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The Use of Learning Curves to Evaluate the Development of Nurses' Procedural Competence in Gastroenterology

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The Use of Learning Curves to Evaluate

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Abstract

The purpose of this study was to elucidate a methodology to characterize learning curves related to the task performances primarily related to the psychomotor domain of learning inherent to the specialty of gastroenterology nursing. A search of the literature offered no specific guidance in such an endeavor; however, the nursing literature in nursing education has called for the development and utilization of learning curves generally. This is important for myriad reasons, patient safety being primary, yet important to this study is the relation of the cost associated with orienting new nurses, as well as those associated with nursing turnover; these are significant in terms of financial cost and labor encumbrances endured by staff nurses as a result of alternative assignments, increased assignments associated with both short staffing, or in conjunction with the orientation process itself. The Visual Analog Scale (VAS) tool has demonstrated the ability to characterize the learning curves for nurses involved with the technical aspects of gastroenterology nursing practice associated with the psychomotor domain of learning. Additionally, the conceived VAS tool has also shown a capacity to characterize learning curves for performances associated primarily within the cognitive domains as well, and this represents an evolution of the learning curve beyond its historical origins within industrial management. This study found that that the preponderance of empirical support reached statistical significance with respect to the relationships inferred from the VAS tool. Results have been presented, described, and analyzed, including recommendations for future research, which will benefit nursing, nurse educators, and nursing theory.

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Table of Contents

Table of Tables

Table of Figures

Chapter I

Introduction

Significance of Study

Previous research has indicated that the cost associated with nursing turnover can range between $42,000 and $64,000 dollars per nurse, depending upon practice context (Hayes et al., 2006, p. 244), which is only slightly less than that associated with orienting a new graduate nurse; that cost has been estimated to range between $15,000 to $75,000 (Sportsman, 2010, p. 143).The variability of observed financial ranges has been suggested to relate to conceptual and methodological differences in the study designs; however, in general, it has been recognized that the cost of nursing turnover will cost between 0.75 to as great as 2 times the departing nurses salary (McConnell, 1999, p. 7) Along similar lines, the Gastroenterology Procedures Department (GPD) (2011) at the Minneapolis Veterans Affairs calculated that to orient a single RN or a LPN, the recent cost was $32,496 and $22,500 respectively. Astonishingly, these figures only represent the direct financial impact to the GPD and do not reflect the financial expenditures associated with the hospital wide orientation process. Finally, it has been estimated that nationally, hospitals throughout the United States have allocated between $150,000 to $1,000,000 dollars annually for new graduate nursing orientation programs (Greene, 2010, p. E3). It is reasonable to associate these figures with the GPD as new graduate nurses have been hired to work within this environment, and even if experienced nurses were to transfer to the GPD, they would be considered neither competent, nor completely independent.

These figures are impressive, but pale in comparison to the humanitarian costs associated with making patient care or clinical errors. For example, the Institute of Medicine (IOM) estimated that between 44,000 and 98,000 Americans have died yearly since 1999 as result of

clinical errors (Tso-Ying, Wen-Chii, Chia-Huei, & Mei-Ling, 2009, p. 1218), such as

medication, intravenous, critical thinking, and delay of care, all of which endanger patient safety

as a result of the stress nurses incurred due to adapting to a new environment, creating errors,

honing their clinical decision-making skills, competence, and confidence (Oermann & Garvin,

2002; Saintsing, Gibson, & Pennington, 2011, pp. 355-356). These factors are all significantly

related to financial, as well as, labor encumbrances endured by staff nurses as a result of

alternative assignments or increased assignments associated with both short staffing, and in

conjunction with the orientation process itself. Similarly, according to the U.S. Joint Commission

on Accreditation of Healthcare Organizations (JCAHO, 2004), "of the 1690 adverse events that

have taken place in the previous five years, 24% were related to human resources and training of

the nursing staff regarding problems related to clinical errors" (Tso-Ying et al., 2009, p. 1218).

The learning curve concept may offer theoretical assistance in order to address the

negative issues of increased cost, and human affliction, as a result of exhausted educational and

orientation processes or systems. The learning curve is a graphical representation that depicts a

person's learning rate, usually over time, and a particular variable of interest, typically, either

mastery of a task or the completion of a task (Bastable & Doody, 2008, p. 418). By creating

learning curves, researchers were then able to compare them, which enabled them to identify

disruptions to startup and investigate team stability, concentrations of human capital,

organizational structure, and intrinsic or systemic issues related to the learning process itself

(Winslow, 2007). Industrial management has studied the phenomenon of the learning curves for

over 80 years.

Utilization of a learning curve provides the ability to identify similar and novel aspects

that affect the learning process contemporaneously inherent to the orientation process itself, thus

providing the guidance in which to apply focused interventions to improve the overall orientation process for all stakeholders. Literature review suggests that learning curve characterization has never been guided by a theoretical nursing framework within the gastroenterology-nursing context.

Statement of Problem/Research Questions

There are four questions driving this study: (a) Can a triangulated score of independent perceptions characterize a learning curve for nurses? (b) Does the strength of the interaction between nurse preceptor and nurse orientee influence the characterization of the nurses' learning curves? (c) Does the transaction between nurse preceptor and nurse orientee influence the temporal length of orientation for the orientee? (d) Can a preceptor's perceptual score predict an orientee's perceptual score of perceived dependence or independence?

Statement of the Purpose of the Study

The purpose of this study is to characterize the learning curve of primarily technical psychomotor learning acquisition of tasks and procedures. One example of a procedure is that of assisting with the cutting out and removal of polyps from peoples' colons and other tasks which normally fall within the registered nurses' (RN) and licensed practical nurses' (LPN) scope of practice within the Minneapolis' GPD. Additionally, the study's purpose is to determine both the direction and strength of the interaction between preceptor and orientee utilizing descriptive statistics. Finally, the purpose of the study is to determine if the transaction or exchange of knowledge between the preceptor and orientee influences the chronological length of the orientation process for the orientee.

Statements of Hypotheses

The following hypotheses are derived from the study's questions:

1. Complete independence (i.e., transaction) will be achieved if a positive correlation results from the interaction as depicted by a learning curve between nurse orientee and nurse preceptor as evidenced through both self and preceptor assessment.

2. A stronger Interaction between orientee and preceptor as evidenced by a greater positive calculated percentage of the product-moment correlation between the two will result in a chronologically abbreviated orientation process.

Chapter II

Literature Review

Background

The learning curve is a graphical representation that depicts a person's learning, usually over time, and a particular variable of interest, typically, either mastery of a task or the completion of a task. Regardless of the measured outcome variables, they are usually concerned with the psychomotor domain of learning, as opposed to either cognitive or affective aspects of learning. The origins of the learning curve can be traced to manufacturing, but recently it has begun to be described in the healthcare literature as well, and according to initial database searches of MEDLINE and CINAHL, appears to be more prevalently described within the medical paradigm as compared to the nursing meta-paradigm. This literature review will describe the utilization of learning curves in describing nurses' psychomotor task performance learning in the specialty of Gastroenterology.

Methodology of Review

The specific methodology utilized for this literature review began with the following search terms: learning curves, nursing, and gastroenterology. The full text delimiter further reduced the findings, and an ancestral search was then performed utilizing the references found in the initial relevant findings. This led to the four chosen articles for this literature review: Specifically, Koornstra et al., (2009), Mathus-Vliegen et al., (2010), Krugilkova, Grantcharov, Drewes, & Funch-Jensen, (2010), and Maule, (1994).

Overview of Research Studies

The four research studies chosen for this review included two studies from the Netherlands (Koornstra et al., 2009; Mathus-Vliegen et al., 2010), one from a combined study

originating from Denmark and Canada(Krugilkova et al., 2010), and one from the United States (Maule, 1994). The study conducted in the United States was intentionally included, despite its age, because it represents a sentinel study and is one of the earliest methodological initiatives concerned with characterizing the learning curve in relation to nurses (Maule, 1994). All four studies included RNs. One study included LPNs as well as RNs (Maule, 1994). Two of the studies incorporated theory into their methodologies (Koornstra et al., 2009; Maule, 1994). All four of the studies primarily utilized a quantitative design method such as incorporating survey questionnaires, chronological time measurements, and utilized descriptive statistics for their results analysis. The study conducted by Koornstra et al., (2009), was quasi-experimental because it incorporated aspects of randomization. However, the design methodology did not rise to the level of an experimental study because there was no control. Three of the studies were conducted in tertiary facilities (Koornstra et al., 2009; Krugilkova et al., 2010; Mathus-Vliegen et al., 2010), while (Maule, 1994) conducted his study in a community clinic. All four studies utilized a convenience sample for study participants of both nurses and patients involved with the learning processes related to the specific task performance being studied; however, none discussed calculating the power to ensure sufficient sample sizes. Three studies reported discrepant numbers of patients or simulations within, and between groups, for task performance measurement (Koornstra et al., 2009; Mathus-Vliegen et al., 2010; Maule, 1994). Three of the studies used virtually identical training or educational methodologies for teaching the performance task to the nurses for which learning assessment would follow (Koornstra et al., 2009; Krugilkova et al., 2010; Maule, 1994). All four studies utilized similar outcome measurement standards such as percentage of successful task performances, as well as chronological time measures for successful task completion.

Findings of the Review

  Principle investigators of the studies. None of the studies listed a registered nurse as the principle investigator, although one study listed a registered nurse as an co-investigator (Mathus-Vliegen et al., 2010).

  Theoretical bases. Three studies utilized medical theory in their study methodology: Koornstra et al., (2009), Krugilkova et al., (2010), and Maule, (1994). One study appears to be atheoretical unless physician preceptorship or education and supervision can be construed as a theoretical basis for learning, and if so, then it should also be considered medical theory (Mathus-Vliegen et al., 2010).

  Educational methodologies. Three studies utilized virtually identical methods of instruction for nurses' learning (e.g., standard textbook for the task theory, videos, picture slides, observation of live cases, plastic model, computer simulation, practical experience, and practice scope withdrawals): Koornstra et al. (2009), Krugilkova et al. (2010), and Maule (1994). One study initially utilized physician instruction as the primary methodology to teach or instruct a single nurse in task performance, who subsequently taught the other nurses the task that the physician taught her: Mathus-Vliegen et al. (2010).

  Type of gastroenterology psychomotor task utilized in the characterization of the nurse's learning curve. Three studies evaluated performance tasks considered outside the registered nurses scope of practice, such as performing colonoscopy and flexible sigmoidoscopy: Koornstra et al. (2009), Krugilkova et al. (2010), and Maule, (1994). One study evaluated a performance task within a Registered Nurses scope of practice: Mathus-Vliegen et al. (2010).

  Batching of task performances and or observations. All four studies broke down task performances and observations into batches. Two studies created batches consisting of 25 tasks

or observations: Koornstra et al. (2009) and Mathus-Vliegen et al. (2010). One study created three batches of ten repetitions for observation: Krugilkova et al. (2010). One study created batches of 30-35 task performances or observations: Maule (1994). Three of the studies (Koornstra et al., 2009); (Krugilkova et al., 2010); (Mathus-Vliegen et al., 2010) used the separated batches with their corresponding outcome measures (e.g., percentage or time measures of successful task performances) in order to characterize the learning curve and utilize it for between-group comparisons. Although all four studies utilized batches of task performance and observations for learning acquisition characterization or competence, there appeared to be no apparent methodology for the batches size determination. Thus, from the literature, it seems as though batch size was, at worst, arbitrary and, at best, subjectively determined based on individual investigator's perceptions and determinations.

Conclusions

Despite a paucity of literature describing learning curves and nursing, the literature appears to support the utilization of learning curves in characterizing psychomotor task performance/learning related to nurses in the specialty of gastroenterology. Although the literature makes clear that learning curves have been successfully utilized to characterize nurses' learning related to gastroenterology specific psychomotor tasks, the tasks or procedures that have primarily been studied have predominantly been outside the scope of practice related to registered nurses. Additionally, there appears to be a dearth of literature describing studies conceived and executed principally by registered nurses, despite the identified studies' goals of characterizing the learning curve of nurses, just as there has been no attempt to associate a nursing theory in which to guide the studies' learning methodology or outcome measures (i.e, learning curve construction).

In short, the characterization of nurses' learning curves in the literature appears to have been conceptualized and contextualized from a medical perspective and paradigm, which appears to have resulted in a paucity of both quantitative and qualitative insights of the nurses upon which the characterization of the learning curve rests. This begs the question: What do these learning curves mean to the nurses they purportedly represent?

Recommendations for Future Research

The majority of the studies have been quantitative in design; therefore, future studies should incorporate qualitative aspects so as to gain a deeper understanding of the meaning of the learning curve in relation to those it is to represent. Additionally, because clinical nursing practice involves extensive utilization of practical interventions, which can be categorized as psychomotor in essence, research should be directed at investigating associated learning curves of psychomotor task performances within the scope of registered nurses practice in general. Furthermore, the studies should characterize individual nurse's learning curves rather than consolidating the data as an aggregate. This would, in contrast, provide a potential range of learning curves rather than an amalgamated one, which could then be utilized by nurse managers or educators to identify whether new nurses being trained in a new procedure or task are, in fact, progressing at the expected rate, and if not, appropriate educational interventions could be implemented earlier to assist the learner. Along similar lines, future research should incorporate a learner input and feedback process into the study designs. Finally, and most important, nurses need to incorporate an appropriate nursing theory into their future study designs.

Theoretical Framework

Imogene King's theory of goal attainment has been instrumental in providing the theoretical conceptual propositions and assumptions, which allowed derivational integration of

the current conceptual elements of this study's design into a cohesive integrated model in order to study the processes influencing learning curve characterization. For example, in King's model, perception is both an innate characteristic of humans, as well as the antecedent to judgment, which manifests as action. The actions of two people instigate a reaction. Reactions result in an integrated interaction. Transaction is the valuation basis derived from the integrated interactions (King, 1995), which then results in an iterative feedback loop for renewed perceptions regarding the overall process. For this study; judgment has been quantized via a visual analogue scale (VAS), which in turn defines the strength and direction of the resulting integrated interactions; this leads to a concrete valuation of the transaction between the two in the form of a correlational coefficient and a coefficient of determination.

Definition of Terms

King (1995) defines the following:

➢ Interaction is a process of perception and communication between person and environment, person to person, and is represented by both verbal and non-verbal communication, including behavior, as well as being goal directed.

➢ Communication is information from person to person, either directly or indirectly, and represents the informational component of interaction.

➢ Perception is each person's representation of reality.

➢ Transaction is purposeful interaction leading to goal attainment.

➢ Role is a set of behaviors expected of persons occupying a position in a social system, which are governed by rules that define rights and obligations for a particular position.

➢ Stress is a dynamic state which manifests when human beings interact with their environments.

➢ Growth and development is a continuous change in individuals occurring at cellular, molecular, or behavior levels that enable the individual to move towards maturity.

Hatton and Smith (1995) define Schön's (1983, 1987) constructs in the following manner:

➢ Reflection-On-Action is defined as, an intentional cognitive process involving underlying beliefs, moral action, and interconnected knowledge of the past and present, which has taken place some considerable time after the teaching experiences and events being reflected upon occurred (pp. 34-42).

➢ Reflection-In-Action is defined as an intentional cognitive process involving underlying beliefs, moral action, and interconnected knowledge of the past and present, that typical occurs while the event(s) or experience(s) were originally unfolding, such that learners were thinking about reasons to explain the underlying processes for what was evolving as it was happening (pp. 34-42).

➢ "Both [of these] forms of reflection involve demanding rational and moral processes in making reasoned judgments about preferable ways to act" (Hatton & Smith, 1995, p. 34).

Learning curves are defined by Bastable and Doody (2008) as concrete graphical representations of the relationships influencing practice and performance during a specific period

of time. The learning curve is a graphical representation that depicts a person's learning, usually over time, and a particular variable of interest, typically, either mastery of a task or the completion of a task.

Polit and Beck (2008) define the following terms related to research methods:

➢ Data triangulation is defined as the use of multiple data sources for the purposes of validating conclusions.

➢ Observer triangulation is defined as collecting data from different people associated the study with the aim of validating data through multiple perspectives regarding the study's phenomena of interest.

➢ A visual analog scale (VAS) is a measurement scale typically utilized in order to measure subjective perceptions, and is constructed in such a manner that a straight line commonly 100mm in length is anchored at both ends with extreme or bi-polar labels purporting to represent the subjective phenomenon being measured. The point where one marks that line between the extreme anchors is then measured in millimeters, and thus, represents the magnitude of their perception of the phenomenon under examination (pp. 417-418).

Kolb (2005) defines four learning styles:

➢ Reflective Observation or watching is the degree by which one "deals" with, or "transforms" the experience, whereby one learns by reflecting or carefully observing, viewing multiple perspectives in order to appreciate the constructed meaning of experience.

➢ Active Experimentation or doing is the degree by which one "deals" with, or "transforms" the experience, whereby, one learns by active experimentation, by doing, by being actively involved within the experience.

➢ Concrete experience or feeling is the degree by which one "perceives" or "grasps" an experience, whereby one learns by getting involved physically and emotionally within the experience, learn by interacting with others, acting upon gut feelings and experimenting with intuition by trial and error within the current experience.

➢ Abstract conceptualization or thinking is the degree by which one "perceives" or "grasps" an experience, whereby one learns by reasoning, analyzing problems, developing implementation plans, evaluating alternatives, and integrating them into reasoned theory for practical application in relation to the experience.

The Minneapolis Veterans Affairs (VA) Gastroenterology Procedures Department (GPD 2011) defines the following terms related to orientation and performance of new appointees:

➢ The technical phase is that part of orientation process whereby the orientee is educated and hones the primarily psychomotor competencies necessary to aid the physician with tasks and performances related to colonoscopy, endoscopy, or flexible sigmoidoscopy, in such a manner, that the orientee would eventually be able to perform the competencies in a safe and completely independent manner.

➢ The sedation phase is that part of orientation process whereby the orientee is educated, and hones the primarily cognitive competencies necessary to aid the physician with tasks and performances related to moderate sedation for such procedures as colonoscopy and endoscopy, in such a manner, that the orientee

would eventually be able to perform the competencies in a safe and completely independent manner.

➢ The recovery phase is that part of the orientation process whereby the orientee is educated, and hones the primarily cognitive competencies necessary to execute the tasks and performances related to the immediate post-procedure period, as well as the discharge process, in such a manner, that the orientee would eventually be able to discharge those competencies in a safe and completely independent manner.

➢ Complete dependence, is defined as necessitating continuously present supervision of the preceptor while operating in the procedure room.

➢ Complete independence, is defined as not necessitating any supervision of the preceptor while operating in the procedure room. (This would indicate that the orientee is practicing at a basic entry level of competency as outlined in the Competency Check List for the department). The Competency Check List is provided to both the preceptor and their new orientee, and can be found both within their orientation packets, which are provided by the gastroenterology nurse manager, and the S drive (an online repository which contains the departments standard operating procedures and competencies).

