most important findings in the care of this patient.	Does student notice the call light on the floor, or the home inhaler and pack of cigarettes near the patient and communicate with patient about these? Does student answer pt. questions appropriately with good communication?	Cue: I feel like I can't breathe- Pt. is anxious- coughing freq. Patient asks: How are my lungs sounding? I wish I had my inhaler- where did I put it? Wish I could go out for a smoke right now.

INTERPRET & ACTION 3-5min.	I can't breathe- What is happening to me? Am I ok? Where is my wife?	Possible actions: 1. Sit HOB up 2. Apply O2 NC 3. Call provider 4. I.S. or CDB (exemplary only)	Does student apply O2 and watch SPO2 to see if increases? Does student call provider and communicate effectively? Does student notice I.S. and/or teach patient about breathing techniques, CDB or I.S.?	Cue: I can't breathe. What is happening to me? Where is my wife? Cue: What is that thing there? (I.S.)
5-10 min. Reflection	Reflection paper: Write at least 2 sentences to evaluate your own performance (consider strengths & weaknesses & decision points). Describe how you will grow from this experience?	Instructor to give brief summary of performance for formative feedback. Instructions on how to take final state/ trait anxiety scales	Student questions will be answered in bigger group debriefing with everyone.	

APPENDIX G

PERMISSIONS

Appendix G

Permissions

EXT: Re: tool permission request

Dr. Zsidó András Norbert <zsido.andras@pte.hu>
To Reed, Janet

Reply | Reply All | Forward | ...

Wed 6/30/2021 3:14 PM

If there are problems with how this message is displayed, click here to view it in a web browser.

Dear Janet,

Thank you for your letter and interest in STAI-5 once again. Yes, by all means, feel free to use it!

Best,
Andras

András Norbert ZSIDÓ, PhD
Assistant Professor
Institute of Psychology
University of Pécs
6, Ifjúság útja, Pécs, Hungary 7624
Tel: +36 30 121 7035

Principal Investigator: Visual Cognition and Emotion Lab
https://vicelab.btk.pte.hu/
https://www.researchgate.net/profile/Andras_Zsido

EXT: Re: permission to use LCJR

Kathie Lasater <lasaterk@ohsu.edu>
To Reed, Janet

Reply | Reply All | Forward | ...

Tue 7/20/2021 6:13 PM

Hi Janet,

Thank you for your interest in the Lasater Clinical Judgment Rubric (LCJR). You have my permission to use the tool for your project. I ask that you (1) cite it correctly, and (2) send me a paragraph or two to let me know a bit about your project when you've completed it, including how you used the LCJR. In this way, I can help guide others who may wish to use it. Please let me know if it would be helpful to have an electronic copy.

You should also be aware that the LCJR describes four aspects of the Tanner Model of Clinical Judgment—Noticing, Interpreting, Responding, and Reflecting—and as such, does not measure clinical judgment because clinical judgment involves much of what the individual student/nurse brings to the unique patient situation (see Tanner, 2006 article). We know there are many other factors that impact clinical judgment in the moment, many of which are impacted by the context of care and the needs of the particular patient.

The LCJR was designed as an instrument to describe the trajectory of students' clinical judgment development over the length of their program. The purposes were to offer a common language between learners, faculty, and preceptors in order to talk about learners' thinking and to serve as a help for offering formative guidance and feedback (See Lasater, 2007, 2011). For measurement purposes, the rubric appears to be most useful with multiple opportunities for clinical judgment vs. one point/patient in time.

Please let me know if I can be of help,

Kathie

REFERENCES

References

Abed, M., Hall, L., & Moser, D. (2011). Spielberger's state anxiety inventory: Development of a shortened version for critically ill patients. *Issues in Mental Health Nursing*, 32(4), 220–227. https://doi.org/10.3109/01612840.2010.546493.

Adamson, K. A. (2011*).* Assessing the reliability of simulation evaluation instruments used in nursing education: A test of concept study (Doctoral dissertation). Washington State University. Retrieved from https://eric.ed.gov/?id=ED530764

Adamson, K.A., & Kardong-Edgren, S. (2012). A method and resources for assessing the reliability of simulation evaluation instruments. *Nursing Education Perspectives*, 33(5):334-9.

Adamson, K.A., Gubrud, P., Sideras, S., & Lasater, K. (2012). Assessing the reliability, validity, and use of the Lasater clinical judgment rubric: Three approaches. *Journal of Nursing Education*, 51, 66-73. doi:10.3928/01484834-20111130-03

Aebersold, M. (2016). The history of simulation and its impact on the future. *AACN Advanced Critical Care*, *27*(1), 56–61. https://doi.org/10.4037/aacnacc2016436

Aebersold, M., & Dunbar, D. M. (2021). Virtual and augmented realities in nursing education: State of the science. *Annual Review of Nursing Research*, *39*(1), 225–242. https://doi.org/10.1891/0739-6686.39.225

Aebersold, M., & Tschannen, D. (2013) Simulation in nursing practice: The impact on patient care. *The Online Journal of Issues in Nursing*, 18 (2). Retrieved from http://ojin.nursingworld.org

Al Sabei, S.D., & Lasater, K. (2016). Simulation debriefing for clinical judgment development: A concept analysis. *Nurse Education Today*, 45:42-7. doi: 10.1016/j.nedt.2016.06.008.

Albaqawi, H. (2018). Achieving clinical judgment of nursing students through simulation: A quasi-experimental study. *American Journal of Nursing Research*, 6 (3), p. 113-116. doi: 10.12691/ajnr-6-3-5.

Al-Ghareeb A., & Cooper S.J. (2016). Barriers and enablers to the use of high-fidelity patient simulation manikins in nurse education: An integrative review. *Nurse Education Today*. 36:281-6. doi: 10.1016/j.nedt.2015.08.005.

Al-Ghareeb, A., Cooper, S., Mckenna, L. (2017). Anxiety and clinical performance in simulated setting in undergraduate health professional's education: An integrative review. *Clinical Simulation in Nursing*, 13, 478-491.

Aller, L. (2020). A contemporary model for undergraduate nursing education: A grounded theory study. *Nurse Educator*, 1–5. https://doi.org/10.1097/NNE.0000000000000933

Alpert, R., & Haber, R. N. (1960). Anxiety in academic achievement situations. *The Journal of Abnormal and Social Psychology*, 61(2), 207–215. https://doi.org/10.1037/h0045464

American Association of Colleges of Nursing. (2008). The essentials of baccalaureate education for professional nursing practice. Retrieved from https://www.aacnnursing.org/Portals/42/Publications/BaccEssentials08.pdf

American Association of Colleges of Nursing. (2019). Fact sheet: Enhancing diversity in the nursing workforce. Retrieved from https://www.aacnnursing.org/news-information/fact-sheets/enhancing-diversity

American Association of Colleges of Nursing. (2021). *The essentials: Core competencies for professional nursing education.* Retrieved from: https://www.aacnnursing.org/Education-Resources/AACN-Essentials

American College Health Association. (2018). *American College Health Association-National College Health Assessment II: Reference Group Executive Summary Spring 2018*. Silver Spring, MD: American College Health Association.

