The Effect of Guided Imagery Upon First Semester Nursing Students Performing Their First Injections

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ABSTRACT

This study examined the effect of guided imagery upon the anxiety of baccalaureate nursing students learning to perform their first injections. The quasi-experimental post test design used a treatment (imagery) group and a control group of subjects who were first semester undergraduate students. Anxiety was measured by State-Trait Anxiety Inventory (STAI), Biodot stress dots, performance time, and performance score.

Analyses of covariance were performed on the post treatment STAI scores, performance times, and performance scores. A Kruskal-Wallis was performed on post treatment Biodot stress dot reading. Results indicated statistically significant lower anxiety levels by self-report (STAI), \( p = .008 \), in the experimental group. No statistically significant differences were found in the Biodot stress dot readings, \( p = .6777 \), performance times, \( p = .130 \), or performance scores, \( p = .774 \).

The significance of the findings is that if guided imagery reduces self-reported anxiety levels in nursing students, introduction of this teaching strategy early in the curriculum may be beneficial to students.

Introduction

The purpose of this study was to determine if the use of guided imagery reduced anxiety levels in Semester 1 nursing students learning to perform injections. Guided imagery in education is a process of mental imagery in which the subject guides, or is guided, through the steps of relaxation, focus on the lesson, actual image of the procedure, and successful completion of the imaged procedure or task (Gallyean, 1985).

The Neuman Systems Model was the theoretical framework for this study. One of the assumptions of this model is that “There are many known stressors. Each stressor is different in its potential to disturb an individual’s equilibrium or normal line of defense.” (Neuman, 1982 , p. 12). Nursing students are a part of the health-care system and the educational system; they are also individual systems exposed to a barrage of stressors during the educational process. By reducing anxiety levels, students will have a greater capability to protect their normal line of defense. In addition, by identifying anxiety-producing situations, students may prevent or allay some of the possible factors associated with stressors, which is another assumption of the Neuman Systems Model (Neuman, 1982).

The hypotheses for this study represented four measures of anxiety. Semester 1 nursing students who use guided imagery prior to administering their first injections will (a) have lower scores on the State-Trait Anxiety Inventory State Scale than students who do not use guided imagery; (b) have lower readings on Biodot stress dots than students who do not use guided imagery; (c) perform the injection in less time than students who do not use guided imagery; and (d) have higher performance scores than students who do not use guided imagery.

Significance of the Study

Learning is impaired when anxiety levels are high. The beginning nursing student is faced with many highly
anxious situations in the first year of the nursing program. If guided imagery is effective in reducing anxiety levels, the student who has learned the technique may apply it to many other situations. Introduction of guided imagery early in nursing education could have a positive effect on the learning process in a variety of positive situations.

**Review of the Literature**

Studies by Parkes (1985) and Blainey (1980) support the concept that nursing students perceive learning to give an injection as an anxiety-producing activity. Test taking has been demonstrated to be an anxiety producing situation, and several methods, including imagery, have been shown to reduce test anxiety (Allen, 1971; Mann, 1972; Graber, 1982).

Nursing students are expected to learn the psychomotor skill of injection administration and to perform the new skill in the presence of an instructor; thus, evaluation apprehension becomes a factor. Studies by Paulus and Murdock (1971) and Zajonc and Sales (1966) support the hypothesis that evaluation leads to enhancement of dominant responses (psychomotor or verbal responses that are well learned) at the expense of subordinate responses (responses that are newly learned or unfamiliar). These studies support the concept that evaluation apprehension could be a factor in students performing a new psychomotor skill and having higher anxiety levels than if they were to perform the skill without an instructor present.

Little research has been published on motor skill acquisition in nursing. Benjamin et al., (1984) based their research on the phases of motor skill acquisition. They observed the presence or absence of extraneous conversation in skill acquisition, not with the methods used to improve skill acquisition in anxious students. Numerous studies have been published that support the use of imagery in psychomotor skill acquisition in sports. In one study, Samuels and Samuels (1975) demonstrated a similar improvement in basketball free throw accuracy in a group who practiced every day and a group that imaged every day.

**Methodology**

**Sample**

The subjects for the study were the 26 baccalaureate nursing students registered in the three fundamental skills laboratory sections at a midwestern university. The control group was randomly selected from the three sections. Ten subjects were in the control group. The experimental group consisted of two sections totaling 16 subjects. The control and experimental groups were similar in age, number of children, and hours of employment. In both groups the majority of the subjects were between the ages of 20 and 24 years old (experimental = 62.5%; control = 60.0%). Twenty-five percent of the experimental group and 30% of the control group had children. Fifty percent of the experimental group and 60% of the control group worked 10 to 30 hours per week. Thirty-seven and one-half percent of the experimental group and 20% of the control group reported that they did not work outside the home.