Chapter III

Methodology

Research Design

An overall non-experimental research design was employed as complete randomization to intervention or control groups could not be employed; a quantitative correlational research design was utilized. Additionally, the research design was prospective, to compare the presumed a priori antecedent (i.e., orientation,) with subsequent measure of its effect or outcome (e.g., the effect of Interaction upon Transaction). The design was longitudinal, in order to study how psychomotor task learning processes evolve over time by capturing the evolution of the related learning curve at different points over time for the same subjects. The design utilized a within-subjects design to compare a single subject's outcome at various points in time. The research design contemporaneously utilized both data and observer triangulation to increase the credibility of results by utilizing multiple data sources e.g., individual visual analogue scale (VAS) scores between the preceptors and orientees; VASs are commonly utilized to measure subjective constructs. Finally, to reduce potential rating bias for both preceptors and orientees in relation to VAS scores, both self and preceptor VAS assessments were masked. These research design methodologies were employed to minimize bias and enhance interpretability in order to strengthen the study's rigor.

Study Subjects/Participants

The target population included all RNs and LPNs hired to work in the GPD at the Minneapolis VA and participate in the unit's orientation process. No specific study participation exclusions existed, and therefore consisted of those 18 years of age or older, representing both

genders, which then resulted in a convenience sample from which to recruit the study participants.

A power analysis could not be calculated, because there were no relevant previous studies in which to estimate a sample size necessary to detect a true relationship between the correlates for this study. Thus, this study may indeed provide the correlational coefficients in order to approximate a sample size with sufficient power to reduce the likelihood of type II error for future studies.

Techniques for Data Collection

Based upon the research problem, questions, and resulting hypotheses, a novel data collection tool was designed. Specifically, a VAS consisting of a 100mm line representing a continuum of "Dependence" was constructed, which is anchored on the left, with the construct of "Completely Dependent", whereas the right side is anchored by the construct of "Completely Independent." The orientee is instructed to mark an (x) representing the orientee's perceived position along that continuum. By contrast, the preceptor is instructed to rate the orientee's position along the continuum of "Dependence" from their perspective in relation to their observations gained during the daily precepting of the orientee. The marks placed by the respective parties will be measured utilizing a millimeter ruler and recorded, therefore allowing for conceptual quantification, and hence, a correlation coefficient. The correlation coefficient serves a dual purpose in that not only does it describe the strength and direction of the relationships, but also may be utilized in order to determine the effect size of the relationship of variables, as well as identifying both the confidence interval and the Power or beta of the sample, thus serving as both a descriptive and inferential statistic respectively (Polit & Beck, 2008, pp. 601-602). Furthermore, Polit and Beck, suggest that when "prior estimates of effect size are

unavailable, the conventional values of small, medium, and large effect sizes in a bivariate correlation situation are 0.1, .3, and .5 respectively…for a power of .8 and a significance level of .05" (Polit & Beck, p. 606). Additionally, to encourage truth in assessment regarding the VAS, the individual scoring will be masked in relation to one another (i.e., Preceptor and the orientee will not be privy to the other's scoring). The validity of this study's VAS instrument remains to be determined; however, some degree of validity will be determined based upon its ability to accurately operationalize the constructs being measured (i.e. "Dependence," which is theorized to relate to King's theory of Goal Attainment as a measurable manifestation of the theory's core concepts, specifically, interaction and transaction. Consequently, the confirmation or refutation of the study's hypotheses will serve as a method for determining construct validity based upon the following logic:

1. According to King's theory (K): if perceptual accuracy (positive correlation) is present in interactions(X), then transactions will occur (Y)

2. If transactions(Y) are made, goals will be attained (Z)

3. Thus, if (X) then (Y) , if (Y), then (Z)

The VAS instrument (A) is theorized to measure both direction and strength of (X); Therefore, if scores on (A) correlate positively as predicted by (K), it is inferred that (A) is a valid measure of (X). Hence, providing a certain degree of logical evidence for this study's measuring tool related to construct validity.

Procedure for Data Collection

The first day upon presentation to the GPD, the orientee was given an orientation packet by the nurse manager. The packet contained some of the unit's individual and specific policies and retrieval instructions for the remainder. The packet also contained the technical

competencies the orientee must demonstrate at a completely independent, basic competency level of performance following the orientation process. Additionally, the packet contained a single demographic form, which both the orientee and the preceptor(s) individually completed on the first day (Appendices A and C respectively). The packet also contained the daily assessments which additionally contained a VAS (Appendix B) inquiring about the orientee's perception related to the continuum of being completely independent versus completely dependent and then asking that a (x) be marked on the line representing their perceived position upon that continuum. The daily assessment form also requested the number of orientation hours received that day as well as the type of procedures the orientee participated in (e.g., colonoscopy, esophagoduodenoscopy, or flexible sigmoidoscopy). Furthermore, the preceptor was given an identical packet; however, the VAS assessment was completed from the perspective of the preceptor (Appendix D), asking them to evaluate the orienetee's position upon the "Dependence" continuum, as a result of the subsequent daily observations.

On Day One, informed consent was obtained, and if granted, the participants, following their introductions and subsequent full day of orientation/precepting, completed the demographic form as well as the first daily assessment form which included the VAS, as well as the other components of inquiry mentioned above. On each subsequent day that the orientee participated in orientation, both the preceptor as well as the orientee completed the daily assessment form containing the VAS at the close of that particular day of orientation. The daily assessment form continued to be completed at the close of the day until a triangulated score between that of the preceptor and the orientee equaled 100mm or "Completely Independent." Once "Complete Independence" was attained, the orientee was independently trialed in the technical role for one week, with the standby assistance of their original preceptor outside the procedure room, as well

as with a sedation RN who was deemed technically strong (by the nurse manager) to aid with potential questions related to novel situations or contexts not experienced during the orientation process. During that independent trial period, the orientee completed a daily assessment form containing a VAS which contained a continuum ranging from Requiring Continuous Supervision while in the procedure room to Requires No Supervision while in the procedure room in order to gauge the orientee's perceived need for continued preceptor supervision and hence, orientation. Following that trial week of independence, the determination of either terminating, or extending the orientation phase was discussed in collaboration with all the stakeholders (i.e., the preceptor, the orientee, and the nurse manager).

Protection of Human Rights

To ensure the study participants' human rights were appropriately considered and protected, Institutional Review Board (IRB) approval was secured, from both St. Catherine University, and the Minneapolis VA. Specifically, an exempt review was granted because the study involved very minimal risk, did not disrupt or manipulate the normal life experiences of subjects, nor did it incorporate any form of intrusive procedures, sensitive topics, or involve deception. Additionally, informed consent was obtained from all participants prior to study involvement (Appendix E) and the data was de-identified.

Limitations

The limitations of this study are primarily related to aspects of the design and measurement device. For example, in terms design limitations, the convenience sampling methodology utilized for this study, represents the weakest form of sampling, and offers very little protection from the probability of sampling an atypical representation of the population with regard to the variables of interest (Polit & Beck, 2008, p. 341). In terms of the measurement

device, the VAS represents a sub-category of a structured self-report instrument, specifically, that of a closed-ended structural questioning strategy. Structured self-report instruments vary in their degree of flexibility but tend to be fixed rather than flexible in relation to the methods by which they gather their data (Polit & Beck). In general, these broad strategies demonstrate both strengths and limitations. For example, in terms of strengths, closed-ended questions tend to be easy to administer and analyze (Polit & Beck, p. 415). They lend themselves to efficiency as respondents are able to complete greater numbers of closed-ended questions in comparable time frames as compared to open-ended questions (Polit & Beck, 2008). Finally, closed-ended questions are preferred by those respondents who tend to be less articulate communicators (Polit & Beck). The limitations of closed-ended questioning techniques include the relative difficulty inherent in constructing "good closed-ended questions" (Polit & Beck, p. 415). The potential to neglect, and or narrow the extent of potential respondents' responses of expression, lead to "omissions [that] can lead to inadequate understanding of the issues or to outright bias if respondents … [are forced to]…choose an alternative that misrepresents their position" (Polit & Beck, p. 415).

The specific limitations related to the VAS, are primarily related to the inherent aspects of self-report and observation necessary to derive the data. First, with regard to self-report, behavior does not always reflect the true cognitive state of thought. Second, the tendency of individuals to respond in a perceived socially desirable fashion, which may lead respondents to consistently misrepresent their true cognitions in order to appear socially homogenous related to values and behaviors. Third, there is the potential for extreme response bias such as those respondents who consistently choose either 10/10 or 1/10 repeatedly throughout the instrument. These responses do not represent a true valuation of the construct or the phenomena under study,

but rather, represent inherent characteristics of the respondent (Polit & Beck, 2008). Finally,

there are the phenomena known as acquiescence and oppositional response sets, which represent

either the consistent agreement or disagreement, regardless of questioned content value.

Moreover, the VAS functions as a structured post-observation tool and more specifically, as a

rating scale in that it requires observers (preceptors) "to integrate a number of activities and to

judge which point on a scale [that] most closely fits their interpretation of the overall situation"

(Polit & Beck, p. 435). The limitations related to this data gathering strategy are similar to those

related to self-reports, but also include the following biases: (a) enhancement of contrast which

occurs when observers distort the gestalt phenomena into individual parts of the whole; (b)

central tendency is a bias in which observers distort extreme observations by mediating them

toward neutrality; (c) assimilatory biases are a tendency for observers to distort their

observations in favor of unrelated past experiences which leads to miscategorization of the

current inputs; (d) halo effect occurs when observers are unduly influenced by an unrelated, yet

inherent characteristic or phenomena of the subject, when judging the primary characteristic or

phenomena; (e) Finally, there is the error of both leniency, and severity. These represent

observers' personality and reflect their tendency to rate everything positively for the former and

negatively for the latter.

Data Analysis

The primary data analysis strategy employed a derivative of bivariate descriptive

statistical methodologies (i.e., correlation indexes such as the product-moment correlation

coefficient, also known as Pearson's *r*). Correlations describe the dimensional breath of

relationships between variables, both in proportion and direction. Consequently, this method of

data analysis is exceptionally well suited to assist in the interpretation of the study's results in

relation to the study's questions, design, hypotheses, sample, and conceived measurement

instrument. Furthermore, Pearson's *r* can also be utilized as an inferential statistic in order to test

hypotheses about population correlations (Polit & Beck, 2008, p. 602). This is accomplished by

comparing the study's computed *r* to a theoretical distribution table of *r*'s. In so doing, one can

determine whether the result represents a chance relationship confined to the study's sample, or

whether there is a statistically true relationship that can be generalized to the population and, in

essence, be a guide as to whether to accept or reject the study's null hypotheses. Although there

is no reason to suspect that the convenience sample of participatory subjects violates a normal

distribution in the population, a nonparametric test was calculated in order to compare it to the

parametric test of Pearson's *r*. Specifically, Spearman's rank order correlation coefficient or r_s

was utilized because it represents a nonparametric test which is appropriate for use when

assumptions of parametric testing are violated or questionable (i.e., the normal distribution of

the study variables in the greater population).

Chapter IV

Analysis of Data

Overview

This chapter presents the data analysis of the learning curve methodology manifested within various independent cases. In this chapter, the demographic characteristics of the subjects are initially presented, followed then by both the descriptive and inferential findings related to the individual cases of observations within the study.

Presentation of Descriptive Characteristics of Participants

Table 4.1
Descriptive Demographic Characteristics of the Participants (*n* = 15)

Demographics	Preceptors (*n=9*)	Orientees (*n=6*)
Age range:		
24 to 29 years of age	11%	16%
30 to 35 years of age	34%	☐
36 to 41 years of age	22%	17%
42 to 46 years of age	☐	33%
47 to 52 years of age	22%	17%
59 to 64 years of age	☐	17%
Gender:		
Female	67%	83%
Male	33%	17%
Race:		
African American	☐	16.9%
Caucasian	100%	67%
Asian/Pacific Islander	☐	16.9%
Highest degree earned:		
College diploma	22%	34%
Associates degree	22%	33%
Bachelor's degree	45%	33%
Master's degree	11%	☐
Professional credential:		
LPN	22%	50%
RN	78%	50%
Years of generalized nursing experience:		
1 to 5 years	11%	16.9%
6 to 11 years	34%	16.9%
12 to 17 years	22%	50%
18 or > years	33%	16.9%
Years of specialized gastroenterology nursing experience:		
0 years	☐	67%
1 to 2 years	34%	☐
3 to 5 years	33%	16.9
6 to 8 years	22%	☐
9 to 11 years	11%	16.9%

Presentation of Descriptive and Inferential Analysis of the Individual Participants Data as

Contained within Cases 1-6

The descriptive and inferential findings related to the individual participants data are presented in cases and are initially presented narratively, followed then by graphical presentations of the data. The individual names associated with the cases are pseudonyms.

Case # 1. Case number one consisted of one orientee, and 16 observations with four paired observations with one preceptor. This case represents competency acquisition and demonstration primarily related to the psychomotor domain of learning. Specifically, Mike was an orientee who was a 36 to 41 year old White male with 12 to 17 years of professional experience as a licensed practical nurse (LPN), and no years of gastroenterology nursing experience who also held a college diploma. Sheila was a preceptor who was a 30 to 35 year-old Caucasian female with six to eleven years of professional experience, and six to eight years of specialized gastroenterology nursing experience who additionally held a college diploma.

Mike achieved complete independence subsequent to the performance of 49 various procedures (i.e., colonoscopies, endoscopies, and flexible sigmoidoscopies). Mike required 16 days of preceptored orientation, and neither he, nor Sheila, documented the total hours of required orientation before complete independence was achieved.

r and r_s were computed to assess the relationship between Sheila and Mike. There was a positive correlation between the Sheila and Mike, $r = +0.75$, $r^2 = 0.56$, $n = 4$, p = 0.25 which was NOT significant at the 0.05 critical alpha level (2-tailed), 95% CI = $-0.76 < = r > = +0.99$, and r_s = +0.8.
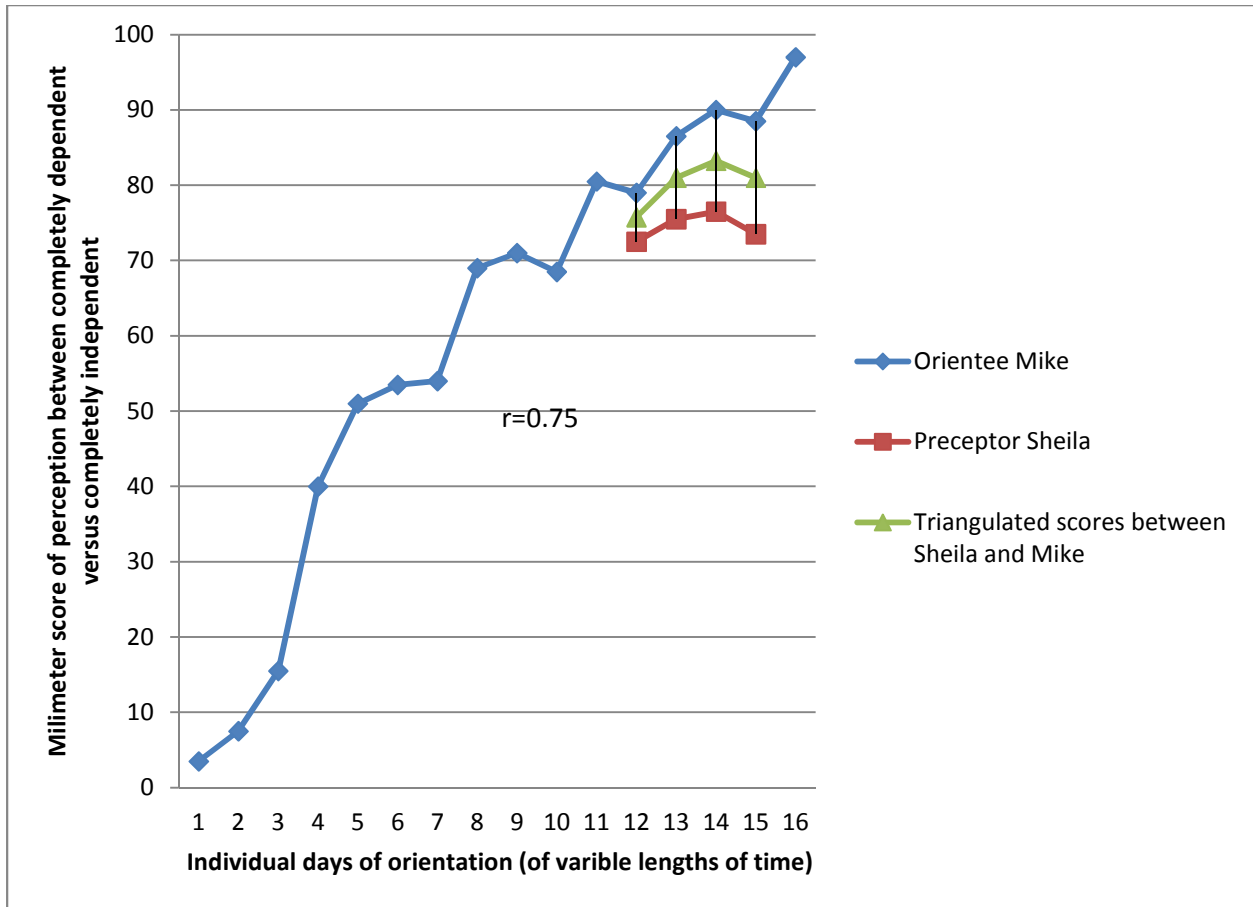
Figure 4.1. Learning curves for orientee Mike and preceptor Sheila with the triangulated learning curve (*n* = 4).
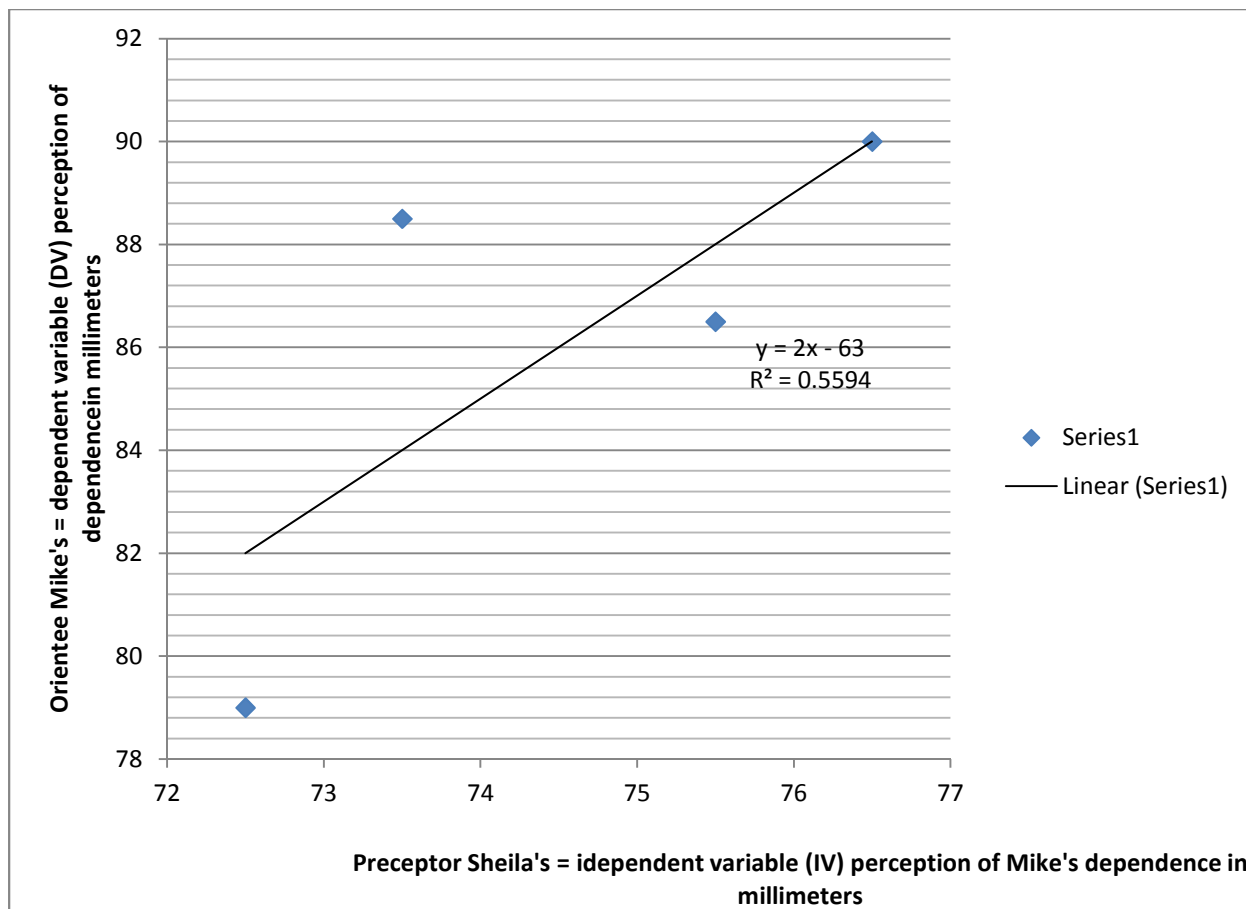
Figure 4.2. Scatter plot and regression line between orientee Mike and preceptor Sheila (*n* = 4).