Ashcraft, A., & Opton, L. (2009). Evaluation of the Lasater Clinical Judgment Rubric. *Clinical Simulation in Nursing,* 5(3). https://doi.org/10.1016/j.ecns.2009.04.006

Ashcraft, A.S., Opton, L., Bridges, R.A., Caballero, S., Veesart, A., & Weaver, C. (2013). Simulation evaluation using a modified Lasater Clinical Judgment Rubric. *Nursing Education Perspectives*, 34, 122-126.

Ashley, J., & Stamp, K. (2014). Learning to think like a nurse: The development of clinical judgment in nursing students. *Journal of Nursing Education*, *53*(9), 519–525. https://doi.org/10.3928/01484834-20140821-14

Bambini, D., Washburn, J., & Perkins, R. (2009). Outcomes of clinical simulation for novice nursing students: Communication, confidence, clinical judgment. *Nursing Education Perspectives,* 30, 79-82.

Barber, S. (2016). *Structured Prebriefing Prior to Simulation.* (Electronic Thesis or Dissertation). Retrieved from https://etd.ohiolink.edu/

Barbagallo, M. S. (2021). Nursing students' perceptions and experiences of reflective practice: A qualitative meta-synthesis. *Teaching and Learning in Nursing*, *16*(1), 24–31. https://doi.org/10.1016/j.teln.2020.07.006

Bartlett, M. L., Taylor, H., & Nelson, J. D. (2016). Comparison of mental health characteristics and stress between baccalaureate nursing students and non-nursing students. *Journal of Nursing Education*, *55*(2), 87-90.

Bednarczuk, N. F., Bradshaw, J. M., Mian, S. Y., Papoutselou, E., Mahmoud, S., Ahn, K., Chudenkov, I., Fuentealba, C., Hussain, S., Castro, P., Bronstein, A. M., Kaski, D., & Arshad, Q. (2020). Pathophysiological dissociation of the interaction between time pressure and trait anxiety during spatial orientation judgments. *European Journal of Neuroscience*, 52(4), 3215–3222.

Beischel, K. (2013). Variables affecting learning in a simulation experience: A mixed methods study. *Western Journal of Nursing Research*, 35(2), 226-247.

Benner, P. (2020). Introducing a revolutionary solution to remake nursing education. *Institute for Teaching and Learning at Health Impact.* Retrieved from: https://healthimpact.org/benner-institute/

Berkow, S., Virkstis, K., Stewart, J., & Conway, L. (2008). Assessing new graduate nurse performance. *The Journal of Nursing Administration*, 38(11), 468–474. https://doi.org/10.1097/01.NNA.0000339477.50219.06

Bierman, K. L., Nix, R. L., Maples, J. J., & Murphy, S. A. (2006). Examining clinical judgment in an adaptive intervention design: The fast track program. *Journal of Consulting and Clinical Psychology*, *74*(3), 468-481. doi:10.1037/0022-006X.74.3.468

Blomberg, G., Sherin, M. G., Renkl, A., Glogger, I., & Seidel, T. (2014). Understanding video as a tool for teacher education: Investigating instructional strategies to promote reflection. *Instructional Science*, *42*(3), 443–463. https://doi.org/10.1007/s11251-013-9281-6

Blum, C. A., Borglund, S., & Parcells, D. (2010). High-fidelity nursing simulation: Impact on student self-confidence and clinical competence. *International Journal of Nursing Education Scholarship, 7*(1), 18. https:// doi.org/10.2202/1548-923X.2035

Brailsford, R., Catherwood, D., Tyson, P. J., & Edgar, G. (2014). Noticing spiders on the left: Evidence on attentional bias and spider fear in the inattentional blindness paradigm. *Laterality*, *19*(2), 201–218. https://doi.org/10.1080/1357650X.2013.791306

Brod, C. (1984). *Technostress: the human cost of the computer revolution*. Reading, MA: Addison-Wesley Publishing Company.

Burbach, B., Struwe, L, Young, L., & Cohen, M. (2019). Correlates of student performance during low stakes simulation. *Journal of Professional Nursing, 35*, 44-50.

Burbach, B. E., & Thompson, S. A. (2014). Cue recognition by undergraduate nursing students: An integrative review. *Journal of Nursing Education, 53*(9, Suppl), S73–S81. https://doi.org/10.3928/01484834- 20140806-07 PMID:25102133

Bussard, M. (2015). The nature of clinical judgment development in reflective journals. *Journal of Nursing Education, 54*(8), 451–454. https://doi. org/10.3928/01484834-20150717-05 PMID:26230165

Bussard, M. (2018). Evaluation of clinical judgment in prelicensure nursing students. *Nurse Educator*, 43 (2), 106-108. doi: 10.1097/NNE.0000000000000432

Cant, R., Cooper, S., Sussex, R., & Bogossian, F. (2019). What's in a name? Clarifying the nomenclature of virtual simulation. *Clinical Simulation in Nursing*, *27*, 26–30. https://doi.org/10.1016/j.ecns.2018.11.003

Cantrell, M. L., Meyer, S. L., & Mosack, V. (2017). Effects of simulation on nursing student stress: An integrative review. *Journal of Nursing Education*, *56*(3), 139–144. https://doi.org/10.3928/01484834-20170222-04

Cason, M., & Reibel, M. (2021). Progressive application of the Lasater Clinical Judgment Rubric in an accelerated undergraduate program. *Nursing Education Perspectives*, 42 (4), 252-254. doi: 10.1097/01.NEP.0000000000000612

Cato, M. (2013). Nursing student anxiety in simulation settings: A mixed methods study. Dissertations and Theses. Portland State University. 10.15760/etd.1035

Centers for Disease Control (CDC). (2021). Mental disorders. Retrieved from https://www.cdc.gov/nchs/fastats/mental-health.htm

Chen, F. Q., Leng, Y. F., Ge, J. F., Wang, D. W., Li, C., Chen, B., & Sun, Z. L. (2020). Effectiveness of virtual reality in nursing education: Meta-analysis. *Journal of Medical Internet Research*, *22*(9), 1–12. https://doi.org/10.2196/18290

Cherry, K. (2020). How the attentional bias influences the decisions we make. *Cognitive Psychology: Very Well Mind.* Retrieved from https://www.verywellmind.com/what-is-an-attentional-bias-2795027

Chlan, L., Savik, K., & Weinert, C. (2003). Development of a shortened State Anxiety Scale from the Spielberger State-Trait Anxiety Inventory (STAI) for patients receiving mechanical ventilatory support. *Journal of Nursing Measurement, 11*(3), 283–293.