The control group and the experimental group were not as similar in regard to marital status, gender, and number of semester hours. The experimental group consisted of 56.3% married subjects and 43.7% single subjects while 90% of the control group were single. One hundred percent of the experimental group was female, while 80% of the control group was female. One hundred percent of the experimental group were attending school full time, while only 70% of the control group attended school full time.

**Instruments**

The State-Trait Anxiety Inventory (STAI) was utilized to obtain self-reported anxiety data. This instrument is one page with 20 state anxiety questions on one side and 20 trait anxiety questions on the other side. Reliability and validity have been well established with the STAI (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). This instrument is easy to administer, taking less than 10 minutes for both scales; the readability index is at the fifth to sixth grade level.

Biobod Stress Dots were used to measure physiological stress. Biobod is a micro encapsulated cholesteric liquid crystal that indicates temperature ranges from 89.6 to 94.6 F (Biobod Fact Sheet, 1986). A search of the literature failed to reveal reported research on the reliability and validity of stress dots. Stress dots are used clinically to indicate peripheral body temperature as a measure of stress level. Biobod were selected as the best measure of physiological anxiety for this study, as any involved or invasive measure would have the potential to raise anxiety levels just by measurement.

Two other measures of anxiety were the students’ performance time and performance score. It was hypothesized that students with lower anxiety levels could perform the newly acquired psychomotor skill of injection administration in less time and with higher performance scores.

All 26 students were evaluated by two instructors (investigator and graduate teaching assistant). Interrater reliability for reading Biobod was 80.8% and 88.1% for evaluation performances. Interrater reliability was established utilizing the procedure of interrater education and percent agreement described by Loustau et al., (1980).

**Method**

Demographic data of the subjects were collected during the fourth week of the semester. At the same time, the State-Trait Anxiety Inventory was administered to all subjects for baseline scores of state anxiety and trait
anxiety. To determine if the two groups came from the same population in reference to anxiety, the state scores and the trait scores were both analyzed by one-way analysis of variance (ANOVA). No statistical difference was found for either the trait scores ($F[1,24] = .0984, p = .7625$) or the state scores ($F[1,24] = .4524, p = .5077$).

The instruction for the injection unit was during the 7th week of the semester. All students received the same instruction by the same instructor for the injection unit. The experimental group received guided imagery instruction by audio cassette tape. On the audio cassette tape, the subjects were asked to imagine with the following guided steps: relaxation, focus on the topic, imaging of the procedure for injection, and imagery of successful completion. Subjects were guided to use the senses with imagery; for example, smell the alcohol wipe and feel the client’s skin when checking for landmarks—imaging successful completion was an important component of the imagery process.

Also, during the seventh week approximately 3 hours were allowed for supervised practice for all subjects. Subjects practiced all aspects of injection administration; that is, checking medication order, working with syringe, withdrawing solution from medication bottle, and finding landmarks. The subjects utilized models for practice injections.

In the eighth week, all subjects scheduled time during their regular laboratory class to perform their first injection on a student partner for performance evaluation by an instructor. The evaluation for all subjects was an intramuscular injection in the dorsogluteal muscle. The subjects in the experimental group listened to the guided imagery audio cassette tape prior to administering their first injection. All subjects, prior to their first injection, completed the State-Trait Anxiety Inventory (STAI), state scale. Biodot readings were taken before the injection and the performance was timed and scored.

### Analysis of data

Demographic data were analyzed by descriptive technique. An analysis of variance (ANOVA) was performed on baseline STAI scores to determine that the control and experimental groups came from the same population. Analyses of covariance (ANCOVA) were performed on the subjects post treatment state anxiety scores, performance times, and performance scores for the performance evaluation. A Kruskal-Wallis was performed on the Biodot stress dot color readings. A $2 \times 2$ ANOVA compared the post treatment STAI state scores of the experimental and control groups with the order of the subjects’ performance of the injection.

### Results

The difference in the means and the standard deviations for the baseline STAI and the post treatment STAI state scores are presented in Table 1. The difference in the means of the experimental and control groups for baseline state anxiety was 4.01. The difference in the means of the experimental and control groups for baseline trait scores was 1.40. In contrast, the difference in the means of the control and experimental groups post treatment state anxiety was 9.30.

The hypothesis that subjects who used guided imagery prior to performing their first injection would have lower levels of anxiety as measured by STAI state scores than subjects who did not use the guided imagery was supported by a statistical difference ($p = .008$). Baseline trait scores were used as the covariant for the ANCOVA (Table 2).