Case # 2. Case number two consisted of one orientee, and 23-paired observations with three individual preceptors. This case represented competency acquisition and demonstration consistent with a mixture of both the cognitive and psychomotor domains of learning. Specifically, June was an orientee who represented a 41-46 year old Caucasian female with 12-17 years of professional nursing experience as a Registered Nurse (RN), and three to five years of gastroenterology nursing experience, who additionally held a bachelor's degree in nursing. Shawn was a preceptor who was a 30-35 year-old Caucasian male with 6-11 years of professional experience as a RN, and three to five years of specialized gastroenterology nursing experience, who additionally held a bachelor's degree in nursing. Jan was a preceptor who was a 24-29 year-old Caucasian female with one to five years of professional nursing experience as a

RN, and three to five years of specialized gastroenterology nursing experience, who additionally held a bachelor's degree in nursing. Fred was a preceptor who represented a 30-35 year-old Caucasian male with six to eleven years of nursing experience as a RN, and three to five years of specialized gastroenterology nursing experience, who additionally held an associate's degree in nursing.

June achieved complete independence subsequent to the performance of 34 various procedures (i.e., colonoscopies, endoscopies, and flexible sigmoidoscopies). June required 23 total days of preceptored orientation, and 10 days of preceptored orientation related to the technical phase of orientation. Neither she, nor her preceptors documented the total hours of required orientation before complete independence was achieved for any phase of the orientation process.

r, r^2, and r_s were computed to assess the relationship between for orientee June and Preceptors Jan and Fred during the primarily technical phase of orientation. There was a positive correlation between the three variables, $r = +0.86$, $r^2 = 0.74$, $n = 10$, 95% CI $= +0.50 < = r > = +0.97$, p $= 0.0014$, and $r_s = +0.88$, p $= 0.000746$ which was significant at the 0.05 critical alpha level (2-tailed).

r, r_2 were computed to assess the relationship between orientee June and preceptors Shawn, Jan, Fred for the entire orientation process. There was a positive correlation between June, Shawn, Jan, and Fred. $r = +0.97$, $r^2 = 0.94$, $n = 23$, p $= <.0001$ which was significant at the 0.05 critical alpha level (2-tailed), 0.95 confidence interval or CI $= +0.93 < = r > = +0.99$, and $r_s = +0.95$.

Figure 4.3. Learning curves for orientee June and aggregated preceptors Shawn, Jan, and Fred and the triangulated learning curve (*n* = 23).

Figure 4.4. Scatter plot and regression line between orientee June and preceptors Shawn, Jan, and Fred (*n* = 23).

Case # 3. Case number three consisted of one orientee, and 37-paired observations with

four individual preceptors. This case represents competency acquisition and demonstration

consistent with a mixture of both the cognitive and psychomotor domains of learning.

Specifically, orientee May represented a 59-64 year-old Asian/Pacific Islander female with 12-17

years of professional nursing experience as a RN, and 9-11 years of specialized

ggastroenterology nursing experience, who additionally held a bachelor's degree in nursing.

Preceptor Shawn represented a 30-35 year-old Caucasian male with 6-11 years of professional

experience as a RN, and three to five years of specialized gastroenterology nursing experience,

who additionally held a bachelor's degree in nursing. Preceptor Jan represented a 24-29 year-old

Caucasian female with one to five years of professional nursing experience as a RN, and three to five years of specialized gastroenterology nursing experience, who additionally held a bachelor's degree in nursing. Preceptor Lucy represented a 47-52 year-old Caucasian female with greater than 18 years of professional nursing experience, and one to two years of specialized gastroenterology nursing experience, who additionally held a master's degree in a related field (health education). Preceptor Fran represented a 47-52 year-old Caucasian female with greater than 18 years of professional nursing experience, and nine to eleven years of specialized gastroenterology nursing experience, who additionally held a bachelor's degree in nursing.

May achieved complete independence subsequent to the performance of 33 various procedures (i.e., colonoscopies, endoscopies, and flexible sigmoidoscopies). May required 37 total days of preceptored orientation, and 9 days of preceptored orientation related to the technical phase of orientation. May required a total of 220.5 hours of preceptored orientation before complete independence was achieved for the entire orientation process.

r, r^2, and r_s were computed to assess the relationship between orientee May and preceptors, Jan, Lucy, and Fran during the primarily technical phase of orientation. There was a positive correlation between May, Jan, Lucy, and Fran. $r = +0.94$, $r^2 = 0.88$, $n = 9$, 95% CI = $+0.72 < = r > = +0.99$, p = 0.0002, and $r_s = +0.93$, p = 0.0002.

r and r_s were computed to assess the relationship between orientee May and preceptors Shawn, Jan, Lucy, and Fran during the entire orientation process. There was a positive correlation between the five variables. $r = +0.98$, $r^2 = 0.96$, $n = 37$, p = $<.0001$, 95% CI = $+0.96 < = r > = +0.99$, and $r_s = +0.99$, p = 0.000001.
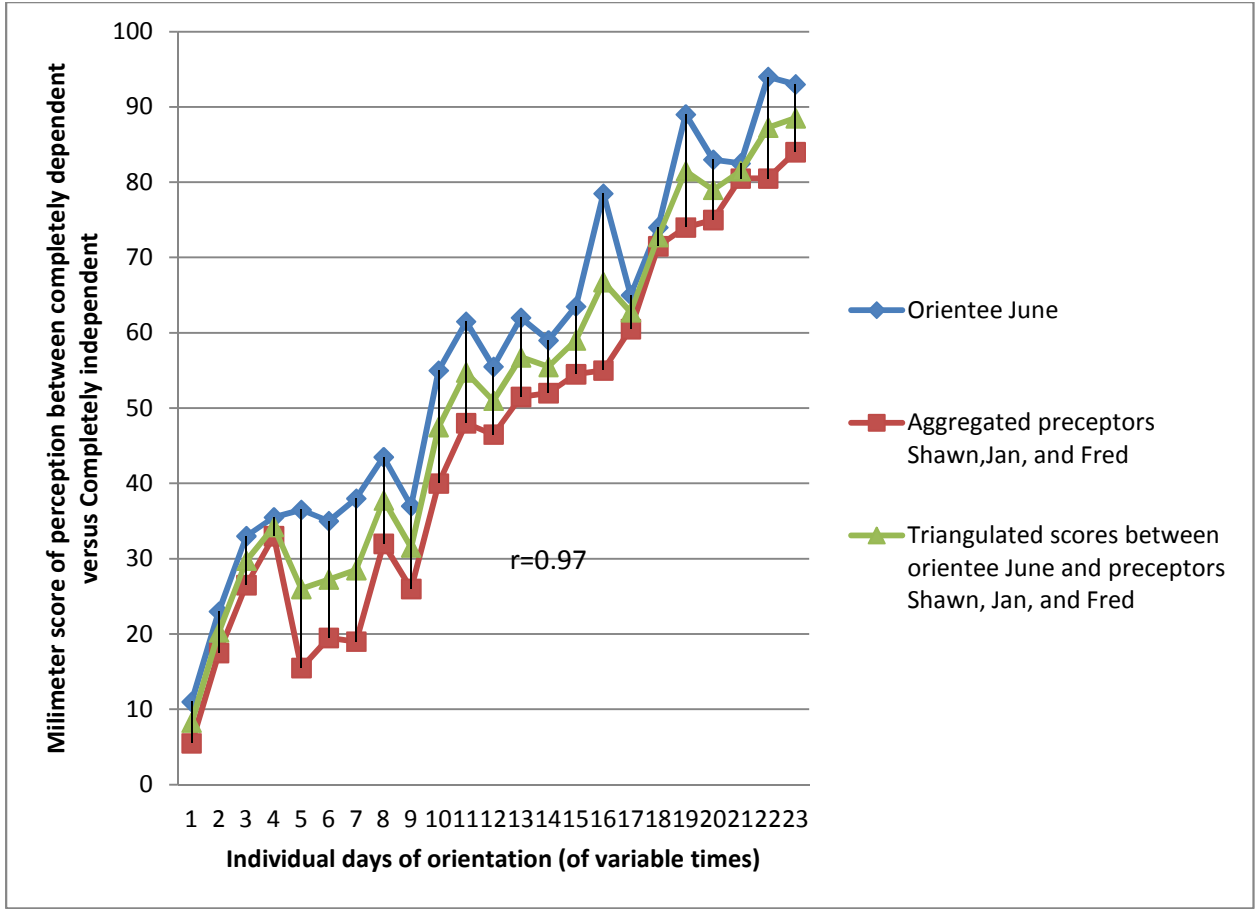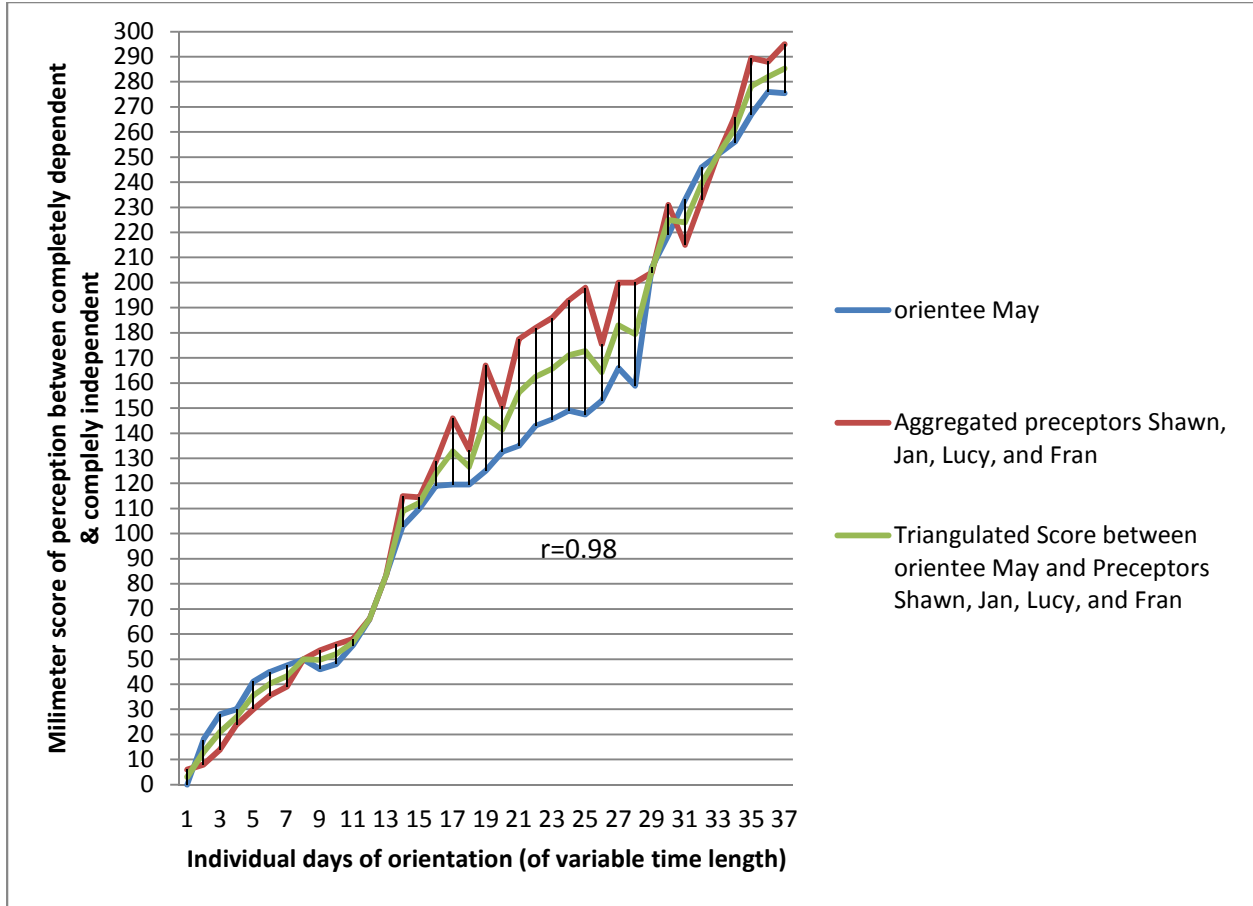
Figure 4.5. Learning curves for orientee May and aggregated preceptors Shawn, Jan, Lucy, Fran, and the triangulated learning curve (*n*= 37).
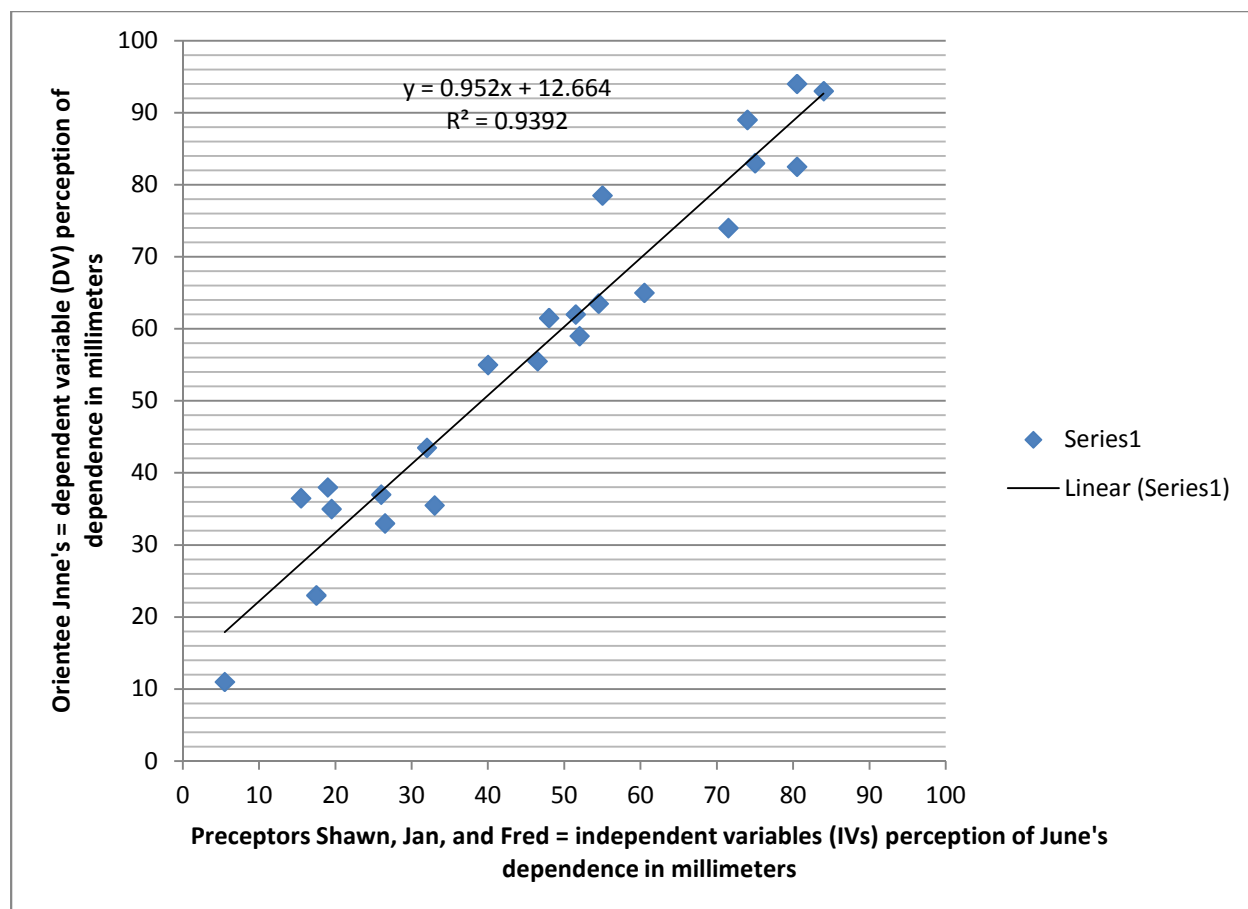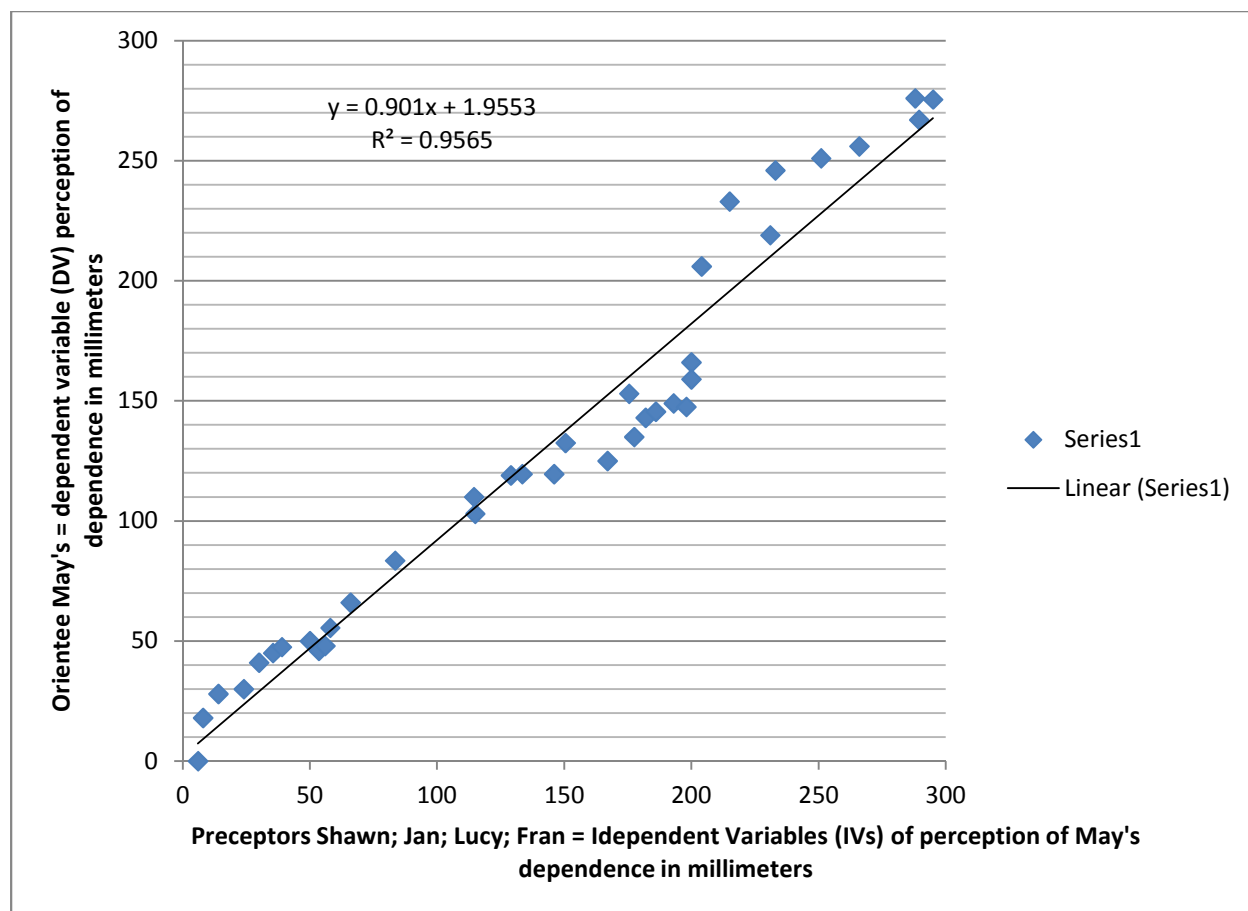
Figure 4.6. Scatter plot and regression line between orientee May and preceptors Shawn, Jan, Lucy, and Fran (*n* = 37).