Chmil, J. V., Turk, M., Adamson, K., & Larew, C. (2015). Effects of an experiential learning simulation design on clinical nursing judgment development. *Nurse Educator*, *40*(5), 228–232. https://doi.org/10.1097/NNE.0000000000000159

Cipher, D.J., LeFlore, J.L., Urban, R.W., & Mancini, M.E. (2021). Variability of clinical hours in prelicensure nursing programs: Time for a reevaluation? *Teaching and Learning in Nursing*, 16 (1), 43-47. https://doi.org/10.1016/j.teln.2020.05.005.

Cobbett, S. & Snelgrove-Clarke, E. (2016). Virtual versus face-to-face clinical simulation in relation to student knowledge, anxiety, and self-confidence in maternal-newborn nursing: A randomized controlled trial. *Nursing Education Today*, 45, 179-184.

Cook D, & Triola M. (2009). Virtual patients: A critical literature review and proposed next steps. *Med Educ*, 43(4):303–311.

Coram, C. (2016). Expert role modeling effect on novice nursing students' clinical judgment. *Clinical Simulation in Nursing, 12*(9), 3850391. https://doi.org/10.1016/j.ecns.2016.04.009

Crocker, L. M., & Algina, J. (1986). *Introduction to classical and modern test theory*. New York: Holt, Rinehart, and Winston.

Daley, B. J., Beman, S. B., Morgan, S., Kennedy, L., & Sheriff, M. (2017). Concept maps: A tool to prepare for high fidelity simulation in nursing. *Journal of the Scholarship of Teaching and Learning*, *17*(4), 17–30. https://doi.org/10.14434/josotl.v17i4.21668

del Bueno, D. (2005). A crisis in critical thinking, *Nursing Education Perspectives, 26*(5), 278–282. Retrieved from: https://pubmed.ncbi.nlm.nih.gov/16295306/

Dickison, P., Haerling, K. & Lasater, K. (2019). Integrating the National Council State Boards of Nursing-Clinical Judgment Model (NCSBN-CJM) into nursing educational frameworks. *Journal of Nursing Education* 58(2), 72-8.

Dickison, P., Haerling, K. A., & Lasater, K. (2020). NCBSN Clinical Judgment Measurement Model clarification. *Journal of Nursing Education*, *59*(7), 365.

Dillard, N., Sideras, S., Ryan, M., Hodson, K. C., Lasater, K., & Siktberg, L. (2009). A collaborative project to apply and evaluate the clinical judgment model through simulation. *Nursing education perspectives*, 30(2), 99-104.

Dodson, T. M., & Ferdig, R. E. (2021). Understanding nursing student choice in completion of presimulation activities. *Clinical Simulation in Nursing*, 1–9. https://doi.org/10.1016/j.ecns.2021.05.007

Dolan, H., Amidon, B., & Gephart, S. (2021). Evidentiary and theoretical foundations for virtual simulation in nursing education. *Journal of Professional Nursing*, 37(5), 810-815. https://doi.org/10.1016/j.profnurs.2021.06.001

Dunn, K. E., Osborne, C., & Link, H. J. (2014). High-fidelity simulation and nursing student self-efficacy: Does training help the little engines know they can? *Nursing Education Perspectives*, 35(6): 403–404. doi:10.5480/12-1041.1

Elfrink, V., Nininger, J., Rohig, L., & Lee, J. (2009). The case for group planning in human patient simulation. *Nursing Education Perspectives*, 30(12), 83-86.

Espinosa-Rivera, B.P., Morán-Peña, L., García-Piña, M.A., González-Ramírez, P., & López-Ruíz, C.M. (2019). Self-confidence and anxiety as intervening factors in clinical decision-making in newly nursing bachelor graduates. *American Journal of Nursing Science*, 8 (2), 59-67. doi: 10.11648/j.ajns.20190802.14

Etheridge, S.A. (2007). Learning to think like a nurse: Stories from new nurse graduates. *Journal of Continuing Education in Nursing,* 38:24-30

Everett-Thomas, R., Joseph, L., & Trujillo, G. (2021). Using virtual simulation and electronic health records to assess student nurses' documentation and critical thinking skills. *Nurse Education Today,* 99(1), 1-6. https://doi.org/10.1016/j.nedt.2021.104770

Fawaz, M. A., & Hamdan-Mansour, A. M. (2016). Impact of high-fidelity simulation on the development of clinical judgment and motivation among Lebanese nursing students. *Nurse Education Today*, 46, 36–42. https://doi.org/10.1016/j.nedt.2016.08.026 PMID:27591378

Fedko, A., & Dreifuerst, K. (2017). Examining the relationship between clinical judgement and nursing actions in prelicensure students. *Nurse Educator, 42,* 1, 47-50.

Fenske, C.L., Harris, M.A., Aebersold, M.L., & Hartman, L.S. (2013). Perception versus reality: A comparative study of the clinical judgment skills of nurses during a simulated activity. *Journal of Continuing Education in Nursing*. 44(9), 399-405. https://doi.org/10.3928/00220124-20130701-67

Ferdig, R. E., & Kosko, K. W. (2020). Implementing 360 video to increase immersion, perceptual capacity, and teacher noticing. *TechTrends*, 64, 849-859.

Field, A. (2013). Discovering statistics using IBM SPSS Statistics. 4th Edition. Sage Publications. IBSN: 978-1-4462-4918-5

Fogg, N., Kubin, L., Wilson, C. E., & Trinka, M. (2020). Using virtual simulation to develop clinical judgment in undergraduate nursing students. *Clinical Simulation in Nursing*, *48*, 55–58. https://doi.org/10.1016/j.ecns.2020.08.010

Foronda, C., Fernandez-Burgos, M., Nadeau, C. et al. (2020). Virtual simulation in nursing education: A systematic review spanning 1996 to 2018. *Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare*, 15, 46-54. https://doi.org/10.1097/SIH.0000000000000411

Frost, J., Delaney, L. & Fitzgerald, R. (2020). Exploring the application of mixed reality in nurse education. *BMJ Simulation and Technology Enhanced Learning*, 6(4), pp. 214-219.

Gaba, D. M. (2004). The future vision of simulation in health care. *Quality & Safety in Health Care*, 13 Suppl 1, i2-10. doi: 10.1136/qhc.13.suppl%5F1.i2

Gantt, L. T. (2013). The effect of preparation on anxiety and performance in summative simulations. *Clinical Simulation in Nursing*, *9*(1), e25–e33. https://doi.org/10.1016/j.ecns.2011.07.004

George, T. P., DeCristofaro, C., & Murphy, P. F. (2020). Self-efficacy and concerns of nursing students regarding clinical experiences. *Nurse Education Today, 90,* 104401. https://doi.org/10.1016/j.nedt.2020.104401

Gordon, M., Murphy, C. P., Candee, D., & Hiltunen, E. (1994). Clinical judgment: An integrated model. *Advances in Nursing Science*, 16(4), 55-70.

