

THE EFFECTS OF INFORMATION IN
PREPARATION FOR BARIUM ENEMA

by

Judith E. Kraft, B.S.N.

A Thesis

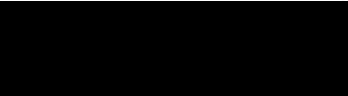
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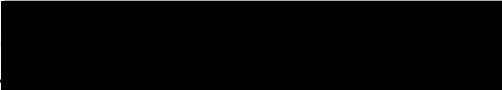
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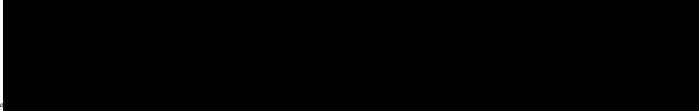
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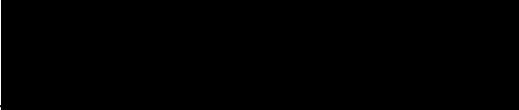
Joyce Crane, M.S.N., Professor of Nursing, Thesis Advisor



May Rawlinson, Ph.D., Professor of Nursing, First Reader



Sharon Clark, M.N. F.N.P., Assistant Professor of Nursing,
Second Reader



Carol A. Lindeman, Ph.D., Dean, School of Nursing

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TABLE OF CONTENTS

Chapter		Page
I	INTRODUCTION	1
	Conceptual Framework.....	3
	Interaction of Event and Personal Characteristics.....	3
	Primary Appraisal.....	5
	Anxiety.....	6
	Information.....	7
	Review of the Literature.....	9
	The Independent Variable - Information..	9
	Laboratory Studies.....	13
	Clinical Studies.....	15
	The Dependent Variable-Anxiety.....	26
	Definitions of Anxiety.....	25
	Measurement of Anxiety.....	25
	Measurement of Anxiety in the Nursing Literature.....	29
	Hypotheses.....	34
II	METHODS	35
	Sample and Setting.....	35
	Design and Procedure.....	36
	Independent Variables.....	38
	Sensation-Procedural Information.....	38
	Procedural Information.....	39
	Dependent Variables.....	39
	Subjective, Self Report.....	39
	Physiological Measure.....	40
	Behavioral Anxiety Measure.....	41
	Demographic Information.....	42
	Extraneous Variables.....	43
	Data Analysis.....	43
III.	RESULTS.....	45
	Description of Subjects.....	45
	Results for Major Variables.....	47
	Subjective Report of Anxiety.....	47
	Heart Rate.....	51
	Behavioral Distress.....	53
	Correlations Among Anxiety Measures.....	56

<u>Chapter</u>	<u>Page</u>
	Correlations of the Anxiety Measures and Extraneous Variables..... 57
IV.	DISCUSSION..... 61
	Characteristics of the Subjects..... 61
	Discussion of Major Variables..... 62
	Subjective Report of Anxiety..... 62
	Heart Rate..... 64
	Behavioral Distress..... 66
	Influence of Extraneous Variables..... 68
	Methodological Issues..... 72
	Preparatory Information..... 72
	Measurement of Subjective Anxiety..... 75
V.	SUMMARY, CONCLUSIONS AND RECOMMENDATIONS..... 77
	Summary..... 77
	Conclusions..... 78
	Implications for Nursing..... 79
	Limitations of the Study..... 81
	Recommendations for Further Study..... 82
	REFERENCES..... 83
	APPENDICES
	A. Sensation-Procedural Information..... 87
	B. Pre and Post procedural A-State Scale.... 91
	C. Data Collection Form..... 92
	D. Additional Discussion of A-State Scale... 95
	E. Instructions to Agencies..... 97
	F. Consent form..... 98
	G. List of Drugs..... 100
	H. Protocol..... 101