Case # 4. Case number four consisted of one orientee, and 13-paired observations with

two individual preceptors. This case represents competency acquisition and demonstration

primarily related to the psychomotor domain of learning. Specifically, orientee Sara represented

a 24 to 29 year-old African American female with one to five years of nursing experience as a

LPN, and no years of specialized gastroenterology nursing experience, who additionally held an

associate's degree. Preceptor Lucy represented a 47 to 52 year-old Caucasian female with greater

than 18 years of professional nursing experience, and one to two years of specialized

gastroenterology nursing experience, who additionally held a master's degree in a related field

(health education). Preceptor Mary represented a 36 to 41 year-old Caucasian female with 12 to

17 years of professional nursing experience, and one to two years of specialized gastroenterology nursing experience, who additionally held a bachelor's degree in nursing.

Sara achieved complete independence subsequent to the performance of 48 various procedures (i.e., colonoscopies, endoscopies, and flexible sigmoidoscopies). Sara required 13 total days of preceptored orientation. Sara required a total of 81 hours of preceptored orientation before complete independence was achieved for the entire orientation process.

r, r^2, and r_s were computed to assess the relationship between orientee Sara and preceptors Lucy and Mary. There was a positive correlation between the Sara, Lucy, and Mary. r = +0.95, r^2 = 0.90, n = 13, p = <.0001, 95% CI = +0.83 < = r > = +0.98, 0.95 and r_s = +0.92.

Figure 4.7. Learning curves for orientee Sara and aggregated preceptors Lucy and Mary, and the triangulated learning curve (*n* = 13).

Figure 4.8. Scatter plot and regression line between orientee Sara and preceptors Lucy and Mary (*n* = 13).

Case # 5. Case number five consisted of one orientee, and 14-paired observations with three individual preceptors. This case represents competency acquisition and demonstration primarily related to the psychomotor domain of learning. Specifically, orientee Joy who was a 41 to 46 year-old Caucasian female with six to eleven years of nursing experience as a LPN, and no years of specialized gastroenterology nursing experience, who additionally held a college diploma. Preceptor Mike represented a 36 to 41 year-old Caucasian male with 12 to 17 years of nursing experience as a LPN, and one to two years of specialized gastroenterology nursing experience, who additionally held an associate's degree. Preceptor Jan represented a 24 to 29 year-old Caucasian female with one to five years of professional nursing experience, and three to

five years of specialized gastroenterology nursing experience, who additionally held a bachelor's

degree in nursing. Preceptor Fran represented a 47 to 52 year-old Caucasian female with greater

than 18 years of professional nursing experience, and nine to eleven years of specialized

gastroenterology nursing experience, who additionally held a bachelor's degree in nursing.

Joy achieved complete independence subsequent to the performance of 56 various

procedures (i.e., colonoscopies, endoscopies, and flexible sigmoidoscopies). Joy required 14 total

days of preceptored orientation. Joy required a total of 63 hours of preceptored orientation before

complete independence was achieved for the entire orientation process.

r, r^2), and r_s were computed to assess the relationship between orientee Joy and

preceptors Mike, Jan, and Fran. There was a positive correlation between Joy, Mike, Jan, and

Fran. $r = +0.92$, $r^2 = 0.85$, $n = 14$, p = <.0001, 95% CI = +0.78 < = r > = +0.98, and r_s = +0.94.
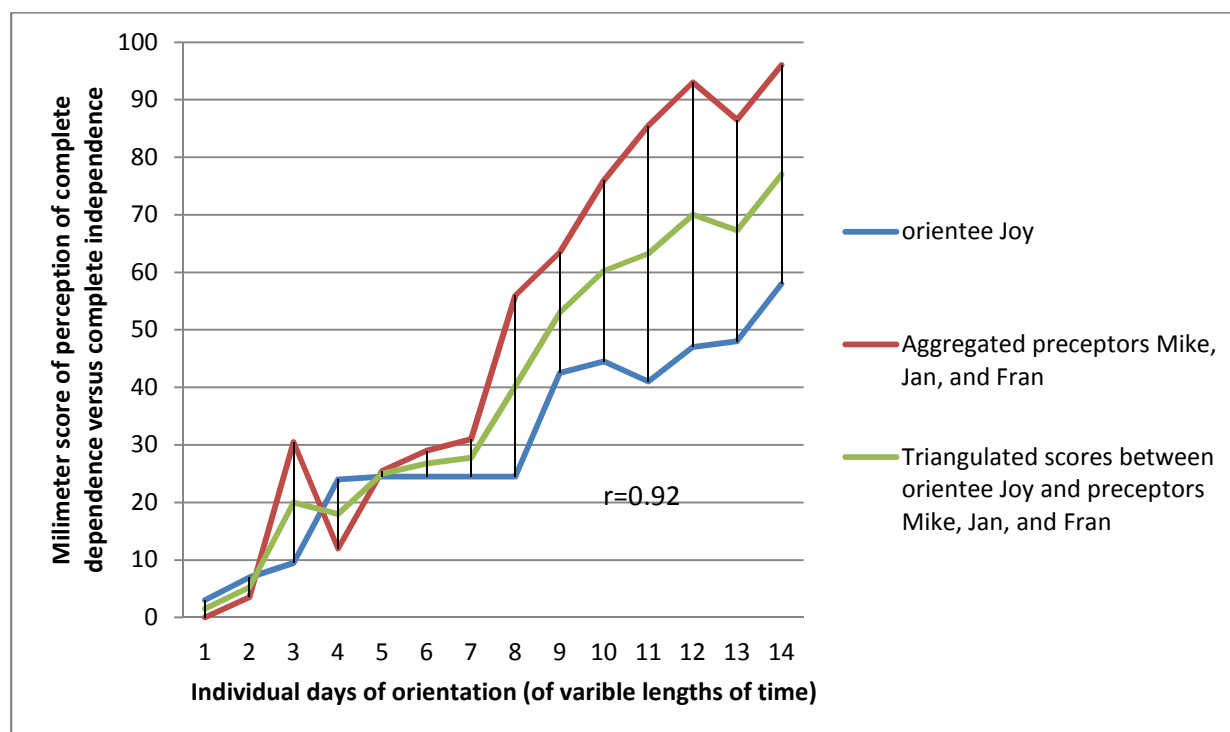
Figure 4.9. Learning curves for orientee Joy and aggregated preceptors Mike, Jan, and Fran, and
the triangulated learning curve (*n* = 14).
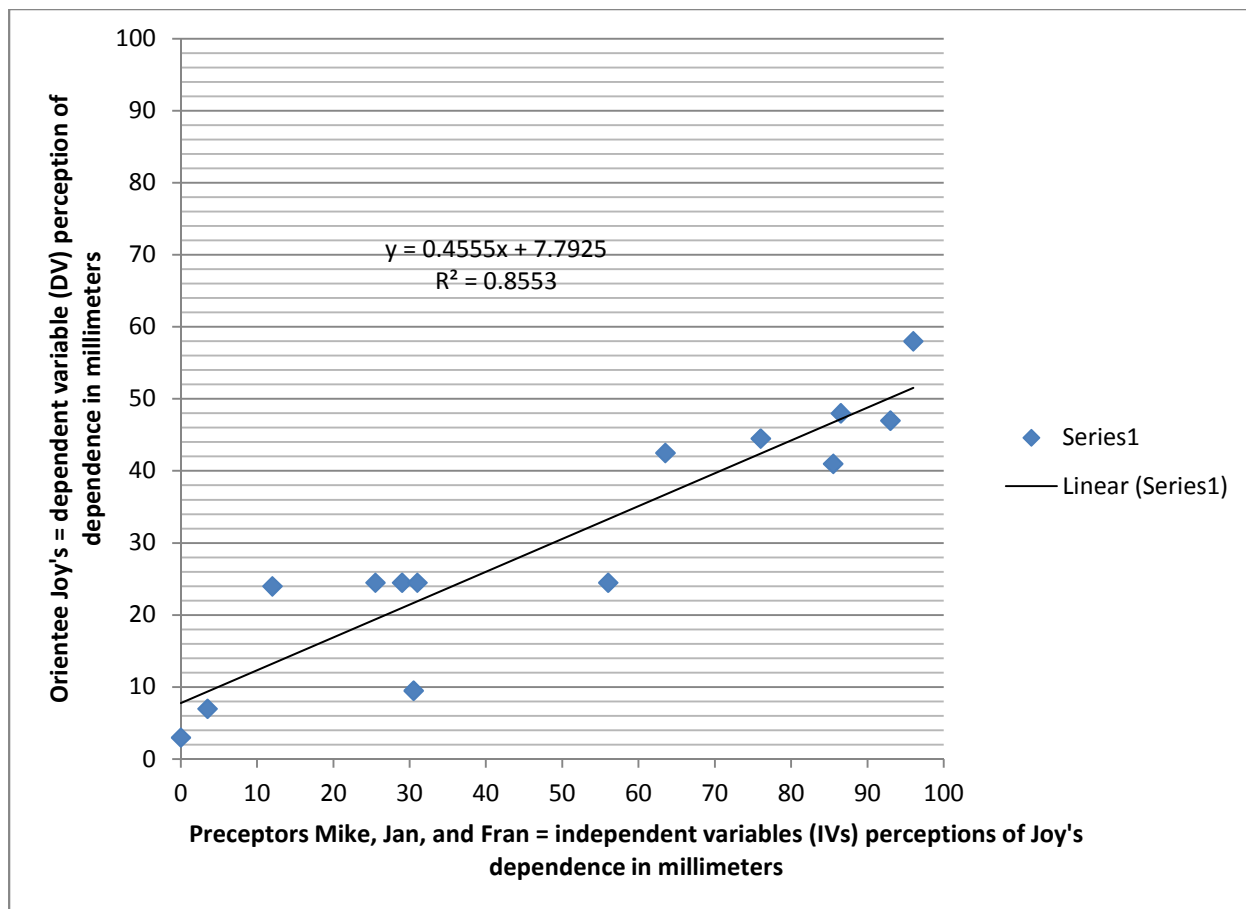
Figure 4.10. Scatter plot and regression line between orientee Joy and preceptors Mike, Jan, and Fran (*n* = 14).

Case # 6. Case number six consisted of one orientee, and 9-paired observations with one preceptor. This case represents competency acquisition and demonstration primarily related to the cognitive domain of learning. Specifically, orientee Pam was a 47 to 52 year-old Caucasian female with greater than 18 years of professional nursing experience as a RN, and no years of specialized gastroenterology nursing experience, who additionally held an associate's degree in nursing. preceptor Shawn represented a 30 to 35 year-old Caucasian male with 6 to 11 years of professional experience as a RN, and three to five years of specialized gastroenterology nursing experience, who additionally held a bachelor's degree in nursing. Preceptor Faith was a 53 to 58 year-old Caucasian female with 12-17 years of professional nursing experience as a RN, and 3 to

5 years of specialized gastroenterology nursing experience, who additionally held a bachelor's degree in nursing.

Pam achieved complete independence subsequent to the performance of 53 various procedures (i.e., colonoscopies, endoscopies, and flexible sigmoidoscopies). Pam required nine total days of preceptored orientation. Pam required a total of 67 hours of preceptored orientation before complete independence was achieved for the entire orientation process.

r, r^2, and r_s were computed to assess the relationship between orientee Pam and preceptors Shawn and Faith. There was a positive correlation between Pam, Shawn, and Faith. r = +0.93, r^2 = 0.90, n = 9, p = 0.000118 which was significant at the 0.05 critical alpha level (2-tailed), 95% CI = +0.71 < = r > = +0.99, and r_s = +0.98.
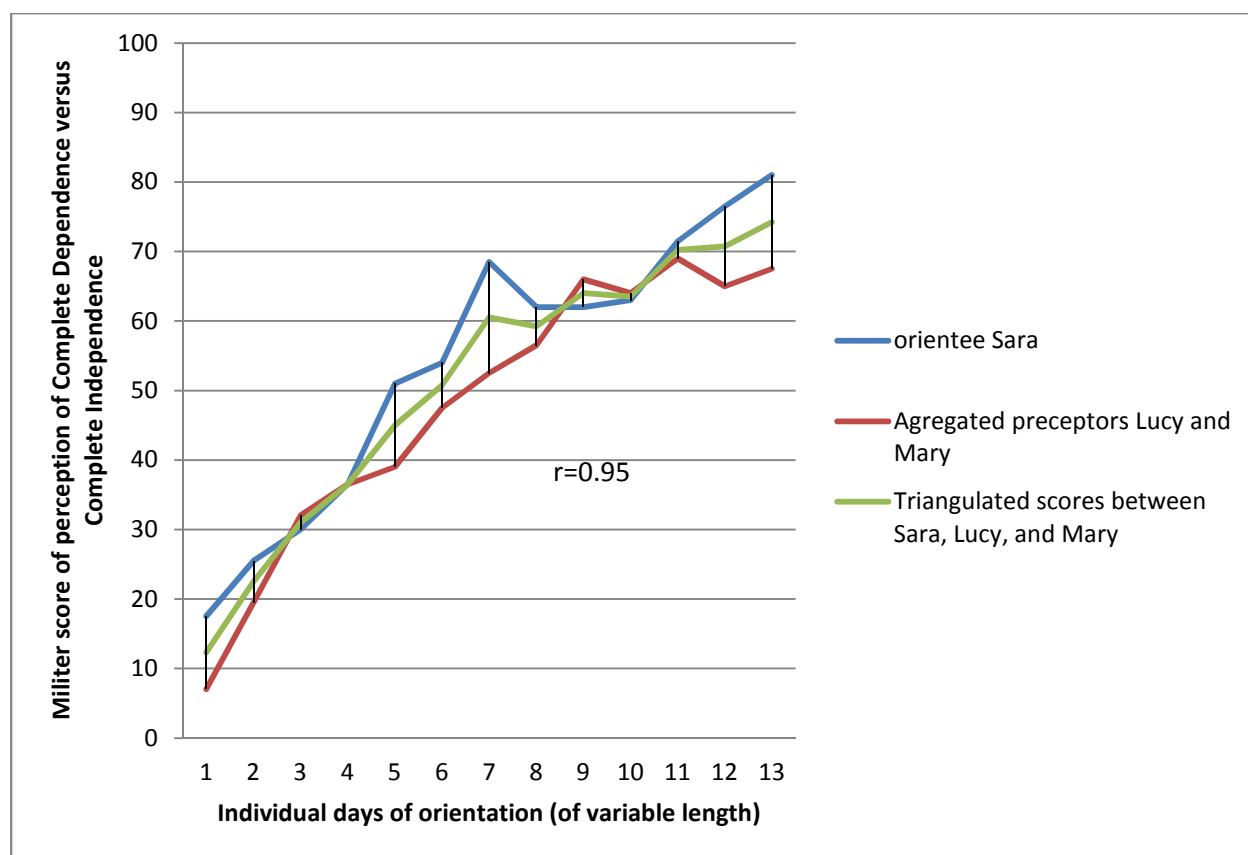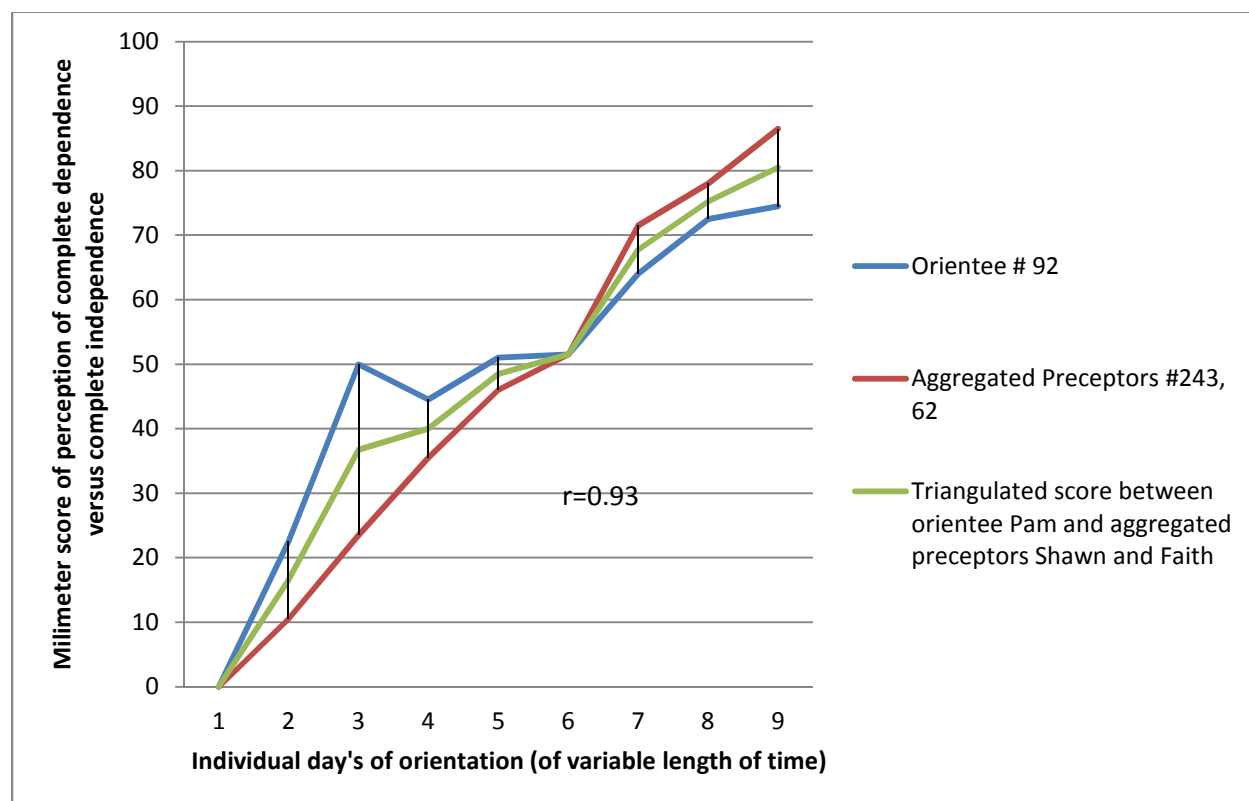