Gore, T., Hunt, C. W., Parker, F., & Raines, K. H. (2011). The effects of simulated clinical experiences on anxiety: Nursing students' perspectives. *Clinical Simulation in Nursing*, *7*(5). https://doi.org/10.1016/j.ecns.2010.02.001

Gosselin, K, Holland, B., Mulcahy, A., Williamson, S. & Widacki, A. (2016). Music for anxiety reduction and performance enhancement in nursing simulation. *Clinical Simulation in Nursing, 12,* 16-23.

Graur, S., & Siegle, G. (2013). Pupillary motility: bringing neuroscience to the psychiatry clinic of the future. *Current neurology and neuroscience reports*, *13*(8), 365. https://doi.org/10.1007/s11910-013-0365-0

Green, A. A., & Kinchen, E. V. (2021). The effects of mindfulness meditation on stress and burnout in nurses. *Journal of Holistic Nursing*, *39*(4), 356–368. https://doi-org.proxy.library.kent.edu/10.1177/08980101211015818

Gu, Y., Zou, Z., & Chen, X. (2017). The effects of vSIM for Nursing™ as a teaching strategy on fundamentals of nursing education in undergraduates. *Clinical Simulation in Nursing*, *13*(4), 194–197. https://doi.org/10.1016/j.ecns.2017.01.005

Haerling, K. (2018). Cost-utility analysis of virtual and mannequin-based simulation. *Simulation in Healthcare,* 13 (1), p. 33-40. doi: 10.1097/SIH.0000000000000280

Hahs-Vaughn, D. L. & Lomax, R. G. (2020). An introduction to statistical concepts (4th ed.). Routledge. ISBN: 978-1138650558

Hayden, J., Keegan, M., Kardong-Edgren, S., & Smiley, R. A. (2014a). Reliability and validity testing of the Creighton competency evaluation instrument for use in the NCSBN national simulation study. *Nursing Education Perspectives*, *35*(4), 244–252. https://doi.org/10.5480/13-1130.1

Hayden, J. K., Smiley, R., Alexander, M., Edgren, S, & Jeffries, P. (2014b). The NCSBN National Simulation Study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation*, 5(2), S3–S40. https://doi.org/10.1016/S2155-8256(15)30062-4

Hickerson, K.A., Taylor, L.A., & Terhaar, M.F. (2016). The preparation-practice gap: An integrative literature review. *Journal of Continuing Education in Nursing*, 47:17-23.

Hinkle, D. E., Wiersma, W., & Jurs, S. J. (2002). *Applied statistics for the behavioral sciences* (5th ed.). Boston, MA: Houghton Mifflin. ISBN: 0-618-12405-5

Holland, B., Gosselin, K., & Mulcahy, A. (2017). The effect of autogenic training on self-efficacy, anxiety, and performance on nursing student simulation. *Nursing Education Perspectives*, 38(2), 87-89. doi: 10.1097/01.NEP.0000000000000110

Hollenbach, P.M. (2016). Simulation and its effect on anxiety in baccalaureate nursing students. *Nursing Education Perspectives*, 37 (1), 45-47, doi: 10.5480/13-1279

Hopkins, T. H. (2008). Early identification of at-risk nursing students. *Journal of Nursing Education,* 47 (6), 254-259.

Huston, C. L., Phillips, B., Jeffries, P., Todero, C., Rich, J., Knecht, P., Sommer, S. & Lewis, M.P. (2018). The academic-practice gap: Strategies for an enduring problem. *Nursing forum*, 53 (1), 27-34.

Ignacio, J., Dolmans, D., Scherpbier, A., Rethans, J. J., Chan, S., & Liaw, S. Y. (2015). Comparison of standardized patients with high-fidelity simulators for managing stress and improving performance in clinical deterioration: A mixed methods study. *Nurse Education Today*, *35*(12), 1161–1168. https://doi.org/10.1016/j.nedt.2015.05.009

Ignacio, J., Dolmans, D., Scherpbier, A., Rethans, J., Lopez, V., & Liaw, S. (2016). Development, implementation, and evaluation of a mental rehearsal strategy to improve clinical performance and reduce stress: A mixed methods study. *Nursing Education Today*, 37, 27-32.

Ignacio, J., Scherpbier, A., Dolmans, D., Rethans, J., & Liaw, S. (2017). Mental rehearsal strategy for stress management and performance in simulations. *Clinical Simulation in Nursing*, 13, 295-302.

International Nursing Association for Clinical Simulation and Learning (INACSL). (n.d.). About: history. https://www.inacsl.org/about/history

International Nursing Association for Clinical Simulation and Learning (INACSL) Simulation Regulations Committee. (June 2020). INACSL Simulation Regulation Map. Retrieved from https://www.inacsl.org/simulation-regulations

International Nursing Association for Clinical Simulation and Learning (INACSL). Standards Committee. (2016). INACSL standards of best practice: Simulation design. *Clinical Simulation in Nursing*, 12(S), S5–S12. https://doi.org/10.1016/j.ecns.2016.09.005.

Institute of Medicine (IOM). (2010). *The future of nursing: Leading change, advancing health*. Washington, DC: The National Academies Press.

Jack, K., & Smith, A. (2007). Promoting self-awareness in nurses to improve nursing practice. *Nursing standard*, *21*(32).

Jeffries, P.R. (2005). A framework for designing, implementing, and evaluating simulations used as teaching strategies in nursing. *Nursing Education Perspectives*, 26(2), 96-103.

Jeffries, P.R. (Ed.) (2016). The NLN Jeffries Simulation Theory. Philadelphia: Wolters Kluwer.

Jenkins, H. (1985). A research tool for measuring perceptions of clinical decision making. *Journal of Professional Nursing*, 1(4), 221-229. doi: 10.1016/s8755-7223(85)80159-9

Jensen, R. S. (2010). Evaluating clinical judgment in a nursing capstone course. Presented at 2010 Assessment Institute, Indianapolis, IN. Retrieved from https://planning.iupui.edu/assessment/institute-files/2010-institute/monday-2010/jensen.pdf

Johnson, E. A., Lasater, K., Hodson-Carlton, K., Siktberg, L., Sideras, S., & Dillard, N. (2012). Geriatrics in simulation: Role modeling and clinical judgment effect. *Nursing Education Perspectives*, 33(3), 176–180. https://doi.org/10.5480/1536-5026-33.3.176 PMID:22860481

Kachaturoff, M., Caboral-Stevens, M., Gee, M., & Lan, V. M. (2020). Effects of peer-mentoring on stress and anxiety levels of undergraduate nursing students: An integrative review. *Journal of Professional Nursing*, 36(4), 223–228. https://doi.org/10.1016/j.profnurs.2019.12.007.