ABSTRACT

List of Tables

<u>Tables</u>	<u>Page</u>
1. Summary of Studies Comparing Sensation Information with Other Types of Preparatory Information.....	10
2. Demographic Characteristics of Patients Receiving Barium Enemas.....	46
3. Means and Standard Deviations for A-state Anxiety by Information Groups.....	49
4. Analysis of Covariance on Post-Procedural A-State using Pre-procedural A-State as the Covariate.....	50
5. Correlations Among Measures of Anxiety; A-State Scores, Heart Rate, and Distress Score....	52
6. Means and Standard Deviations for Heart Rate by Information Group.....	54
7. Analysis of Covariance on Pulse 2 and Pulse 3 Using Pulse 1 as the Covariate.....	55
8. Mean Behavioral Distress Scores with Standard Deviations and t-values by Information Group.....	58
9. Correlations Among Anxiety Measures and Other Extraneous Variables.....	59

CHAPTER I

INTRODUCTION

In the course of health care a patient may experience many diagnostic, therapeutic or surgical procedures. Any of these may have an element of threat or danger that can be a source of anxiety for the patient. Nurses are responsible for assisting patients to prepare for these experiences by giving them information prior to the procedures. However, the question is often raised as to what kind of information is most helpful in reducing anxiety in preparation for procedures. The question has wide ranging implications because it applies to patients of all ages, undergoing a wide array of diagnostic and therapeutic procedures, in a variety of settings.

The preparation given to patients traditionally involves information about the purpose, timing, duration and steps of the procedure. This preparation is similar to the description in nursing textbooks and procedure manuals (The Nurse's Reference Library, 1981; Procedure Manual of Good Samaritan Hospital; Brunner, Emerson, Ferguson & Suddarth, 1970). Is it best to give this procedural information alone, or is it more helpful to add a description of the sensations the patient will experience? A number of studies comparing a procedural description with a description of the sensations a patient might expect to experience, suggest that the patient who is given sensation information is better prepared for the procedure. The

patient then knows what to expect from a personal perspective, including what will be seen, felt, heard and smelled (Fuller, Endress & Johnson, 1978; Hartfield, Cason, 1981; Johnson, 1973; Johnson & Leventhal, 1974; Johnson, Endress & Kirshhoff, 1975). In these previous studies, the efficacy of sensation information in reducing emotional distress has been demonstrated in preparation for stressful procedures such as endoscopy, pelvic exam and cast removal (Johnson & Leventhal, 1974; Fuller et al., 1978; Johnson et al., 1975).

The present study examines the effects of information in patients preparing for a barium enema. Two previous studies have compared the anxiety reducing effects of procedural as opposed to sensation information for patients having barium enemas (Hartfield & Cason, 1981; Hartfield, Cason & Cason, 1982). These studies demonstrated that patients given sensation information prior to a barium enema reported lower anxiety levels than those given procedural or no experimental information. Individual differences in anxiety proneness were measured and controlled for in these studies to determine whether these differences altered the response to information. Further study is needed to determine if sensation information is helpful to patients experiencing barium enema regardless of individual differences in anxiety proneness. The present study explored whether a combined sensation and procedural description of a barium enema was more effective in reducing anxiety than procedural information alone, regardless of the differences in anxiety proneness of persons within each type of preparation.

CONCEPTUAL FRAMEWORK

A cognitive model of emotion was utilized for this study (see Figure 1). Lazarus (1970) proposes that transactions between persons and the environment lead to a series of evaluations by individuals as to their personal significance. In some evaluations, the individuals cognitively appraise the situation as irrelevant while other situations are seen as damaging, threatening or challenging. In the present study the environmental event is identified as the barium enema. The individual, when confronted by this event, engages in the process of cognitive appraisal in order to determine the personal significance of the event. This appraisal may be influenced by the individual's personal characteristics and by the preparatory information that the individual obtains about the procedure. If the event is interpreted by the individual as damaging or threatening, an anxiety response will occur. This anxiety response will manifest itself in one or all of the three response channels; subjective awareness, physiological response, or behavioral response.