Figure 4.11. Learning curves for orientee Pam and aggregated preceptors Shawn and Faith, and the triangulated learning curve (*n* = 9).
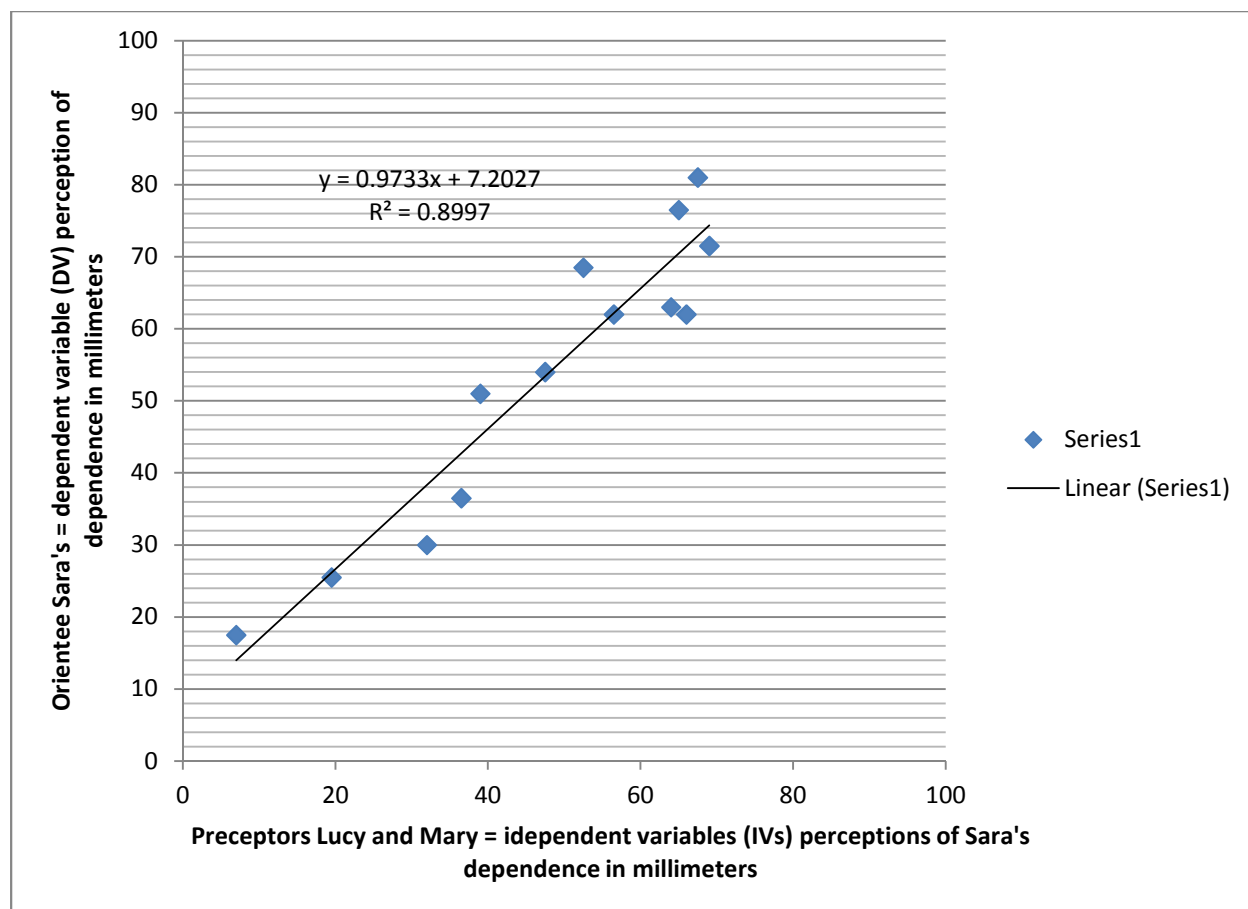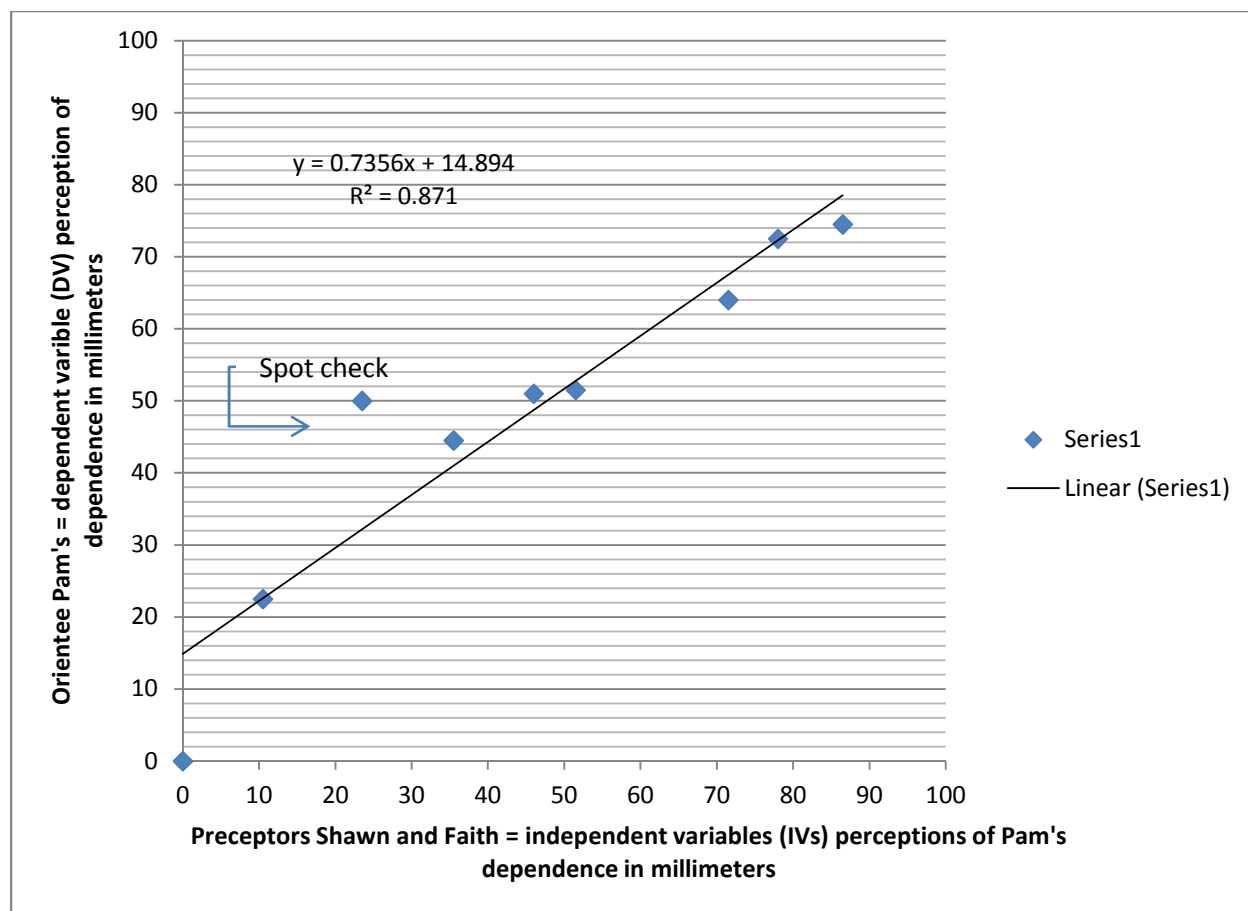
Figure 4.12. Scatter plot and regression line between orientee Pam and preceptors Shawn and Faith (*n* = 9).

Analysis of Findings

The data gathered provided the evidence necessary to answer the study's questions and ultimately either reject or accept the original hypotheses H_1 and H_2 and by extension, their null hypotheses as well.

Therefore, data were analyzed to answer study questions one and two, namely:

1. Can a triangulated score of independent perceptions characterize a learning curve for nurses?

2. Does the strength of the interaction between nurse preceptor and nurse orientee influence the characterization of the nurses' learning curves?

It was beneficial to utilize both descriptive and inferential bivariate correlational statistics in order to objectively accept or reject hypothesis number one (H_1), namely: Complete Independence (i.e., transaction will be achieved if a positive correlation results from the interaction as depicted by a learning curve between nurse orientee and nurse preceptor as evidenced through both self and preceptor assessment). Based upon the data obtained from the observations of participant contained within cases 1-6 as presented in Tables 4.2-4.7, H_1 is accepted, thus; H_1: $+\rho_{xy}$ = complete independence.

Table 4.2
The Correlational Statistics Related to the Individual Cases of Observations Related to the Orientation Process (*n*=15)

CASE #	*n* =	*r*	r^2	P= For *r* (directional) & (non-directional)	95% CI	R_s	P= For r_s (directional) & (non-directional)	Orientee Achieved Complete Independence Yes / No	Days Until Complete Independence Achieved
1	4	+0.75	0.56	P = 0.13 P = 0.30	-0.758 < = r > = +0.994	+0.8	*n* is too small	Y	16
2	23	+0.97*†	0.94	P = <0.0001 P = <0.0001	+0.928 < = r > = +0.987	+0.95*†	P = <0.000 P = <0.000	Y	23
3	37	+0.98*†	0.96	P = <0.0001 P = <0.0001	+0.958 < = r > = +0.988	+0.99*†	P = <0.000 P = 0.000	Y	37
4	13	+0.95*†	0.90	P = <0.001	+0.833 < =	+0.92*†	P = 0.000	Y	13

				P = <0.0001	r > = +0.984		P = 0.000		
5	14	+0.92*†	0.85	P = < 0.0001	+0.775 < =	+0.94*†	P = 0.000	Y	14
				P = < 0.0001	r > = +0.976		P = 0.000		
6	9	+0.93*†	0.90	P = 0.000	+0.709 < =	+0.98*†	Significant	Y	9
				P = 0.000	r > = +0.986		according to table of critical values of r_s		

Note. CI= confidence interval.
Cases are composed of a single orientee and various numbers of preceptors.
†$p < .0001$, one-tailed; *$p < .0001$, two-tailed.

Data were also analyzed to answer study questions 3 and 4:

3. Does the transaction between nurse preceptor and nurse orientee influence the temporal

    length of orientation for the orientee?

4. Can a preceptor's perceptual score predict an orientee's perceptual score of perceived

    dependence or independence?

Both descriptive and inferential bivariate correlational statistics were used to accept or

reject hypothesis number two (H_2), namely: A stronger Interaction between orientee and

preceptor as evidenced by a greater positive calculated percentage of the product-moment

correlation between the two will result in a chronologically abbreviated orientation process, the

data appears to support a stratified H_2, with regard to the participants observational data

contained within cases 1-6, as presented in Tables 4.2-4.7, Thus, H_2: > +ρ_{xy} = < □ preceptored

orientation days.

Although the majority of the participants' observational cases resulted in statistically significant results, namely, observational cases 2-6, the participants' observational data contained within case 1 did not yield statistically significant results. Upon review of the data, it appears obvious why or how the deviation occurred. The primary factor appears to be related to the lack of consistent data collection on the part of preceptor Sheila. Although the data did not achieve statistical significance, the data recorded by orientee Mike clearly manifests a learning curve from the perspective of the orientee, and retains usefulness from a simply descriptive, rather than a statistically inferential, or predictive standpoint. Despite lacking statistical significance, what remains interesting is that analyzing data recorded by preceptor Sheila, the r remains moderately strong. In fact, according to Polit and Beck (2008), a r of 0.70 would be considered high in relation to correlation measures of psychosocial variables (p. 571). The inconsistent data collection significantly increased the probability of committing a type II error by resulting in an inadequate power (1-β). In fact, based upon a r of 0.75 this study would require at least 10 paired observations between the preceptor and the orientee in order to identify a true difference between H_0, H_1 and H_2 for a power of 0.8 and a directional hypothesis alpha of 0.05, given the formula presented in Figure 4.13. Therefore, with regard to the observational participant date contained within case # 1, lacking inferential statistical significance, the ability to accept or reject this study's hypotheses related to this case are based primarily upon descriptive statistics, and because of this, the primary null hypothesis has been rejected as a learning curve was characterized based upon the transaction generated via the interactions between the preceptor and the orientee as evidenced by a positive correlational relationship which ultimately resulted in complete independence. Similarly, the second null hypothesis has been rejected in regards to the observational participant data contained within case # 1 because

the results of this case were consistent with the second hypothesis in that the participants' data

contained within case # 1presented the weakest correlational relationship, and consequently

resulted in the chronologically lengthiest orientation in order to achieve complete independence

for the Psychomotor (Technical) Phase of orientation.

Finally, in consideration of the data, or lack thereof, related to the observational

participant data contained within case # 1, I believe the statistical insignificance derived from the

data probably represents a Type II error as a result of a small n. Thus, I accept that the statistical

probability that the correlation coefficient probably represents a chance finding in relation to the

population this relationship represents.

$$z = \frac{1}{2}\ln\left(\frac{1+r}{1-r}\right)$$

$$n = 3 + \frac{4\,z_\alpha z_\beta}{\ln\left(\frac{1+r}{1-r}\,x\,\frac{1-r_0}{1+r_0}\right)^2}$$

Figure 4.13 Formula used to determine minimum number of sample size for predetermined
power and alpha based upon known, theoretical or arbitrary r.

In considering H_2, consistent patterns emerged within the data regarding all phases of the

orientation process, although this was posited by H_2 specifically with regard to the primarily

psychomotor phases of learning presented in Tables 4.3-4.4. The data presented in Tables 4.5-4.6

suggest H_2 extends to the primarily cognitive phases of learning described as both the "Sedation

Phase" and the "Recovery Phases." These patterns were not contiguous across all cases, but

rather circumscribed to specific credential and educational levels. Please refer to Tables 4.3, 4.4,

and 4.7 to observe the specific patterns which have been illuminated once stratification according

to credential and educational level have been imposed.

It is also of note that Generalized Nursing Experience appears to influence the co-

variability as described by *r* as evidenced by Total Days of Orientation as presented in Table 4.3,

and appears to represent a positive correlation (i.e., as Generalized Nursing Experience increases,

so too does the Total Days of Orientation). Not surprisingly, this phenomenon is not transferable

to the participant observations contained within the cases presented in Table 4.4, but rather,

appear to manifest as an independent phenomenon related to a function of co-variability of

Specialized GI Nursing Experience as described by *r* as evidenced by Total days of Orientation.

Specifically, it appears to represent a negative correlation (i.e., as Specialized GI Nursing

Experience becomes greater, a decrease is observed in the Total Days of Orientation until

Complete Independence is achieved). Please refer to the data presented in Table 4.4.

Table 4.3
Stratified Demographics and Correlational Statistics for the "Technical Phase" of Orientation
Related to Specific Credential and Educational Levels

Case#	Orientee #	Age	Highest degree earned	Credential	Gender	Race	General nursing experience (# yrs)	Specialized GI experience (# yrs)	*r*	*r*^{2}	Total days of technical orientation phase
4	43	24-29	AS	LPN	F	AA	1-5	0	+0.95	0.90	13
5	77	41-46	College Diploma	LPN	F	W	6-11	0	+0.92	0.85	14
1	280	36-41	College Diploma	LPN	M	W	12-17	0	+0.75	0.56	16

Note. GI = Gastroenterology.

Table 4.4

Stratified Demographics and Correlational Statistics for the "Technical Phase" of Orientation
Related to Specific Credential and Educational Levels

Case#	Orientee #	Age	Highest degree earned	Credential	Gender	Race	General nursing experience (# yrs)	Specialized GI experience (# yrs)	R	r^2	Total days of technical orientation phase
3	141	59-64	BA/BS	RN	F	A/PI	12-17	9-11	+0.94	0.88	9
2	214	41-46	BA/BS	RN	F	W	12-17	3-5	+0.86	0.74	10

Note. GI = Gastroenterology.

The data pattern for support of H_2 were not contiguous across all cases, but rather,

circumscribed to a specific educational level. This was particularly evident during the

"Recovery Phase" of orientation as presented in Table 4.6. Specifically, the participants

observational data contained within case # 6 represents as an anomaly of H_2 in that despite a

weaker *r*, less days were required in order to achieve Complete Independence for the recovery

phase of orientation; despite the data not supporting H_2, H_1 was supported by the data as

presented in Table 4.6; however, if stratification of educational level were employed, or if the

participants observational data contained within case # 6 were to be removed --as it has been

presented in Table 4.7-- H_2 would have been supported throughout all phases of orientation (i.e.,

Technical (psychomotor) and Recovery & Sedation (cognitive) phases). Incidentally, these

patterns are confined to RNs because the "Sedation and Recovery Phases" are outside the scope

and practice of the LPNs/LVNs. Please refer to Tables 4.5 - 4.7.