Kalisch, B.J., Landstrom, M.S., & Williams, R.A. (2009). Missed nursing care: Errors of omission. *Nursing Outlook* 57(1): 3-9 doi: 10.1016/j.outlook.2008.05.007

Kameg, K. M., Szpak, J. L., Cline, T. W., & Mcdermott, D. S. (2014). Utilization of standardized patients to decrease nursing student anxiety. *Clinical Simulation in Nursing*, *10*(11), 567–573. https://doi.org/10.1016/j.ecns.2014.09.006

Kang, S. J., & Min, H. Y. (2019). Psychological safety in nursing simulation. *Nurse Educator*, *44*(2), E6–E9. https://doi.org/10.1097/NNE.0000000000000571

Kardong-Edgren, S., Farra, S. L., Alinier, G., & Young, H. M. (2019). A call to unify definitions of virtual reality. *Clinical Simulation in Nursing*, *31*, 28–34. https://doi.org/10.1016/j.ecns.2019.02.006

Kavanagh, J.M., & Sharpnack, P.A. (January 31, 2021). Crisis in competency: A defining moment in nursing education. *The Online Journal of Issues in Nursing*, 26, 1. DOI: 10.3912/OJIN.Vol26No01Man02

Kavanagh, J. M., & Szweda, C. (2017). A crisis in competency: The strategic and ethical imperative to assessing new graduate nurses' clinical reasoning. *Nursing Education Perspectives*, 38(2), 57–62. https://doi.org/10.1097/01.NEP.0000000000000112

Kelly, M., Lapkin, S., McGrath, B., Holloway, K., Nielsen, A., Stoyles, S., Campbell, M., Dieckmann, N., & Lasater, K. (2020). A blended learning activity to model clinical judgment in practice: A multi-site evaluation. *Clinical Simulation in Nursing*, 43, 10-16. https://doi.org/10.1016/j.ecns.2020.03.006

Kenny, L. A. T., Gaston, T., Powers, K., & Isaac-Dockery, A. (2020). Anxiety in nursing students: The impact of using mobile technology with quick response codes. *Nurse Education Today*, *89*(October 2019), 104382. https://doi.org/10.1016/j.nedt.2020.104382

Kim, J., Park, J. H., & Shin, S. (2016). Effectiveness of simulation-based nursing education depending on fidelity: A meta-analysis. *BMC Medical Education*, 16(1), 152. 10.1186/s12909-016-0672-7

Kim, H., Ryu, S., Jang, K. (2019). Effect of structured pre-simulation preparation and briefing on student's self-confidence, clinical judgement, and clinical decision-making in simulation. *Contemporary Nurse, 55,* 4-5, 317-420.

Klenke-Borgmann, L., Cantrell, M, Mariani, B. (2020). Nurse Educators' guide to clinical judgment: A review of the conceptualization, measurement, and development. *Nursing Education Perspectives*, 41, 4.

Kolb, D. A. (1984). *Experiential learning: Experience as the Source of Learning and Development.* Upper Saddle River, NJ: Prentice-Hall.

Kononowicz, A. A., Woodham, L. A., Edelbring, S., Stathakarou, N., Davies, D., Saxena, N., Tutor Car, L., Carlstedt-Duke, J., Car, J. & Zary, N. (2019). Virtual patient simulations in health professions education: Systematic review and meta-analysis by the digital health education collaboration. *Journal of Medical Internet Research*, *21*(7), 1–20. https://doi.org/10.2196/14676

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155–163. https://doi.org/10.1016/j.jcm.2016.02.012

Kosko, K. W., Ferdig, R. E., & Zolfaghari, M. (2021). Preservice teachers' professional noticing when viewing standard and 360 video. *Journal of Teacher Education*, 73 (3), 284-297. https://doi.org/10.1177/0022487120939544

Kubin, L., & Wilson, C. E. (2017). Effects of community volunteer children on student pediatric assessment behaviors. *Clinical Simulation in Nursing*, 13(7), 303–308. https://doi.org/10.1016/j.ecns.2017.04.011

Kucirka, B. G. (2017). Navigating the faculty–student relationship: Interacting with nursing students with mental health issues. *Journal of the American Psychiatric Nurses Association*, *23*(6), 393–403. https://doi.org/10.1177/1078390317705451

Lasater, K. (2007). Clinical judgment development: Using simulation to create an assessment rubric. *Journal of Nursing Education*, *46*, 496-503.

Lasater, K. (2011). Clinical judgment: The last frontier for evaluation. *Nurse Education in Practice*, 11, 86-92. https://doi.org/10.1016/j.nepr.2010.11.013

Lasater, K., Holloway, K., Lapkin, S., Kelly, M., McGrath, B., Nielsen, A., Stoyles, S., Dieckmann, N., & Campbell, M. (2019). Do pre-licensure nursing students' backgrounds impact what they notice and interpret about patients? *Nurse Education Today, 78*, 37–43. https://doi.org/10.1016/j.nedt.2019.03.013

Lasater, K., Johnson, E, Ravert, P., & Rink, D. (2014). Role modeling clinical judgment for an unfolding older adult simulation. *Journal of Nursing Education,* 53, 257-264.

Lasater, K. & Nielsen, A. (2009). Reflective journaling for clinical judgment development and evaluation. *Journal of Nursing Education*, 48, 1, 40-44.

Lasater, K., Nielsen, A., Stock, M., Ostrogorsky, T. (2015). Evaluating clinical judgment of newly hired staff nurses. *Journal of Continuing Education in Nursing*, 46 (12), 563–571. https://doi.org/10.3928/00220124-20151112-09.

Lawrence, K., Messias, D. K. H., & Cason, M. L. (2018). The influence of simulation experiences on new nurses' clinical judgment. *Clinical Simulation in Nursing*, 25, 22-27. 10.1016/j.ecns.2018.10.008

Lee, H. L., Liu, P. C., Hsieh, M. C., Chao, A. S., Chiu, Y. W., & Weng, Y. H. (2019). Comparison of high-fidelity simulation and lecture to improve the management of fetal heart rate monitoring. *Journal of Continuing Education in Nursing*, *50*(12), 557–562. https://doi.org/10.3928/00220124-20191115-07

Lee, K. C. (2021). The Lasater clinical judgment rubric: Implications for evaluating teaching effectiveness. *Journal of Nursing Education*, *60*(2), 67–73. https://doi.org/10.3928/01484834-20210120-03

Lopez, V., Yobas, P., Chow, Y. L., & Shorey, S. (2018). Does building resilience in undergraduate nursing students happen through clinical placements? A qualitative study. *Nurse Education Today*, 67, (April), 1–5. https://doi.org/10.1016/j.nedt.2018.04.020

Lopreiato, J. O. (2016). *Healthcare Simulation Dictionary*. Rockville, MD: Agency for Healthcare Research and Quality.