Interaction of Event and Personal Characteristics

Stress is present when a person perceives the environmental or internal demands of an event as taxing or exceeding adaptive resources and having potentially negative consequences for future well being (Cohen & Lazarus, 1980; Scott, Oberst & Dropkin, 1980). Stress may be

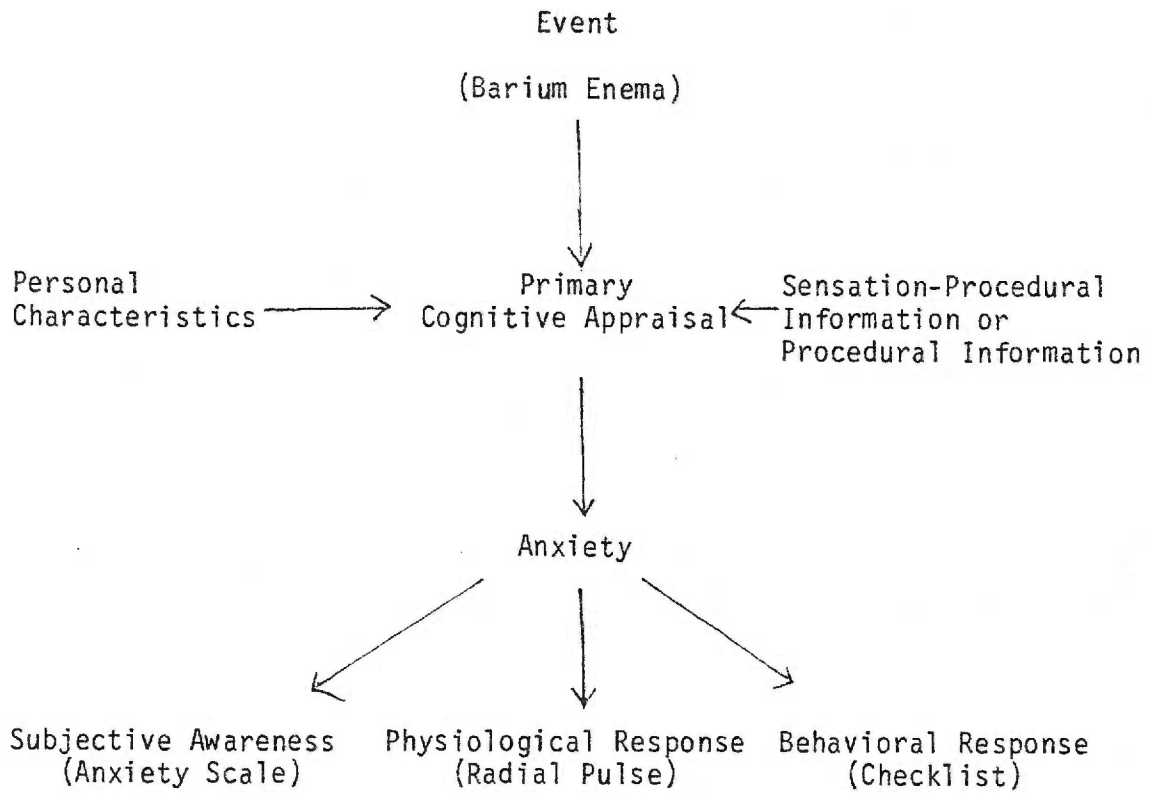


Figure 1. Conceptual model describing anxiety as a response to barium enema

experienced from social, cultural, psychological or physiological factors. The meaning of an event will vary from one individual to the next and may be accompanied by a whole constellation of stresses from other aspects of the person's life. All of these factors contribute to the individual's level of stress. Responses to stress are of particular concern in health care because unrelieved stress may exacerbate existing conditions or cause illness in an otherwise healthy individual (Scott et al., 1980). In this present study the barium enema was identified as a potential stressor. It is an event with demands that may tax or exceed the individual's normal resources and may have negative consequences for future well being.

Primary Appraisal

Primary appraisal is the evaluation of an environmental event by the individual in order to determine whether it is irrelevant, damaging, threatening or challenging. This appraisal mediates between the event and the emotional impact on the individual. The event may be interpreted as producing harm or loss (referring to damage already done), or as a threat, (referring to danger in the future) or as a challenge to be overcome or mastered (Cohen & Lazarus, 1980). This interpretation is an internal process resulting from the unique perceptions of the individual. Different perceptions of stimuli encountered determine whether or not an event is stressful for that individual.