Table 4.5
The Demographics and Correlational Statistics for the "Sedation Phase" of Orientation

Case#	Orientee #	Age	Highest degree earned	Credential	Gender	Race	General nursing experience (# yrs)	Specialized GI experience (# yrs)	r	r^2	Total days of sedation orientation phase
2	214	41-46	BA/BS	RN	F	W	12.17	3-5	+0.97	0.94	9
3	141	59-64	BA/BS	RN	F	A/PI	12-17	9-11	+0.94	0.90	15

Note. GI = Gastroenterology.

Table 4.6
The Demographics and Correlational Statistics for the "Recovery Phase" of Orientation

Case#	Orientee #	Age	Highest degree earned	Credential	Gender	Race	General nursing experience (# yrs)	Specialized GI experience (# yrs)	r	r^2	Total days of recovery orientation phase
2	214	41-46	BA/BS	RN	F	W	12.17	3-5	+0.99	0.98	4
3	141	59-64	BA/BS	RN	F	A/PI	12-17	9-11	+0.95	0.90	13
6	92	47-52	AS	RN	F	W	>18	0	+0.93	0.87	9

Note. GI = Gastroenterology.

Table 4.7
Stratified Demographics and Correlational Statistics for the "Recovery Phase" of Orientation Related to Specific Credential and Educational Levels

Case#	Orientee #	Age	Highest Degree Earned	Credential	Gender	Race	General Nursing Experience (# yrs)	Specialized GI Experience (# yrs)	r	r^2	Total days of recovery orientation phase
2	214	41-46	BA/BS	RN	F	W	12.17	3-5	+0.99	0.98	4
3	141	59-64	BA/BS	RN	F	A/PI	12-17	9-11	+0.95	0.90	13

Note. GI = Gastroenterology.

What is striking about the data presented in Table 4.5 for both of the participants

observations related to the data contained within cases, #2 and #3, as well as that particular

"Phase" of orientation (i.e., the "Sedation Phase"), is that these data presented represent the

converse interpretation of data presented for the "Technical Phase" of RNs as expressed in Table 4.4. This is striking because it seems counter intuitive that a RN with a greater amount of specialized GI nursing experience would require more days of orientation during the sedation phase. The assumption being that the cognitive endeavor related to sedating patients would not vary dramatically from GI department to GI department or across institutions that provide moderate sedation within their GI departments. It should be noted however, that the GPD at the Minneapolis VA utilizes a computerized procedure documentation system called Provation MD® for recording sedation activities. It was revealed that orientee May had no previous experience with Provation MD® or electronic health record systems (EHRs) in general. This may represent an influencing co-variable related to this particular set of findings. An additional note of importance related to only the participant observation data contained within case # 2 involves whether the orientation process was separated into phases from the perspective of the orientee and preceptor. Specifically, the participant observation data contained within case # 2's orientation process was documented on the VAS as a perceived continuous process, documented from both the preceptor's, as well as the Orientee's, perception of dependence while transitioning seamlessly from phase to phase (i.e., from recovery phase, to sedation phase, to finally the technical phase). Whereas, for the participant observation data contained within case # 3, the phases were documented on the VAS as discreet phases. Thus, following complete independence of the orientee for the first phase of orientation (i.e., recovery phase), 100mms were added to the scores documented for the second phase of orientation (i.e., sedation phase); this provided the continuity necessary to characterize the learning curve as a continuous phenomenon. For example, 100mms is the greatest measurement possible during the first phase of orientation; however, during the second phase of orientation, the Principle Investigator (PI)

would simply add 100 to the measurement taken during second phase of orientation. Thus, if the orientee marked a x representing her/his state of dependence for that particular phase that measured only 1mm, the PI would simply add 100 to the 1mm and ultimately record 101mm for that particular point in time, for that particular phase of orientation. This process was repeated for the final phase of orientation, namely, the technical phase. Hence, when all three phases of the orientation process were completed as evidenced by complete independence of the orientee, the greatest score possible would be 300mms.

The rationale for documenting the orientation as continuous process on the VAS versus a phased process stemmed from the previous studies revealed within the literature search. Specifically, none of the previous studies had constructed or instituted phases of learning; rather, they appeared to conceptualize the learning process from a gestalt perspective. This is also consistent for learning curves described by industrial management (Winslow, 2007). Thus, the gestalt perspective was trialed in this study.

Although H_1 and H_2 appear to be supported by the data presented in Table 1, formal complaints were received by the PI from both the orientee and the preceptor involved with the participant observation data contained within case # 2. Specifically, both groups reported that it was difficult to conceptualize the gestalt of the orientation process, and in turn, make accurate judgments of perception at specific points in time for such a perceived comprehensive expanse of orientation time. Despite the legitimate concerns of the participant related to case # 2, the data for the participants related to case # 2 do not appear to substantiate those concerns as evidenced in Table 4.2. In fact, the calculated *r* related to those orientees and preceptors who participated within case # 2 represented the second strongest relationship among the six cases of participant observation that were studied. Although, those *r* scores are impressive, it is not only the strength

of the scores that determine validity, but rather the inferences from the scores that also determine

validity (Burns & Grove, 2005, pp. 376-377). These expressed concerns, as well as the

inferences generated by the participant observation data contained within case # 2, appear to lend

an increased degree of credence to both the study's internal and construct validity. Consequently,

based upon the inferences derived from analyzing the data, in conjunction with King's theory,

the VAS tool appears to represent a highly plausible method for determining construct validity

based upon the previously mentioned logical theoretical framework, namely: According to

King's theory (K): 1) if perceptual accuracy (positive correlation) is present in interactions(X),

then transactions will occur (Y). 2) if transactions(Y) are made, goals will be attained (Z) 3),

thus, if (X) then (Y) , if (Y), then (Z) ; The VAS instrument (A) is theorized to measure both

direction and strength of (X); Therefore, if scores on (A) correlate positively as predicted by (K),

it is inferred that (A) is a valid measure of (X). Therefore, according to the data presented in

Table 4.2; because there were positive correlations present in all the interactions (as evidenced

by the VAS tool), perceptual accuracy was inferred to be present, because perceptual accuracy

was present in the interactions, transactions were made, because transactions were made, goals

were attained as evidenced by the successful attainment of Complete Independence for the

orientation process. Therefore, because the VAS was able to provide a measure of magnitude

and direction regarding the theoretical construct of Interaction as conceived by (King, 1995),

with regard to the various participants within the cases of the study, it provided the inferences

necessary to ascertain a certain degree of logical evidence for this study's measuring tool (the

VAS) related to construct and internal validity. Thus, it appears that the VAS has operationalized

the theoretical constructs in a meaningful and appropriate fashion, which indicates that the

conceived VAS tool provides a feasibly valid approach for increasing the probability of properly accepting or rejecting the study's hypotheses.

Similarly, the data presented appear to support some of the aspects of the attributes inherent to external validity as well. For example, Polit and Beck (2008) described external validity as the ability of the inferences made --in this case, inferences drawn from the data derived from the VAS tool-- will remain consistent despite demographic variability, time, measures of outcome, or setting (p. 287). The results of this study appear to reflect inferential consistency regarding the outcome of dependence across demographic variability, and across time; however, the external validity with regard to context, and alternative outcome measures remains to be determined.

The reliability of the study's data is inextricably related to the primary measurement instrument. For this study, the VAS represents the measurement instrument of concern. According to Burns and Grove (2005), reliability of a measurement instrument is directly related to the random error inherent to the measurement method (p. 374). According to Polit and Beck, (2008) reliability refers to the extent a measurement instrument reduces the amount of error within its score (p. 452). According to the results presented in Table 4.2, the statistical probability of obtaining the calculated r was less than 5%. Therefore, the VAS appears to be capable of reliably measuring the attribute inherent to that of the study, namely dependence, in five of the six cases.

A curious phenomenon related to the data was observed, in that H_2 remains consistent when stratified by Credential, and Highest Degree Earned, yet breaks down when all cases are consolidated for a comparison of the plausibility of H_2.

After reviewing the study design, it has become obvious with regard to the stratification of Highest Degree Earned, that a confounding variable effecting the number of days necessary in order to achieve Complete Independence may be significantly affected by Selection Bias. According to Polit and Beck (2008), selection bias occurs when individuals are not assigned randomly to groups…[therefore]…differences on outcomes may result from initial differences rather than from the effect of the independent variable" (p. 295). Thus, if the participant observation data contained within case # 6 was stratified with an increased numbers of associate-prepared RNs it may have elucidated both a pattern, and a difference specific for that particular group that may have reached the power and alpha necessary to increase the probability of accepting a provisionally stratified H_2. However, at present, the refutation of H_2 for educationally un-stratified RNs, probably represents a Type II error due to the low sample size of RNs without a bachelor's degree enrolled in the study.

In considering the Credential of the participants, it became evident with regard to the stratification of Credential, that a confounding variable related to the number of days necessary in order to achieve Complete Independence existed, and potentially represented an ordering bias. Specifically, because LPNs/LVNs are not oriented to the sedation phase, they are deprived of the ability to observe and reflect upon the psychomotor tasks associated with the "Technical Phase" of orientation for which they will be required to demonstrate at least a basic level of competence. In contrast, every RN was exposed to the psychomotor tasks consistent with the "Technical Phase" of orientation, during the "Sedation Phase" prior to being responsible for the learning acquisition and demonstration of the associated tasks of the "Technical Phase" of orientation that follows. This has provided the opportunity to observe and reflect upon their observations and theoretically learn from them, and hence, potentially decrease the temporal learning time

necessary to achieve complete independence. Reflection is a complex cognitive activity, the details of which are beyond the scope of this analysis. However, the conceptual origination has been credited to Dewey (1933), who expanded upon the works of much earlier philosopher's such as Aristotle, Plato, and Buddha (Hatton & Smith, 1995). I would argue however, that based upon the orientee's current position in the orientation phase, namely, Sedation Phase, they are in essence within the Reflective Observation learning style of the processing continuum related to the cycle of learning very well described by Kolb (2005). While watching the technical nurse, they were witnessing the technical nurse performing specific tasks, while observing, they were presumably Assimilating, according to Kolb (2006) terminology, the ideas and concepts being observed. This appears highly congruent with the concept of Reflection-On-Action where reflection during the observed practices, and "deliberating afterwards about what happened during their lessons, mulling over events soon after they took place" (Hatton & Smith, 1995, p. 42) seems completely plausible. This in retrospect was evidenced as questions were fielded by preceptor's regarding specific technical components not related to the actual current phase of orientation (i.e., Sedation Phase).

Furthermore, Hatton and Smith's (1995), concepts of Reflection-On-Action and Reflection-In-Action appear to have been manifested to some degree within the study's results, in part, as a result of simply completing the VAS tool itself. In fact, the VAS appears sensitive enough to detect when reflection is exerting its attribute, as well as specific enough to detect when its effect is not present, as evidenced in its ability to distinguish those participant observation cases apparently effected, or unaffected by the attribute of reflection, as elucidated by the stratified data presented. Reflection-On-Action can further be analyzed as, Technical, Descriptive, Dialogic, or Critical. These ordinal descriptors have been postulated to represent a

taxonomy of reflective development, wherein various levels of Reflection-On-Learning may be pragmatically employed and more effectual within certain contexts, rather than others. While Reflection-In-Learning, and Reflection-On-Learning are not typically viewed from a hierarchal stage of development, Reflection-In-Learning does seem to represent a more advanced stage of reflective development, in that those who are said to be Reflecting-In-Action have reached the level of professional development, such that thought--both past and present--are contemporaneously amalgamated within current action, whereby modifications of current action are instantaneously possible, this ability to Reflect-In-Action is said to represent professional competence, as well as distinguish professional from non-professional practices (Hatton & Smith, 1995, pp. 34-35). Furthermore, this taxonomy, and potentially argued hierarchy, is congruent with certain theories of nursing. Specifically, with regard to those with conceptual ideas typified by the notion of beginner to professional, and is similarly appreciated in such influential works of thought within nursing, such as that explicated by Benner's (1984a) theory of Novice to Expert. In comparison with this nursing theory, experts would be expected to have reached the reflective developmental stage of Reflection-In-Action, wherein Benner (1984a), affirms the learner, in this case the orientee, would be conceived as a situational participant constantly influenced by reflective as well as non-reflective perceptions of meaning (Brykczynski, 2006, p. 144). Additionally, Benner, et al., (1999) have explicated an approach called Thinking-In-Action, which appears highly analogous with Reflection-In-Learning (Brykczynski, 2006, p. 141). Reflection-On-Learning, and Reflective Observation explicated by Hatton & Smith (1995) and Kolb (2005) respectively, appears to ease the transition to Active Experimentation or the doing side of the processing continuum related to the cycle of learning as explicated by Kolb, as evidenced by the presented data. Specifically, by the decrease of Total

Days of Orientation for that particular phase of orientation (i.e., the technical phase). For example, once RNs are transitioned from the "Sedation Phase" to the "Technical Phase" of the orientation process, the orientees appear to then Reflect-In-Action, which represents reflection on their actions as they are actually unfolding, such that the orientees are simultaneously contemplating the reasoning for their actions while they were actually engaged in performing them. It therefore represents the "contextualization of multiple viewpoints" of applied practice (Hatton & Smith, 1995, p. 45).

Thus, is appears that reflection represents a deliberate cognitive process (Hatton & Smith, 1995) representing an epistemological form of learning, that was utilized by the orientees during the orientation process, such that it appears to potentially represent a co-variable affecting the characterization of the learning curve, especially with regard to the temporal variability as demonstrated by the achievement of Complete Independence and by extension, a co-variating attribute of the construct of Complete Independence or Dependence as conceived upon a continuum of dependence as articulated via the VAS.

With regard to the regression lines presented throughout cases 1-6, they have provided the ability to summarize the relationship between the explanatory independent variable x (i.e., the preceptor), and the responsive dependent variable y (i.e., the orientee), such that for one increase in x, y increased by a certain value (i.e., the value of b). This was appreciated mathematically by the formula, $y = bx + a$, and in essence, yielded equations with predictive capacity.

A final observation was observed between the batches described throughout the literature review and the batches derived from the case data of this study. As recalled from the literature, it seems as though batch size was, at worst, arbitrary, and at best, subjectively determined based on

individual investigator's perceptions and determinations. Nevertheless, the previous studies consisted of batches of observations that ranged from 10 to 35 task performances or observations. The methodology utilized to conceptualize batch construction for this study was simple, and was determined by summating the total number of procedures the orientee participated in until complete independence was achieved, and included colonoscopy, endoscopy, and flexible-sigmoidoscopy. Given this formula, and n=6, the batches for this study ranged from 33 to 56 with an average of 45.5 performances required until Complete Independence was achieved. Only about 33% of this study's results are consistent with the range described in the literature. It is impressive that the apparently arbitrary conceptualization of batch size observed in the literature, could approximate roughly 33% of that deduced from a cogent methodology related to self and peer perceptions, as was utilized for this study. Conversely, the methodology utilized for this study produced results that differed from the literature by 67%. Thus, it remains to be determined whether the study batches differed from the literature batches based solely upon the use of a batching methodology, or whether it was instead a more accurate reflection, and function of both the study design and methodology.

Chapter V

Summary of Findings, Conclusions, and Recommendations

Overview

The summary of findings includes the demographic characteristics of the participants, as well as the findings of the individual case of observations. This chapter also addresses study conclusions, including recommendations for (a) research, (b) nursing, (c) nurse educators, (d) nursing theory development.

Summary of Findings

The findings have been derived from six orientees and nine preceptors comprising six cases, which resulted in 200 individual scores, and 100 paired perceptual scores of dependence.

The study participants' demographics were categorically analyzed utilizing descriptive statistics, which yielded percentages of age ranges, gender, race, highest degree earned, professional credential, years of generalized professional experience, and years of specialized GI nursing experience. Additionally, the data derived from the case observations were analyzed utilizing both descriptive as well as inferential statistics, which yielded correlation coefficients, coefficients of determination, confidence intervals, and probabilities of statistical significance in order to assist in the judgment to either accept or reject the study's null hypotheses, as well as identify unique patterns inherent to the data, and specific to the samples.

Categories Related to the Preceptors' Demographics

Preceptors' age ranges. The data revealed that the largest percentage of preceptors (34%) were between the ages of 30 to 35 years of age, followed by equal percentages (22%) of those between the ages of 36 to 41 years of age and 47 to 52 years of age, and finally, split

evenly (11%) between those whose age ranged between 24 to 29 years of age and those ranging between 59 to 64 years of age.

Preceptors' gender. The majority were female (67%) with males making up 33%.

Preceptors' race. There was no variability within the ranks of preceptors as Caucasian's represented 100% of the preceptors within the study.

Preceptors' highest degree earned. The majority of the preceptors (45%) held a bachelor's degree, while those preceptors with either an aassociate's degree or a college diploma virtually equaled those with a bachelor's degree by comprising 44% of the study's preceptors. Master's prepared preceptors comprised 11% of the sample.

Preceptors' professional credential. The majority of preceptors (78%) were credentialed as a RN, while the remaining (22%) were credentialed as a LPN.

Preceptors' years of generalized nursing experience. A slight majority of preceptors (34%) had between six to eleven years of generalized nursing experience, followed closely (33%) by those with 18 or more years of generalized nursing experience, while those with 12 to 17 years constituted 22% of the sample. Finally, only 11% of the preceptors had between one to five years of generalized nursing experience.

Preceptors' years of specialized GI nursing experience. A slight majority of the preceptors (34%), had between one to two years of specialized GI nursing experience, followed closely (33%) by those preceptors with three to five years of specialized GI nursing experience. The remaining preceptors (22%) had six to eight years of specialized GI nursing experience, and (11%) had nine to eleven years of specialized GI nursing experience.

Categories Related to the Orientees' Demographics

Orientees' age ranges. The data revealed that the largest percentage of orientees (33%) were between the ages of 42 to 46 years of age, followed by equal percentages (17%) of those between the ages of 36 to 41 years of age, 47 to 52 years of age, and 59 to 64 years of age. Finally, 16% of the orientees were between the ages of 24 to 29 years of age.

Orientees' gender. The majority 83% of orientees were female, with males making up 17%.

Orientees' race. The clear majority (67%) of the orientees were Caucasian, with an equal representation (16.9%) for both African American and Asian/Pacific Islanders.

Orientees' highest degree earned. The variability of the highest degree earned among the orientees was virtually equivalent; however, the slight majority of orientees (34%) held a college diploma, whereas, those holding a bachelor's degree or an associate degree each comprised 33% of the sample.