MacKusick, C. I., & Minick, P. (2010). Why are nurses leaving? Findings from an initial qualitative study on nursing attrition. *Medsurg Nursing*, 19(6).

Macy, R., & Schrader, V. (2008, October). Pediophobia: a new challenge facing nursing faculty in clinical teaching by simulation. *Clinical Simulation in Nursing*, 4(3). https://doi.org/10.1016/j.ecns.2008.07.001

Manetti, W. (2019). Sound clinical judgment in nursing: A concept analysis. *Nursing Forum,* 54(1), 102-110. DOI: 10.1111/nuf.12303

Mariani, B., & Doolen, J. (2016). Nursing simulation research: What are the perceived gaps? *Clinical Simulation in Nursing*, 12(1), 30-36. https://doi.org/10.1016/j.ecns.2015.11.004.

Marteau, T., & Bekker, H. (1992). The development of a six-item short-form of the state scale of the Spielberger State—Trait Anxiety Inventory (STAI). *British Journal of Clinical Psychology, 31*(3), 301–306. https://doi.org/10.1111/j.2044-8260.1992. tb00997

Mason, J. (2002). *Researching Your Own Practice: The Discipline of Noticing.* Routledge, London

Megel, M. E., Black, J., Clark, L., Carstens, P., Jenkins, L. D., Promes, J., & Goodman, T. (2012). Effect of high-fidelity simulation on pediatric nursing students' anxiety. *Clinical Simulation in Nursing*, *8*(9), 46–47. https://doi.org/10.1016/j.ecns.2011.03.006

Mills, B., Carter, O., Rudd, C., Claxton, L., & O'Brien, R. (2016). An experimental investigation into the extent social evaluation anxiety impairs performance in simulation-based learning environments amongst final-year undergraduate nursing students. *Nursing Education Today,* 45, 9-15.

Mitchell, K. M., Chorney, M. A., Gural, D. M., Simmons-Swinden, J. M., Picheca, L., & Baxter, C. E. (2019). Social and academic integration strategies for retention of nursing students: A scoping review protocol. *JBI Database of Systematic Reviews and Implementation Reports*, *17*(1), 28–36. https://doi.org/10.11124/JBISRIR-2017-003745

Moscaritolo, L. (2009). Interventional strategies to decrease nursing student anxiety in the clinical learning environment. *Journal of Nursing Education*, 48(1), 17-23. doi:10.3928/01484834-20090101-08

Mulli, J., Nowell, L., & Lind, C. (2021). Reflection-in-action during high-fidelity simulation: A concept analysis. *Nurse Education Today*, *97*(August 2020), 104709. https://doi.org/10.1016/j.nedt.2020.104709

Najjar, R. H., Lyman, B., & Miehl, N. (2015). Nursing students' experiences with high-fidelity simulation. *International Journal of Nursing Education Scholarship*, *12*(1), 1–9. https://doi.org/10.1515/ijnes-2015-0010

National Council State Boards of Nursing (NCSBN). (2018). Next generation NCLEX news. Retrieved from https://www.ncsbn.org/NCLEX_Next_Winter18_Eng_05.pdf

Nehring, W. M., & Lashley, F. R. (2009). Nursing simulation: A review of the past 40 years. *Simulation and Gaming*, 40(4), 528–552. https://doi.org/10.1177/1046878109332282

Nicholas, C., & Sanko, J. S. (2020). Human Simulation in Nursing Education. *Annual Review of Nursing Research*, 39(1), 53–79. https://doi.org/10.1891/0739-6686.39.53

Nielsen, A., Lasater, K., Stock, M. (2016). A framework to support preceptors' evaluation and development of new nurse' clinical judgment. *Nurse Education in Practice, 19,* 84-90.

Nielsen, A., Stragnell, S., Jester, P. (2007). Guide for reflection using the clinical judgment model. *Journal of Nursing Education,46,* 11, 513-516.

Nielson, B. & Harder, N. (2013). Causes of student anxiety during simulation: What the literature says. *Clinical Simulation in Nursing*, 9, e507-e512.

Norman, G., & Streiner, D. (2008). *Biostatistics: The Bare Essentials*. Shelton, CT: People's Medical Publishing House.

Nunez, K. (2020). Fight, flight, freeze: What this response means. Retrieved from https://www.healthline.com/health/mental-health/fight-flight-freeze

Omar, N.A., Nazri, M.A., Ali, M.H., & Alam, S.S. (2021). The panic buying behavior of consumers during the COVID-19 pandemic: Examining the influences of uncertainty, perceptions of severity, perceptions of scarcity, and anxiety. *Journal of Retailing and Consumer Services*, 62, 102600. https://doi.org/10.1016/j.jretconser.2021.102600

Ormrod, J. (2020). *Human Learning*. (8^{th} ed). Upper Saddle River, NJ: Pearson.

Owen, H. (2016). *Simulation in Healthcare Education*. Cham: Springer International Publishing.

Palethorpe, R., & Wilson, J. (2011). Learning in the panic zone: Strategies for managing learner anxiety. *Journal of European Industrial Training*, 35(5), 420-438.

Pfeifer, B. L. E., & Vessey, J. A. (2019). On the healthcare team. *Nursing Management*, (August), 32–38.

Plotzky, C., Lindwedel, U., Sorber, M., Loessl, B., König, P., Kunze, C., … Meng, M. (2021). Virtual reality simulations in nurse education: A systematic mapping review. *Nurse Education Today*, 104868. https://doi.org/10.1016/j.nedt.2021.104868

Razieh, S., Somayeh, G., Fariba, H. (2018). Effects of reflection on clinical decision-making of intensive care unit nurses. *Nurse Education Today*, 66, 10-14.

Reed, J. M. (2020). Gaming in Nursing Education: Recent Trends and Future Paths. *Journal of Nursing Education*, *59*(7), 375–381. https://doi.org/10.3928/01484834-20200617-04

Reed, J. M., & Ferdig, R. E. (2021). Gaming and anxiety in the nursing simulation lab: A pilot study of an escape room. Journal of Professional Nursing, 37(2), 298–305. https://doi.org/10.1016/j.profnurs.2021.01.006

Regan-Kubinski, M. J. (1991). A model of clinical judgment processes in psychiatric nursing. *Archives of Psychiatric Nursing*, 5(5), 262-270. doi:10.1016/0883-9417(91)90024-Y

Riskind, J. H., & Calvete, E. (2020). Anxiety and the dynamic self as defined by the prospection and mental simulation of looming future threats. *Journal of Personality*, 88(1), 31–44. https://doi.org/10.1111/jopy.12465

Rogers, B.A., & Franklin, A.E. (2021). Cognitive load experienced by nurses in simulation-based learning experiences: An integrative review. *Nurse Education Today*. 99:104815. DOI: 10.1016/j.nedt.2021.104815.