Primary appraisal is the initial step in a cyclical process entailing repeated reappraisal to evaluate coping efforts and reassess the meaning of the event as more information is obtained. This secondary appraisal and selection of coping mechanisms is an important aspect of the process of cognitive appraisal. However, the investigation of these aspects of the cognitive model of emotions is beyond the scope of the present study. It is the primary appraisal process which initially determines the intensity of the emotional response to an event (Cohen & Lazarus, 1980).

Anxiety

An emotional response results from primary appraisal of an event as threatening. There is a lack of agreement in both the psychological and nursing literature regarding the exact nature of this response. Definitions and measurements of the emotional response to a stressful event will be discussed fully in the review of literature. For the purposes of this study, anxiety is proposed as the predominant emotion resulting from appraisal of an event as stressful. Scott et al. (1980) propose that primary appraisal results in a generalized, global anxiety reaction and it is only in reappraisal that emotions become more refined and specific to the situation. Spielberger (1966) states that when an event is appraised as dangerous or threatening, a state of anxiety results.

Anxiety is conceptualized for this study, as a subjective feeling of apprehension or tension which is characterized by any or all

of the following changes; reportable subjective awareness, physiological arousal and observable behavior. It may be experienced in varying degrees and could be conceptualized as a continuum between no anxiety and panic. While people vary in emotional responses, the majority of persons will express a moderate amount of anxiety in response to a threatening event. Anxiety is more likely to develop when the event is unfamiliar, accurate information is lacking, and/or there is an element of impending threat. The magnitude of the reaction will also be influenced by personal characteristics such as past experiences, and individual differences in anxiety proneness (Cohen & Lazarus, 1980; Spielberger, 1966). Spielberger (1966) describes two aspects of anxiety; state anxiety which is a transitory state or condition of the person in response to a particular situation and trait anxiety which is anxiety proneness or the tendency to become anxious in many situations. In the present study, state anxiety is seen as a summary of individual disposition (trait anxiety) and present reaction to an event (state anxiety), when a pre-procedural measurement is used for comparison to post-procedural levels of state anxiety.

Information

The information given to the patient prior to a potentially stressful procedure is designed to alter cognitive appraisal of the event so that it is perceived as less threatening and thus reduces anxiety. Johnson and associates (Johnson, 1973; Johnson, 1974; Johnson & Leventhal, 1974; Johnson & Rice, 1974; Johnson, Kirchhoff, &

Endress, 1975; Fuller, Endress & Johnson, 1978) hypothesize that the more accurate a person's expectations of an event, the less emotional distress will be experienced during the event. Specifically, information about sensations will reduce emotional distress most effectively because it increases congruency between what is expected and what is actually experienced. Thus, the aim of the information giving is reduction of anxiety and this is accomplished through altering primary cognitive appraisal of an event that is perceived as threatening.

REVIEW OF THE LITERATURE

This review of the literature is composed of three major aspects. First, laboratory and clinical studies which examine the effects of preparatory information for patients having stressful procedures will be described and evaluated. Second, approaches to the definition and measurement of anxiety in the psychological literature will be discussed. Third, the definition and measurement of anxiety in the nursing literature will be discussed with particular attention to the studies using sensation information as preparation for procedures.

The Independent Variable - Information

A number of studies have explored the effects of different types of information on patients' responses to threatening procedures. Of particular interest to the present investigation are studies which

examine the effects of sensation information on the anxiety level of patients experiencing stressful procedures. A summary chart of these studies is presented in Table 1. Studies by Johnson and associates which compared sensation information with other types of preparation such as behavioral coping instruction, procedural information and general health education information, will be presented chronologically and evaluated. These studies tested the hypothesis that emotional distress is reduced when expectations of sensations to be experienced are congruent with those actually experienced. Studies, by other investigators, of patients having nasogastric intubations and barium enemas subsequently tested this hypothesis. These studies are also reviewed and evaluated.