Orientees' professional credential. The orientees were evenly split between practice credential (i.e., 50% were credentialed as a RN, while the other 50% were credentialed as a LPN).

Orientees' years of generalized nursing experience. 50% of the orientees had between 12 to 17 years of generalized nursing experience, whereas the those representing one to five, six to eleven, and 18 or more years of generalized nursing experience were evenly distributed at 16.9% within the sample.

Orientees' years of specialized GI nursing experience. The majority of the orientees (67%), had no years of specialized GI nursing experience, whereas, those orientees with three to five, and nine to eleven years of specialized GI nursing experience were evenly distributed respectively at 16.9% within the sample.

Summary of Findings for Participant Observation Data Contained Within Cases 1-6

With respect to study hypothesis number one (H_1), namely: Complete Independence (i.e., transaction will be achieved if a positive correlation results from the interaction as depicted by a learning curve between nurse orientee & nurse preceptor as evidenced through both self and preceptor assessment, and based upon the data obtained from cases 1-6 as presented in Tables 4.2-4.7), H_1 is accepted; thus, H_1: $+\rho_{xy}$ = complete independence.

Similarly, with respect to study hypothesis number two (H_2), namely: A stronger Interaction between orientee and preceptor as evidenced by a greater positive calculated percentage of the product-moment correlation between the two will result in a chronologically abbreviated orientation process, and based upon the stratified data from cases 1-6 as presented in Tables 4.2-4.7, H_2 is accepted; Thus, H_2: $> +\rho_{xy}$ = $< \square$ preceptored orientation days.

Although the preponderance of participant observation cases resulted in statistically significant results, namely, 2-6, the participant observation data contained within case # 1 presented as the study's sole outlier. Despite lacking statistical significance, the r remained moderately strong, and probably represented a type II error as a result of inadequate power ($1-\beta$).

Noncontiguous patterns related to both H_2 and all phases of the orientation process were identified; however, these patterns were circumscribed to specific credential and educational levels as presented in Tables 4.2-4.7.

When stratified according to credential and educational level, Generalized Nursing Experience appears to represent as a positive correlational co-variable, such that, as Generalized Nursing Experience increases, so too does the Total Days of "Technical Phase" of orientation. Please refer to Table 4.3.

When stratified according to credential and educational level, Specialized GI Nursing Experience appears to represent a negative correlational co-variable, such that, as Specialized GI Nursing Experience increases, Total Days of "Technical Phase" of orientation decreases. Please refer to Table 4.4.

The orientee associated with case # 6 was only oriented to the "Recovery Phase" as this orientee represented a temporary employee whose position was not expected to remain permanent. The data pattern related to this case does not appear to resemble any of the previously identified patterns presented in Tables 4.2-4.5, but in fact, may represent a unique pattern specific to the RN credential and the associate degree level of education. This was evident during the "Recovery Phase" of orientation as presented in Table 4.6.

The participant observation data contained within case # 2's orientation process was documented on the VAS as a perceived continuous process, documented from a gestalt perspective from both the preceptor's, and orientee's perception of dependence while transitioning seamlessly from phase to phase.

The phases of orientation as depicted by the participant observation data contained within case # 3, illustrate documentation of the VAS as discreet phases of orientation from both the preceptors, as well as the orientees perspectives.

The rationale for Case number two's methodological process was related to the previous studies revealed within the literature search. Specifically, they appeared to conceptualize the learning process from a gestalt perspective. This was also consistent for learning curves described by industrial management described in Winslow (2007). The motivation for altering the subsequent cases were due to formal complaints that were received by the PI from both the orientee and the preceptor involved with case # 2 related to the difficultly of conceptualizing the

gestalt of the orientation process, and in turn, making accurate judgments of perception at specific points in time for such a perceived comprehensive expanse of orientation time.

The inferences derived from the VAS tool data presented in Chapter 4, in conjunction with King's theory, appears to represent a highly plausible method for determining construct validity based upon the previously mentioned logical theoretical framework. Therefore, according to the data presented in Table 4.2, and because there were positive correlations present in all the interactions (as elicited by the VAS tool), perceptual accuracy was inferred to be present; because perceptual accuracy was present in the interactions, transactions were made, and because transactions were made, goals were attained as evidenced by the successful attainment of complete independence for the orientation process.

The VAS provided a certain degree of logical evidence for this study related to construct and internal validity. Thus, it appears that the VAS has operationalized the theoretical constructs in a meaningful and appropriate fashion, which indicates that the conceived VAS tool provides a feasibly valid approach for increasing the probability of properly accepting or rejecting the study's hypotheses.

External validity appears to be supported in part by the data presented. This study appears to reflect inferential consistency regarding the outcome of dependence across demographic variability, and across time; however, the external validity with regard to context, and alternative outcome measures, remains to be determined

The reliability of the study's data is inextricably related to the primary measurement instrument. For this study, the VAS represents the measurement instrument of concern. According to the results presented in Table 4.2, the statistical probability of obtaining the

calculated *r* were less than 5%. Therefore, the VAS appears to be capable of reliably measuring the attribute inherent to that of the study, namely dependence.

The VAS tool is able to objectively document daily changes in individual, and triangulated perceptions of dependence, within a dynamic and unpredictable clinical environment, that accounts for past experience and knowledge acquisition, in relation to the degree, or proportion of what has yet to be accomplished in terms of complete independence.

The need to stratify cases according to credential and/or level of education in order to realize H_2 despite phases of orientation, appears to be related to order bias and selection bias, specifically with regards to credential for the former, and level of education for the latter.

If the participant observation data contained within case # 6 were to be stratified with an increased numbers of associate prepared RNs, it may have elucidated both a pattern, and a difference specific for that particular group that may have reached the power and alpha necessary to increase the probability of accepting a provisionally stratified H_2. However, the refutation of H_2 for educationally un-stratified RNs, probably represents a Type II error due to the low sample size of RNs without a bachelor's degree enrolled in the study.

The regression lines presented throughout the individual cases have provided the ability to summarize the relationship between the explanatory independent variable x (i.e., the preceptor), and the responsive dependent variable y (i.e., the orientee), such that for one increase in x, y increased by a certain value (i.e., the value of b). This was appreciated mathematically by the formula, $y = bx + a$, and in essence, yielded equations with predictive capacity.

Given that *n*=6, the performance batches for this study ranged from 33 to 56 with an average of 45.5 performances required until Complete Independence was achieved. Only about 33% of this study's results are consistent with the range described in the literature. Thus, these

batches differed from the literature in that a methodology was utilized to construct them, and hence, reduced the variability of potential interpretations of those that might occur when no methodology is utilized.

Reflection appears to engender a co-variable of dependence as a result of order bias, and the VAS appears sensitive enough to detect when reflection is exerting its attribute, as well as specific enough to detect when its effect is not present as evidenced in the data presented.

Kolb's (2005) model of Experiential Learning appears relevant for describing how the orientee is processing the experiences they are immediately experiencing while in a particular phase of orientation.

Hatton and Smith's (1995) concepts of Reflection-On-Action and Reflection-In-Action appear to have manifested itself to some degree within the study, simply as a result of completing the VAS tool itself, and participating within a particular phase of orientation. Reflection-On-Action has theoretical similarities to such influential works of thought within nursing such as that explicated by Benner's theory of Novice to Expert, wherein she affirms the learner, in this case the orientee, would be conceived as a situational participant constantly influenced by reflective as well as non-reflective perceptions of meaning (Brykczynski, 2006, p. 144). Additionally, Benner, et al's., (1999) approach called Thinking-In-Action, appears highly analogous with Reflection-In-Action (Brykczynski, 2006, p. 141) which is

Reflection-On-Learning and Reflective Observation explicated by Hatton and Smith (1995) and Kolb (2005) respectively, appears to ease the transition to Active Experimentation, or the doing side of the processing continuum, related to the cycle of learning as explicated by Kolb (2005) this is evidenced by data presented in Table 4.2, specifically by the decrease of Total Days of Orientation for that particular phase of orientation (i.e., the technical phase). Reflection

represents a deliberate cognitive process (Hatton & Smith, 1995) representing an epistemological form of learning, capable of being articulated via the VAS.

Conclusions

In review of the study's hypotheses and questions, and in light of the study's results, the following conclusions have been reached.

With respect to study hypothesis number one (H_1), namely: Complete Independence (i.e., transaction will be achieved if a positive correlation results from the interaction as depicted by a learning curve between nurse orientee & nurse preceptor as evidenced through both self and preceptor assessment) was realized; thus, H_1: $+\rho_{xy}$ = complete independence.

Similarly, with respect to study hypothesis number two (H_2), namely: A stronger interaction between orientee and preceptor as evidenced by a greater positive calculated percentage of the product-moment correlation between the two will result in a chronologically abbreviated orientation process, was realized under the provision of credential and educational stratification; thus, stratified H_2: $> +\rho_{xy} = < \square$ preceptored orientation days.

With respect to question 1: "Can a triangulated score of independent perceptions characterize a learning curve for nurses?" The VAS tool was found capable of characterizing a learning curve derived from a triangulated scores of independence. With respect to question 2: "Does the strength of the interaction between nurse preceptor and nurse orientee influence the characterization of the nurses' learning curves?" The strength of interaction between preceptors and orientees as described by *r,* did influence the phenotype of the learning curve. With respect to question 3: "Does the transaction between nurse preceptor and nurse orientee influence the temporal length of orientation for the orientee?" The transaction inferred from the interaction

between the preceptor and orientee, as described by *r,* did influence the chronological length of the orientation process for the orientee, provided the temporal comparison has been stratified according to credential and level of education attained. Specifically, the stronger the interaction and thus transaction as evidenced by *r,* the shorter the orientation has been, when stratified. Finally, with respect to question 4: "Can a preceptor's perceptual score predict an Orientee's perceptual score of perceived dependence or independence?" It is possible to predict an orientee's perceived score of dependence based upon the preceptor's perceived assessment of the orientee's state of dependence as described by a regression model. The degree of predictive accuracy is related to the particular strength, and variability of the relationships described by *r.* Predictive capacity continues to be determined.

<div align="center">**Recommendations**</div>

Recommendations for Future Research

Future research regarding this methodology must be critically concerned with increasing the sample size of non-Caucasian preceptors to verify this study's findings, as well as potentially extending the range of learning curve characterizations that may exist due to racial variability of preceptors. Similarly, an increase sample of RN orientees with less than a bachelor's degree is seriously needed in order to increase the probability of discerning potentially specific and meaningful patterns within prospective samples.

Future research could be replicated with certain modifications of data collection. For example, perhaps altering the time of day that the VAS is collected. For instance, currently the VAS is completed by both of the participants, and collected at the close of business following the day of orientation; however it may alter the characterization of the learning curve if the VAS

were to be completed by both of the participant's and collected the following day (i.e., the morning of the next day).

Future research should be replicated with the goal of minimizing the number of preceptors involved with the orientation process of a single orientee. This could potentially lead to divergent scores of r.

Future research of this study could be replicated with a modification regarding the number of VAS tool collections (i.e., rather than daily collections, perhaps weekly, bi-weekly, random, or some variation thereof, to investigate how the learning curve characterization is altered).

Future research related to this study could include randomization of the orientees into groups where one group would complete the VAS; while the other group would not.

Future research should be directed toward formalizing an effective feedback system regarding the daily assessments generated by the preceptor in relation to the orientee. Although the exact scores produced by the participants should remain masked, perhaps if Bondy's (1983) clinical rating scale, or Holaday and Buckley's (2008) clinical evaluation tool is found to have a reliable relationship with the VAS, the categorical descriptive aspects of those tools could be helpful in behaviorally describing the orientee's triangulated current state of performance, assistance, and dependence in relation to the expected competencies could be provided. This objective feedback may offer the motivation to self-direct, seek a variety of opportunities to gain experience in order to achieve the goals mutually agreed upon and competencies required in order to become a completely independent practitioner within the particular context.

As discussed in the analysis of findings in chapter 4, reflection appears to be an important co-attribute incidentally identified via the VAS. Thus, it can be inferred that the VAS tool

provides some, as yet to be understood, measurement of reflection and does seem to require that participants engage in the cognitive activity of reflecting upon the previous learning experiences when completing the VAS tool. This is important, as the nursing literature has indicated the need to promote a reflective practice (Richardson & Maltby, 1995). In fact, over the past 20 years, reflection and a reflective practice have been widely accepted by nursing, and its epistemology integrated "into preparatory programmes [sic], continuing education programmes [sic], and by the regulatory bodies of a wide range of …healthcare professions" (Kinsella, 2009, p. 3), including nursing. Therefore, perhaps it would provide interesting future nursing research to elucidate the level of reflective development elicited via the actual completion of the VAS. Hatton and Smith (1995) provide a helpful analysis of the levels of reflective development for future guidance regarding potential research along this trajectory of thought.

Recommendations for Nursing

Nursing is a practice-based discipline, which requires clinical competence. Clinical competence involves the integration of both theoretical and clinical knowledge to effect positive clinical outcomes for patients. Recent research suggests new graduates lack expected clinical competencies from the view point of hospital administrators, which was corroborated by a survey of newly graduated nurses who expressed concern regarding their clinical competence as well (Hickey, 2010). In fact, a recent study found that 59% of new graduate nurses felt their orientation was inadequate for their needs (Budden, 2011, p. 23). Nurses involved with orientation of newly graduated nurses ought to utilize the VAS tool as it incorporates the orientee's perceptions related to the interactional effects, and provides an inference as to the degree with which the orientation methodology is meeting their learning needs. Similarly, nurses involved with staff development for newly graduated nurses ought to utilize the VAS instrument,

as the VAS provides the opportunity for service based nurses to apply an instrument predicated upon a nursing theory into their practice, in order to bridge the proverbial theory-practice gap. This is important, as the nursing literature has indicated the need to promote a reflective practice (Richardson & Maltby, 1995).As the act of completing the VAS tool appears to require some level of reflection on the part of those completing it, and reflection has been said to represent an epistemological form of learning (Hatton & Smith, 1995), perhaps requiring novice nurses to complete the VAS following psychomotor skill education sessions, may impart additional educational benefits such as decreased time spent on learning the task.

Recommendations for Nurse Educators

Nurse educators (NEs)ought to utilize the VAS tool in conjunction with psychomotor skill education as the VAS tool's constructs appear to plausibly operationalize the constructs inherent to the propositional suppositions of King's theory of Goal Attainment. Therefore it represents a pragmatic application of nursing theory to clinical practice.

Nurse educators should begin utilizing the VAS tool in conjunction with supervised psychomotor skill learning, especially those associated with the skills lab. The utilization of the VAS tool may ultimately benefit the NE because the application of the VAS provides the opportunity for the NE to incorporate an objectively rendered triangulated perceptual scoring methodology in order to generate learning curves related to specific psychomotor nursing tasks. This could provide objective criterion or norm referenced ranges for expected performances, given a certain task, such as following the proper steps in order to safely insert a foley catheter, and when certain students generate learning curves inconsistent with the expected criteriological or normative referenced ranges, that may provide the rationale for targeted educational interventions.

Nurse educators should investigate the potential of the VAS to represent a methodology or epistemological approach to teaching inferred aspects of decision-making, which result from critical thinking, as conceptualized by the American Psychological Association's Delphi study, especially with regard to analysis, inference, and evaluation, a subset of the six core skills of critical thinking identified by their study of critical thinking (Sorensen & Yankech, 2008), skills of which are required to some degree, in order to complete the VAS tool itself. The enhancement of both decision-making and critical thinking skills, while still in nursing school, has been theorized to aid in error reduction of novice nurses once transition to the service sector has been made (Saintsing, Gibson, & Pennington, 2011, p. 358). In fact, if complete independence is synonymous with some degree of competence, then according to Roth and Johnson (2011), a negative correlation exists between the practice error rate of new nurses, and greater scores of competence at both the four and six month interval of their first year of practice (p. 58); (i.e., as competence increases, practice error rates drop). Thus, it could safely be deduced that, if complete independence represents some degree of competence, then as degrees of complete independence (i.e., inferred competence increases, then a decrease in practice error rates will result, and patient death rates should decline as well.

The nursing literature has indicated a need to promote a reflective practice (Richardson & Maltby, 1995). As the act of completing the VAS tool appears to require some level of reflection on the part of those completing it, perhaps nurse educators should investigate methodologies to enhance reflective practice, specifically, with regard to identifying tasks or performances that engage one of the levels of Reflection-On-Action conceived by Schön (1983, 1987), and explicated by Hatton and Smith (1995).

Recommendations for Nursing Theory

The theoretical findings of this study have primarily been concerned with King's (1995) theory of Goal Attainment, specifically, with regard to construct operationalization via the VAS. Future research should be replicated with the goal of comparing the VAS to Bondy's (1983) Criterion-Referenced Rating Scale. There are theoretical construct similarities worth investigating and according to Holaday and Buckley (2008), Bondy's rating scale has established validity and reliability (p. 134). Specifically, Bondy has envisioned a five item ordinal scale of dependence, with labels such as: Dependent; Marginal; Assisted; Supervised; Independent. These labels are qualified by both behavior descriptors and the necessary assistance required from a preceptor, mentor, clinical educator, and so on. Along similar lines of thought, Holaday and Buckley have adapted Bondy's rating scale with notable construct changes in two of the ordinal labels from Independent to Self-directed, and Marginal to Novice, as well as the novel creation of percentages of time, in order to guide the label rating of the assessment decision related to the interpretation of both the qualified behavior descriptors, including the necessary assistance required of preceptors and others in the clinical environment. These changes appear innocuous enough so not to inhibit comparison with the VAS, but would help differentiate the empirical assessment results between that of ordinal scales and those of visual analog scales related to dependence, including whether ordinal scales provide the ability to characterize a learning curve.

A final recommendation in relation to nursing theory would be to determine whether the reflection induced by completing the VAS, which has foundational origins within King (1995) results in an increase of critical thinking skills. This is important, because accrediting bodies for nursing education, such as the National League for Nursing Accrediting Commission (NLNAC), require students to demonstrate critical thinking as an outcome of their programs to remain

accredited (Sorensen & Yankech, 2008). Specifically, by investigating whether evolving scores derived from the VAS tool positively correlate to some degree with scores from the California Critical Thinking Skills Test (CCTST) Form 2000 (Facione, Facione, Blom & Giancarlo, 2002). The CCTST was designed to measure analysis, inference, and evaluation, a subset of the six core skills of critical thinking identified by the American Psychological Association's Delphi study of critical thinking (Sorensen & Yankech, 2008), skills which are consistent with those necessary in order to complete the VAS tool.