<table>
<thead>
<tr>
<th>Source of Variation</th>
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*Covariant = baseline trait scores
†$p = .008$

ANOVA's were initiated on the performance times and performance scores of the experimental and control groups. No statistical difference was found with performance time ($p = .130$) or performance scores ($p = .774$). The baseline trait scores were used as the covariant for ANCOVA's.

Kruskal-Wallis was performed on the Biodot stress dot readings. No significant difference was found ($p = .6777$). All performance evaluations were completed in "subject pairs." One subject gave the injection first to his partner. Subsequently the order was reversed and the first subject

### TABLE 1

<table>
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<tr>
<th>Baseline STAI</th>
<th>Trait</th>
<th>Control</th>
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JOURNAL OF NURSING EDUCATION
became the patient for an injection. The subjects' anxiety level could be affected by the order of the performance; that is, if the subject was evaluated first or second in the subject pair. A $2 \times 2$ ANCOVA was performed to compare the post treatment STA1 state scores of the experimental and control groups with the performance. No statistical difference was found ($F[1,24] = 1.920, p = .180$).

**Discussion**

The purpose of this study was to examine the effect of guided imagery upon the anxiety of first semester nursing students performing their first injections. The dependent variable anxiety was measured from four different aspects. The results of the post treatment State-Trait Anxiety Inventory Scale were the only measure that showed a statistical difference. Since this is a self-report scale, subjects who used guided imagery perceived their anxiety as lower than individuals who did not use guided imagery. This alone is significant to nursing education. Guided imagery is a simple process and requires minimal time to learn and utilize. If this process is successful in reducing stress levels in students, it is a worthwhile addition to an undergraduate curriculum.

The stress associated with learning to give injections is temporary in nature. As soon as the student has given several injections clinically, increased anxiety is no longer associated with this skill. However, throughout nursing education and continued clinical practice, new skills and situations pose stressors to the student. If the student benefits by use of imagery while learning one psychomotor skill, then he may be able to utilize the procedure in other stressful situations. By introducing imagery to the student early in the educational process, the student could utilize imagery at other self-perceived stressful times.

The other three measures of anxiety were not supported by statistical differences. Since reliability and validity of stress dots were not verified through research, the question remains whether the stress dot was an actual measure of peripheral skin temperature, and therefore a valid measure of anxiety. Another question is the uniform adhesion of the stress dots to each subject's skin. There was no guarantee that the dots adhered equally to all subjects’ skin; therefore the readings may not have been an accurate measure of peripheral skin temperature. The measurement of the time of the intramuscular injection performance was not significantly different for the experimental and control groups. However, there was a difference of nearly three minutes of the mean of the control ($X = 17.0$) and experimental ($X = 14.2$) groups. This difference could reflect the increased perceived anxiety of the control group as measured by the STA1 State Scale.

The fourth measurement of anxiety was the score of the subject's performance evaluation of the intramuscular injection. The hypothesis that subjects who used guided imagery would have higher performance scores than subjects who did not use guided imagery, was not supported. One possible explanation could be that all subjects were expected to perform the intramuscular injection with a high score. This skill was considered critical for the student to master. Each step of the procedure was closely evaluated; students were not allowed to complete the injection if they did not adhere strictly to the guidelines; therefore, students practiced the skill and all were able to successfully complete the injection on the first attempt. To be successful, the student had to attain a score of 85% or higher. This allowed for small variation in scoring. The total possible points for the injection skill was 28 with a passing score of 24 or higher. All scores in this study were within a range of 3.5 points. It was possible that no statistical difference would have been found, but the small range of scores limits the possibility. There were several limitations to this study. First it was not feasible to randomly assign subjects to the experimental or control group. The section that was designated as control was randomly selected from the three laboratory sections. The small sample size ($n = 26$) was another limitation. A third limitation was the lack of validity for the stress dots, the measure of physiological stress.

**Conclusion**

Suggestions for further research are apparent from the limitations. Replication of the study with a larger number of subjects and in a setting where random assignment of subjects to experimental group or control group, would be more beneficial. Also, an addition of a third group “relaxation only,” is suggested. If the relaxation portion of the guided imagery is all that is necessary to reduce anxiety levels, then it would be more efficient to omit the imagery. The belief of the investigator is that the entire procedure of guided imagery is important in reducing anxiety of the subjects, but this study did not examine that possibility.

The purpose of this study was to examine the use of guided imagery in reducing anxiety levels of first semester nursing students. There was a statistically significant difference in the self-perceived anxiety levels in the imagery group compared to the control group. Further investigation into the use of imagery in teaching psychomotor nursing skills that are associated with anxiety is warranted.

**References**


Blainey, C.G. (1980). Anxiety in the undergraduate medical-