Rodebaugh, T. L., Woods, C. M., & Heimberg, R. G. (2007). The reverse of social anxiety is not always the opposite: The reverse-scored items of the Social Interaction Anxiety Scale do not belong. *Behavior Therapy*, 38(2), 192-206.

Rooney, D., & Boud, D. (2019). Toward a pedagogy for professional noticing: Learning through observation. *Vocations and Learning*, *12*(3), 441–457. https://doi.org/10.1007/s12186-019-09222-3

Rosen, K. R. (2008). The history of medical simulation. *Journal of Critical Care*, *23*(2), 157–166. https://doi.org/10.1016/j.jcrc.2007.12.004

Rosenthal, D. A. (2004). Effects of client race on clinical judgment of practicing European American vocational rehabilitation counselors. *Rehabilitation Counseling Bulletin*, *47*(3), 131-141. doi:10.1177/00343552040470030201

Ross, J. G., & Carney, H. (2017). The effect of formative capstone simulation scenarios on novice nursing students' anxiety and self-confidence related to initial clinical practicum. *Clinical Simulation in Nursing*, 13(3), 116-120. http://dx.doi.org/10.1016/j.ecns.2016.11.001.

Rourke, S. (2020). How does virtual reality simulation compare to simulated practice in the acquisition of clinical psychomotor skills for pre-registration student nurses? A systematic review. *International Journal of Nursing Studies*, 102, 103466. https://doi.org/10.1016/j.ijnurstu.2019.103466

Saintsing, D., Gibson, L., & Pennington, A.W. (2011). The novice nurse and clinical decision-making: How to avoid errors. *Journal of Nursing Management*, 19(3), 354-359.

Sarason, I. G., Pierce, G. R., & Sarason, B. R. (Eds.). (1996). *Cognitive interference: Theories, methods, and findings*. Lawrence Erlbaum Associates, Inc.

Saviola, F., Pappaianni, E., Monti, A. et al. (2020). Trait and state anxiety are mapped differently in the human brain. Sci Rep 10, 11112. https://doi.org/10.1038/s41598-020-68008-z

Selye, H. (1985). *Stress Without Distress*. J.B. Lippincott, Philadelphia.

Shaffer, F. A., & Curtin, L. (2020). What can employers do to increase nurse retention? *American Nurse Journal*, *15*(8), 57–59. Retrieved from https://www.myamericannurse.com/wp-content/uploads/2020/08/an8-Turnover-728.pdf

Shearer, J.E. (2013). High-fidelity simulation and safety: An integrative review. *Journal of Nursing Education*, *52*(1), 39–45. http://dx.doi.org/10.3928/01484834-20121121-01

Shearer, J.N. (2016). Anxiety, nursing students, and simulation: State of the science. *Journal of Nursing Education*, 55(10), 551-554. https://doi.org/10.3928/01484834-20160914-02

Shelestak, D. S., Meyers, T. W., Jarzembak, J. M., & Bradley, E. (2015). A process to assess clinical decision-making during human patient simulation: A pilot study. *Nursing Education Perspectives*, *36*(3), 185–187. https://doi.org/10.5480/13-1107.1

Sherwood, G. D., & Horton-Deutsch, S. (2017). *Reflective practice: Transforming education and improving outcomes.* 2nd edition*,* Indianapolis, IN: Sigma Theta Tau International.

Shinnick, M. A., & Cabrera-Mino, C. (2021). Predictors of nursing clinical judgment in simulation. *Nursing Education Perspectives*, *42*(2), 107–109. https://doi.org/10.1097/01.NEP.0000000000000604

Shioiri, T., Kuwabara, H., Abe, R., Iijima, A., Kojima-Maruyama, M., Kitamura, H., Bando, T., & Someya, T. (2006). Lack of a relationship between the pupillary light reflex response and state/trait anxiety in remitted patients with panic disorder. *Journal of Affective Disorders*, 95(1-3), 159–164. https://doi.org/10.1016/j.jad.2006.04.031

Shukman, H. (2017). The most stressed out majors in the nation. *The Tab*. Retrieved from https://thetab.com/us/2017/03/08/most-stressful-major-62217

Simonton, D. (2021). From simulation anxiety to COVID-19 anxiety: The perceptions of pre licensure nursing students to utilizing brief mindfulness interventions as a coping mechanism (Doctoral dissertation). https://summit.plymouth.edu/handle/20.500.12774/429

Smith, R. (2010). The long history of gaming in military training. *Simulation & Gaming*, 41(1), 6-19. https://doi.org/10.1177/1046878109334330

Smith, T., Hogewood, C., Etheridge, S., Britt, S., & Vance, D. (2019). Anxiety of active and passive role groups in clinical simulation: A pilot study. *Nursing Education Perspectives*, 40 (1), 46-47. doi: 10.1097/01.NEP.0000000000000325

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *Manual for the State-Trait Anxiety Inventory*. Polo Alto, CA: Consulting Psychologists Press.

Spielberger, C.D., Gorsuch, R.L., Lushene, R.D., Vagg, P.R., & Jacobs, G.A., (1983). Manual for the state-trait anxiety inventory for adults manual, instrument and scoring key. Retrieved from. www.mindgarden.com.

Sun, F. K., Long, A., Tseng, Y. S., Huang, H. M., You, J. H., & Chiang, C. Y. (2016). Undergraduate student nurses' lived experiences of anxiety during their first clinical practicum: A phenomenological study. *Nurse Education Today*, *37*, 21–26. https://doi.org/10.1016/j.nedt.2015.11.001

Sun, H., Wang, S., Wang, W., Han, G., Liu, Z., Wu, Q., & Pang, X. (2021). Correlation between emotional intelligence and negative emotions of front-line nurses during the COVID-19 epidemic: A cross-sectional study. *Journal of Clinical Nursing*, *30*(3–4), 385–396. https://doi.org/10.1111/jocn.15548

Tang, F.I., Sheu, S.J., Yu, S., Wei, I.L., & Chen, C.H. (2007). Nurses relate the contributing factors involved in medication errors. *Journal of Clinical Nursing*, 16(3):447-57. https://doi.org/10.1111/j.1365-2702.2005.01540.x

Tanner, C. (2006). Thinking like a nurse: a research-based model of clinical judgment. *Journal of Nursing Education*, 45(6), 204-211.

Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. *Perioperative Nursing*, 7(3), 155–163. doi:10.5281/zenodo.2552022

Thomas, C. L., & Cassady, J. C. (2021). Validation of the state version of the State-Trait Anxiety Inventory in a university sample. *SAGE Open*. https://doi.org/10.1177/21582440211031900

Tluczek, A., Henriques, J. B., & Brown, R. L. (2009). Support for the reliability and validity of a six-item state anxiety scale derived from the state-trait anxiety inventory. *Journal of Nursing Measurement, 17*(1), 19–28. https://doi.org/10.1891/ 1061-3749.17.1.19.