<div align="center">**Summary**</div>

The previous and current research is clear, whether nurses are new to nursing or new to an unfamiliar nursing context, the new nurse deserves a structured orientation process which incorporates sufficient assessment of their proficiency, competence, or independence in relation to pre-defined competencies related to the unit of practice. The orientation process should incorporate their input and self-assessments, in order to individualize their learning needs. The VAS tool created for this study provides a coherent methodology underpinned by nursing theory that has demonstrated the ability to characterize a learner's growth over time and orientation phase (i.e., cognitive and psychomotor acquired competencies) by using a learning curve of triangulated perceptions between the preceptor and orientee learner. This learning curve provides the objectivity and opportunity to influence the orientation process or educational environment in a substantial manner that favors the learner's educational needs, to achieve the mutual goal of becoming completely independent within the neo-context.

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Appendix A

Orientee Demographic Form with VAS Scale

<table>
<tr>
<td rowspan="10" style="text-align:center">Orientee Completes this Form</td>
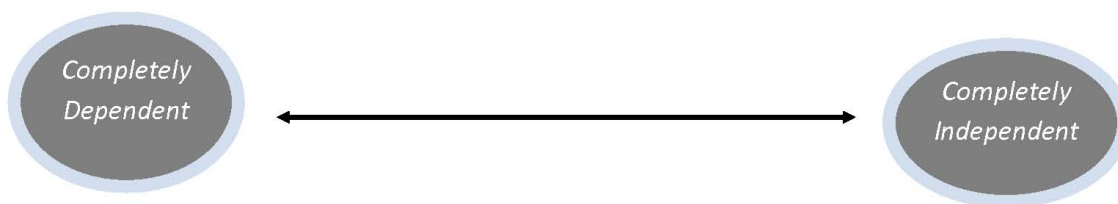<td colspan="2">ORIENTEE'S NAME :</td>
</tr>
<tr>
<td colspan="2">DATE :</td>
</tr>
<tr>
<td colspan="2">PRECEPTOR'S NAME :</td>
</tr>
<tr>
<td colspan="2" style="text-align:center">PLEASE CIRCLE THE APPROPRIATE CATEGORY LISTED IN THE RIGHT HAND COLUMN</td>
</tr>
<tr>
<td>PHASE OR TYPE OF ORIENTATION EXPERIENCED TODAY :</td>
<td>RECOVERY ROOM

SEDATION

TECHNICAL</td>
</tr>
<tr>
<td>IF PERFORMING THE TECHNICAL OR SEDATION ROLE, ENTER THE # OF EACH TYPE OF PROCEDURES PERFORMED :</td>
<td>EGD's   {   }

COLON'S   {   }

SIG'S   {   }</td>
</tr>
<tr>
<td>NUMBER OF HOURS EXPERIENCED IN ORIENTATION TODAY :</td>
<td># OF HOURS   {   }</td>
</tr>
<tr>
<td>AGE RANGE :</td>
<td>18-23 YRS
24-29
30-35
36-41
42-46
47-52
53-58
59-64</td>
</tr>
<tr>
<td>GENDER :</td>
<td>FEMALE

MALE</td>
</tr>
<tr>
<td>RACE :

RACE CONTINUES ON BACK....</td>
<td>AFRICAN AMERICAN

CAUCASIAN</td>
</tr>
</table>

(Please turn over to complete)

RACE CONTINUED ...	ASIAN PACIFIC ISLANDER HISPANIC - WHITE HISPANIC — BLACK NATIVE AMERICAN BI-RACIAL OTHER:
HIGHEST DEGREE EARNED :	HIGH SCHOOL DIPLOMA COLLEGE DIPLOMA ASSOCIATES DEGREE BACHELOR'S DEGREE MASTER'S DEGREE DOCTORAL DEGREE
PROFESSIONAL CREDENTIALS :	TECHNICAL LPN / LVN RN
YEARS OF PROFESSIONAL EXPERIENCE :	1-5 YEARS 6-11 12-17 18 OR > YEARS
NUMBER OF YEARS' EXPERIENCE PERFORMING THESE DUTIES OR TASKS. I.E., GI TECHNICAL SKILLS	O YEARS 1-2 3-5 6-8 9-11 12-14 OR > 14YRS

Page 2

Please place an [x] on the line which represents your current perceived state of Dependence or Independence with regard to your technical ability as you believe it to be today, i.e., Are you ready for Completely Independent practice ? :

Completely
Dependent

<————————————————————————————>

Completely
Independent

Completely dependent is defined as requiring continuously present supervision of the preceptor while operating in the procedure room.

Completely Independent is defined as **NOT requiring any** supervision of the preceptor while operating in the procedure room. (This would indicate that you are practicing at a basic entry level of competency as outlined in the Competency Check List for the department). This can be found within your orientation packet provided by the GI Nurse Manager, or the "G" Drive.

Appendix B

Orientee Daily Assessment Form with VAS Scale

Orientee Completes this Form

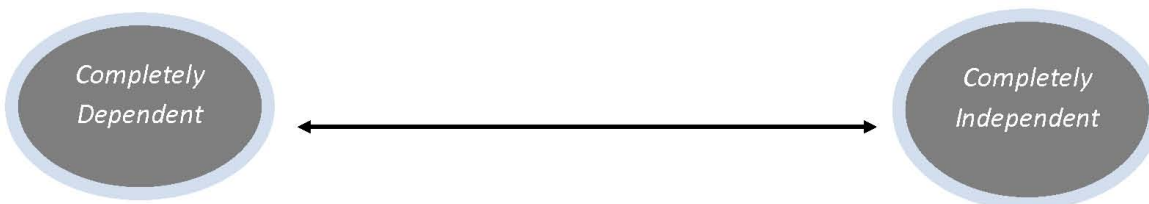| ORIENTEE'S NAME :	
DATE :	
NAME OF PRECEPTOR:	
PLEASE CIRCLE THE APPROPRIATE CATEGORY LISTED IN THE RIGHT HAND COLUMN:	
PHASE OR TYPE OF ORIENTATION EXPERIENCED TODAY:	RECOVERY ROOM SEDATION TECHNICAL
IF PERFORMING THE TECHNICAL OR SEDATION ROLE, ENTER THE # OF EACH TYPE OF PROCEDURES PERFORMED :	EGD'S { } COLON'S { } SIG'S { }
NUMBER OF HOURS EXPERIENCED IN ORIENTATION TODAY :	# OF HOURS { }

Orientee Completes this Form

Please place an [x] on the line which represents your current perceived state of Dependence or Independence with regard to your technical ability as you believe it to be today, i.e., Are you ready for Completely Independent practice ? :

Completely Dependent

Completely Independent

Completely dependent is defined as requiring continuously present supervision of the preceptor while operating in the procedure room.

Completely Independent is defined as **NOT requiring any** supervision of the preceptor while operating in the procedure room. (This would indicate that the Orientee is practicing at a basic entry level of competency as outlined in the Competency Check List for the department). This can be found within your orientation packet provided by the GI Nurse Manager.

_____ **(Please turn over to complete)** _____

Appendix C

Preceptor Demographic Form with VAS Scale

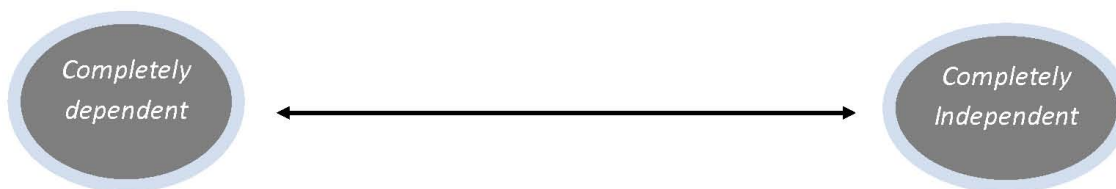<div style="text-align:center">Preceptor Completes this Form</div>

PRECEPTOR'S NAME :	
DATE :	
ORIENTEE'S NAME :	

PLEASE CIRCLE THE APPROPRIATE CATEGORY LISTED IN THE RIGHT HAND COLUMN	
PHASE OR TYPE OF ORIENTATION EXPERIENCED TODAY :	RECOVERY ROOM SEDATION TECHNICAL
IF PERFORMING THE TECHNICAL OR SEDATION ROLE, ENTER THE # OF EACH TYPE OF PROCEDURES PERFORMED :	EGD's { } COLON'S { } SIG's { }
NUMBER OF HOURS EXPERIENCED IN ORIENTATION TODAY :	# OF HOURS { }
AGE RANGE :	18-23 YRS 24-29 30-35 36-41 42-46 47-52 53-58 59-64
GENDER :	FEMALE MALE
RACE : RACE CONTINUES ON BACK...	AFRICAN AMERICAN CAUCASIAN

(Please turn over to complete)

Page 1

Race Continued...	Asian
	Pacific Islander
	Hispanic - white
	Hispanic – Black
	Native American
	Bi-racial
	Other:
Highest degree earned :	High school diploma
	College Diploma
	Associates degree
	Bachelor's degree
	Master's degree
	Doctoral degree
Professional credentials :	Technical
	LPN / LVN
	RN
Years of professional experience :	1-5 years 6-11 12-17 18 or > years
Number of years' experience performing these duties or tasks. I.e., GI technical skills	O years 1-2 3-5 6-8 9-11 12-14 or > 14yrs

(Please turn over to complete)

Page 2

Please place an [x] on the line which represents your Orientee's current state of Dependence or Independence with regard to technical ability, i.e., Is your Orientee ready for Completely Independent practice?

Completely
dependent

Completely
Independent

Completely dependent is defined as requiring continuously present supervision of the preceptor while operating in the procedure room.

Completely Independent is defined as **NOT requiring any** supervision of the preceptor while operating in the procedure room. (This would indicate that you are practicing at a basic entry level of competency as outlined in the Competency Check List for the department). This can be found within your orientation packet provided by the GI Nurse Manager, or the "S" Drive.

Appendix D

Preceptor Daily Assessment of Orientee with VAS Scale

PRECEPTOR COMPLETES THIS FORM

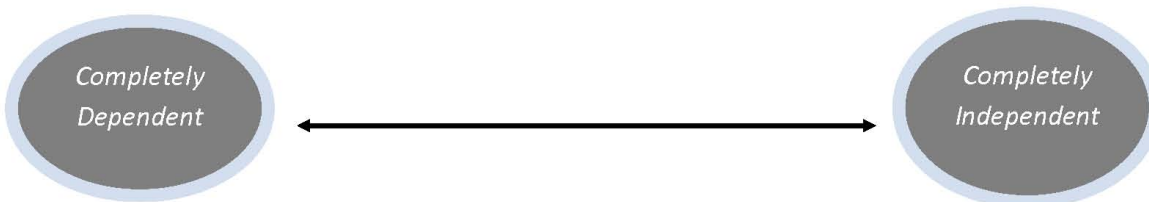|	
PRECEPTOR'S NAME :	
DATE :	
NAME OF ORIENTEE:	
PLEASE CIRCLE THE APPROPRIATE CATEGORY LISTED IN THE RIGHT HAND COLUMN:	
PHASE OR TYPE OF ORIENTATION EXPERIENCED TODAY :	RECOVERY ROOM SEDATION TECHNICAL
IF PERFORMING THE TECHNICAL OR SEDATION ROLE, ENTER THE # OF EACH TYPE OF PROCEDURES PERFORMED :	EGD's { } COLON'S { } SIG'S { }
NUMBER OF HOURS EXPERIENCED IN ORIENTATION TODAY :	# OF HOURS { }

PRECEPTOR COMPLETES THIS FORM

Please place an [x] on the line which represents your Orientee's current state of Dependence or Independence with regard to technical ability, i.e., Is your Orientee ready for Completely Independent practice?

Completely dependent is defined as requiring continuously present supervision of the preceptor while operating in the procedure room.

Completely Independent is defined as **NOT requiring any** supervision of the preceptor while operating in the procedure room. (This would indicate that the orientee is practicing at a basic entry level of competency as outlined in the Competency Check List for the department). This can be found within your orientation packet provided by the GI Nurse Manager, or the "S" Drive.

_____ **(Please turn over to complete)** _____

Appendix E

Research Information and Consent Form

**A method to characterize the learning curve of nurses' psychomotor skill learning at the
Minneapolis VA Gastroenterology Procedures Department (GPD).
RESEARCH INFORMATION AND CONSENT FORM**

Introduction:
You are invited to participate in a research study investigating a method to characterize the learning curve of nurse's psychomotor skill learning at the Gastroenterology Procedures Department. This study is being conducted by Jonathan Gair, BSN, RN-BC, MA candidate at St. Catherine University. You were selected as a possible participant in this research because you are a Registered Nurse, Licensed Practical Nurse, or Licensed Vocational Nurse and have been hired to work in the Gastroenterology Procedures Department and will be learning the technical skills related to performing the tasks and competencies related to the position itself. Please read this form and ask questions before you decide whether you wish to participate in the study, or not.

Background Information:
The purpose of this study is to characterize the learning curve of primarily technical (psychomotor/hands-on learning) learning acquisition of tasks / procedures. For example, assisting with the cutting out, and removal of polyps from peoples' colon and similar tasks which normally fall within the Registered Nurses' (RN) and Licensed Practical Nurses' (LPN) scope of practice within the Gastroenterology Procedures Department (GDP) at the Minneapolis VA. Additionally, the study's purpose is to determine both the direction and strength of the interaction between preceptor and orientee utilizing descriptive statistics. The final purpose of the study is to determine if the transaction or exchange of knowledge between the preceptor and orientee influences the chronological length of the orientation process for the orientee. Approximately 200 people are expected to participate in this research.

Procedures:
If you decide to participate, you will be asked to do the following: The first day you report to the GPD, you will be given an orientation packet by the nurse manager. The packet will contain some of the unit's individual and specific policies, and retrieval instructions for the remainder. The packet will also contain the technical competencies that you must demonstrate at a completely independent, basic competency level of performance following the orientation process. Additionally, the packet will contain a single demographic form, which both you and your preceptor, or vice versa, will complete on the first day. The packet will also contain daily assessments which contain a Visual Analog Scale (VAS) inquiring what your perception is on a continuum of being completely independent versus completely dependent and by marking an (x) on the line representing that continuum. The daily assessment form will also request the number of orientation hours received that day as well as the type of procedures you participated in e.g., Colonoscopy, Esophagoduodenoscopy, and Flexible Sigmoidoscopy. Furthermore, the preceptor will be given an identical packet.

Beginning on Day One following their introductions and subsequent full day of orientation, both you and your preceptor, or vice versa, will complete the demographic form as well as the first daily assessment form which includes the VAS as well as the other components of inquiry mentioned above. On each subsequent day that you participate in orientation, both you and your preceptor, or vice versa, will complete the daily assessment form containing the VAS at the close of that particular day of orientation. The daily assessment form will be completed at the close of each day until a triangulated score between your's and your preceptor's equal 100mm or Completely Independent. This mutual agreement signifies the successful completion, and end of the preceptored orientation process. When Complete Independence is attained, you will be independently trialed in the technical role for one week with the standby assistance of your original preceptor outside the procedure room as well as with a sedation RN who has been deemed technically strong (by the nurse manager) to aid with potential questions related to novel situations or contexts not experienced during the orientation process. During this independent trial period, you (the Orientee) will complete a daily assessment form containing a VAS with a continuum ranging from Requiring continuous supervision while in the procedure room to Requires no supervision while in the procedure room in order to gauge your perceived need for continued preceptor supervision and hence, orientation. This orientation could potentially take up to 60 sessions, at

seven hours a day, as that coincides with both the length of a clinical day of work within the GPD, and is consistent with the historical maximum length of the GPD's orientation process for new hires.

If you decide NOT to participate, Non-participants would be oriented to the unit in the same manner as those who would choose to participate. The only differences for non-participants would be the following: 1) that they would neither provide demographic data, nor provide self-assessments related to their perception of Complete Dependence versus Complete Independence, and 2) that the preceptor would assume primary responsibility for determining either the successful completion, or continuation of the preceptored orientation process.

Risks and Benefits:

The study has minimal risk. The potential risks involved with participating in this study may include psychological or emotional distress resulting from self-disclosure, or introspection, and possible social risks such as the perceived stigma of being a slow learner, or adverse effects on personal relationships developed during the precepting interaction and orientation process. If significant emotional or social distress were to occur, there is an Employee Assistance Program wherein all federal agencies provide Employee Assistance Programs (EAP) for employees. Basic EAP services include free, voluntary, short-term counseling and referral for various issues affecting employee mental and emotional well-being, such as alcohol and other substance abuse, stress, grief, family problems, and psychological disorders, this a confidential service available to all federal employees, including you. The phone number is (800) 222-0364.

There are no direct benefits to you for participating in this research. You, perhaps, may feel a sense of satisfaction that participation will eventually lead to more mutually advantageous preceptor pairings and an effectual orientation process in the future.

Confidentiality:
Any information obtained in connection with this research study that could identify you will be kept confidential. In any written reports or publications, no one will be identified or will be identifiable and only group data will be presented. I will utilize a random numbers generator to assign a random number to each individuals' information. That random number will replace your name on the forms, and the top portion of the forms where your name is, will be removed and shredded, leaving only a randomly assigned number on the form, therefore rendering it de-identified. A key system will link your name to the de-identified raw data contained within the forms. The key link will be stored on the primary researcher's personal drive space on the VA network which is password protected. Only the primary researcher will have access to the Key link. All the paper raw data will be kept for four years and then be shredded. The data key will be erased at the same time as the paper raw data. All de-identified data will be kept indefinitely in a computer file on the primary investigator's personal drive space on the VA's database.

We/I will keep the research results in a password protected computer and/or a locked file cabinet in the GPD's Nursing Clinic Director's office and only I and my advisor will have access to the identified records while we/I work on this project. We/I will finish analyzing the data within four years of when the data was collected. We/I will then destroy all original reports and identifying information that can be linked back to you.

Voluntary nature of the study:
Participation in this research study is voluntary. Your decision whether or not to participate will not affect your future relations with Department of Veterans Affairs, the Gastroenterology Procedures Department, or St. Catherine University in any way. You have the right to refuse to answer any question,

for any reason, or no reason at all, if you choose. If you decide to participate, you are free to stop at any time without affecting these relationships, and no further data will be collected.

New Information:
If during course of this research study we/I learn about new findings that might influence your willingness to continue participating in the study, we/I will inform you of these findings.

Contacts and questions:
If you have any questions, please feel free to contact me, Jonathan Gair (612) 516-5116 or jonathan.gair@va.gov, my faculty advisor Dr. Kalb at kakalb@stkate.edu. You may ask questions now, or if you have any additional questions later, either I, or my faculty advisor, Dr. Kalb at kakalb@stkate.edu, will be happy to answer them. If you have other questions or concerns regarding the study and would like to talk to someone other than the researcher(s), you may also contact John Schmitt, PhD, Chair of the St. Catherine University Institutional Review Board, at (651) 690-7739.

You may keep a copy of this form for your records.

Statement of Consent:
You are making a decision whether or not to participate. Your signature indicates that you have read this information and your questions have been answered. Even after signing this form, please know that you may withdraw from the study at any time and no further data will be collected.

_____

I consent to participate in the study.

_____
Signature of Participant   Date

_____
Signature of Researcher   Date