Todd, M., Hawkins, K., Hercinger, M., Manz, J., & Tracy, M. (2015). Competency evaluation instrument. Retrieved from https://nursing.creighton.edu/academics/competency-evaluation-instrument

Todd, M., Manz, J. A., Hawkins, K. S., Parsons, M. E., & Hercinger, M. (2008). The development of a quantitative evaluation tool for simulations in nursing education. *International Journal of Nursing Education Scholarship,* 5(1). https://doi.org/10.2202/1548-923X.1705

Turner, K., & McCarthy, V. (2017). Stress and anxiety among nursing students: A review of intervention strategies in literature between 2009 and 2015. *Nursing Education in Practice*, 22, 22-29. https://doi.org/10.1016/j.nepr.2016.11.002

Verkuyl, M., & Hughes, M. (2019). Virtual Gaming Simulation in Nursing Education: A Mixed-Methods Study. *Clinical Simulation in Nursing*, *29*, 9–14. https://doi.org/10.1016/j.ecns.2019.02.001

Victor, J. (2017). Improving clinical nursing judgment in prelicensure students. *Journal of Nursing Education*, *56*(12), 733–736. https://doi.org/10.3928/01484834-20171120-05

Victor, J., Ruppert, W., & Ballasy, S. (2017). Examining the relationships between clinical judgment, simulation performance, and clinical performance. *Nurse Educator*, *42*(5), 236–239. https://doi.org/10.1097/NNE.0000000000000359

Victor-Chmil, J. (2013). Critical thinking versus clinical reasoning, versus clinical judgment: Differential diagnosis. *Nurse Educator*, 38, 1, 34-36.

Victor-Chmil, J., & Larew, C. (2013). Psychometric properties of the Lasater clinical judgment rubric. *International Journal of Nursing Education Scholarship*, *10*(1), 30. https://doi.org/10.1515/ijnes-2012-0030

Walkoe, J., Sherin, M., & Elby, A. (2020). Video tagging as a window into teacher noticing. *Journal of Mathematics Teacher Education*, *23*(4), 385–405. https://doi.org/10.1007/s10857-019-09429-0

Watson, F., & Rebair, A. (2014). The art of noticing: Essential to nursing practice. *British Journal of Nursing*. *23*(10), 514–518.

Wedgeworth, M. (2016). Anxiety and education: An examination of anxiety across a nursing program. *Journal of Nursing Education and Practice*, 6(10), 23-32.

Weil., M, & Rosen. L (1997). *Technostress: Coping with technology @Work @Home @Play*. NY: Wiley.

White K. A. (2014). Development and validation of a tool to measure self-confidence and anxiety in nursing students during clinical decision making. *The Journal of Nursing Education*, *53*(1), 14–22. https://doi.org/10.3928/01484834-20131118-05

White, K., Fetter, M., & Ruth-Sahd, L. (2019). Extern programs promote confidence and reduce anxiety with clinical decision making in nursing students. *Nurse Educator*, *44*(5), 239–244. https://doi.org/10.1097/NNE.0000000000000573

Wickline, V. (2021). The 10 hardest and easiest college majors. *College Vine*. Retrieved from https://blog.collegevine.com/easiest-and-hardest-college-majors/

Wiersma, W., & Jurs, S.G. (2009). *Research methods in education: An introduction* (9th ed.). Boston, MA: Allyn & Bacon

Wildenhaus, C. (2019). *Helping children manage anxiety at school*. Goodbye Anxiety, Hello Joy, LLC. IBSN: 978-0-578-53164-9

Woda, A., Hansen, J., Paquette, M., & Topp, R. (2017). The impact of simulation sequencing on perceived clinical decision making. *Nurse Education in Practice*, 26, 33-38. https://doi.org/10.1016/j.nepr.2017.06.008.

Woon, A.P.N., Mok, W.Q., Chieng, Y.J.S., Zhang, H.M., Ramos, P., Mustadi, H.B., & Lau, Y. (2021). Effectiveness of virtual reality training in improving knowledge among nursing students: A systematic review, meta-analysis and meta-regression. *Nurse Education Today,* 98(1), 1-9. https://doi.org/10.1016/j.nedt.2020.104655

Wu, X., Hayter, M., Lee, A. J., & Zhang, Y. (2021). Nurses' experiences of the effects of mindfulness training: A narrative review and qualitative meta-synthesis. *Nurse Education Today*, 100, N.PAG. https://doi-org.proxy.library.kent.edu/10.1016/j.nedt.2021.104830

Yerkes, R., & Dodson, J. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology*, 18, 459-482.

Yockey, J. (2015). Simulation anxiety and learning styles. (Doctoral Dissertation). Retrieved from https://pdfs.semanticscholar.org/a51f/09c4a6a7292a9f24eb78c44f03cf9a158c36.pdf

Yockey, J. & Henry, M. (2019). Simulation anxiety across the curriculum. *Clinical Simulation in Nursing*, 29, 29-37. https://doi.org/10.1016/j.ecns.2018.12.004

Yuan, H. B., Williams, B. A., & Man, C. Y. (2014). Nursing students' clinical judgment in high-fidelity simulation-based learning: A quasi-experimental study. Journal of Nursing Education and Practice, 4(5), 7–15. https://doi.org/10.5430/jnep.v4n5p7

Zapko, K., Ferranto, M., Blasiman, R. & Shelestak, D. (2018). Evaluating best educational practices, student satisfaction, and self-confidence in simulation: A descriptive study. *Nurse Education Today*, 60: 28-34. doi.org/10.1016/j.nedt.2017.09.006

Zheng, R., Zhou, Y., Fu, Y., Xiang, Q., Cheng, F., Chen, H., … Li, J. (2021). Prevalence and associated factors of depression and anxiety among nurses during the outbreak of COVID-19 in China: A cross-sectional study. *International Journal of Nursing Studies*, *114*, 103809. https://doi.org/10.1016/j.ijnurstu.2020.103809

Zsido, A. N., Arato, N., Ihasz, V., Basler, J., Matuz-Budai, T., Inhof, O., Schacht, A., Labadi, B., & Coelho, C. M. (2021). Finding an emotional face revisited: Differences in own-age bias and the happiness superiority effect in children and young adults. *Frontiers in Psychology*, *12*(March), 1–10. https://doi.org/10.3389/fpsyg.2021.580565

Zsido, A. N., Teleki, S. A., Csokasi, K., Rozsa, S., & Bandi, S. A. (2020). Development of the short version of the spielberger state—trait anxiety inventory. *Psychiatry Research*, 291(January), 113223. https://doi.org/10.1016/j.psychres.2020.113223