Laboratory Studies

Johnson and colleagues conducted three separate laboratory studies in which ischemic pain was induced in male college students, using a blood pressure cuff (Johnson, 1973, Johnson & Rice, 1974). In the first of these studies, twenty randomly selected subjects were divided into two groups who received, 1) relevant sensation information, 2) irrelevant information condition which gave no sensory information. Forty-eight subjects participated in the second study and were randomly assigned to one of four information groups, 1) relevant sensation information with distraction, 2) irrelevant non-sensation information with distraction, 3) relevant sensation information with attention and 4) irrelevant non-sensation information

Table 1
 Summary of Studies Comparing Sensation Information With Other Types of
 Preparatory Information

Author	Procedure	Sample	Dependent Variable	Independent Variable	Findings
Johnson (1973)	Ischemic Pain	20 male students	Mood Adjective Checklist (MACL) Sensation & Distress Rating Scales	Relevant Sensation Info. Irrelevant Sensation Info.	Relevant info. group emotional distress ratings sig. lower than irrelevant group. No sig. differences in mood between groups
Johnson (1973)	Ischemic Pain	48 male students	MACL Sensation & Distress Rating Scale	Irrelevant Info. with distraction Relevant Sensation Info. with Distraction Irrelevant info. with attention Relevant sensation info. with attention	No significant effect of attention on distress ratings Irrelevant info. resulted in higher distress ratings than relevant info.
Johnson & Rice (1974)	Ischemic Pain	61 male students	MACL Sensation & Distress Scale	Complete sensation info. Partial sensation info. False sensation info. Procedural	Emotional distress ratings sig. less for both partial and complete sensation groups than for false and procedural groups than for false and procedural groups

Table 1 (continued)

Author	Procedure	Sample	Dependent Variable	Independent Variable	Finding
Johnson & Leventhal (1974)	Endoscopic Exam	48 adult patients	Amount of tranquilizer heart rate hand & arm movements gagging time to pass tube	Sensory info. Coping technique Sensory + coping No info.	No sig. difference between groups on heart rate. Hand and arm movements did not sig. vary among conditions Sensory info. reduced most indicators of emotional distress. Benefit of sensory not seen when combined with coping.
Johnson, Kirchoff & Endress (1975)	Cast Removal	84 children age 6-11	Heart rate Behavioral distress Subjective report	Sensory info. Procedural Info. No information	Emotional distress scores sig. lower in sensory group than in other groups. Heart rate increased sig. in all but sensory group.
Fuller, Endress & Johnson (1978)	Pelvic Exam	24 women patients	Self report of fear heart rate behavioral checklist	Sensation info. Sensation info. with relaxation technique Health education Relaxation Tech. with health ed.	Lower distress behavior in sensory group Significantly less change in heart rate in sensory group

Table 1 (continued)

Author	Procedure	Sample	Dependent Variable	Independent Variable	Findings
Padilla, et al. (1981)	Nasogastric Tube insertion	50 adult patients	Self report - visual analogue NG tube insertion checklist Mood Adjective checklist	Procedure info. Procedure with sensation Procedure with coping skill Procedure, coping and sensation	Sensory with procedural lowered anxiety only in some patients Sig. less discomfort, distress, pain and anxiety in group receiving procedure, sensation and coping.
Barnett (1978)	Barium Enema	70 adult patients	Self report anxiety scale	Procedural-sensation No info.	Anxiety scores sig. lower in procedural-sensation group than in control group
Hartfield & Cason (1981)	Barium Enema	24 adult patients	Self report State-Trait Anxiety Inventory (STAI)	Procedural info. Sensation info. No info.	Anxiety scores sig. lower in sensation group than the procedural group
Hartfield, Cason & Cason (1982)	Barium Enema	20 adult patients	STAI & sensation checklist	Procedural info. Sensation info.	Anxiety scores sig. lower in sensation group. Lowest anxiety scores in subjects whose expectations were similar to experiences. Sig. negative correlation between congruency score (sensation checklist) & state anxiety score.

with attention. The additional groups were added to test the effect of attention or distraction on perception of sensations. Individuals in the attention groups were asked to focus on the sensations in their arms during the experimentally induced ischemia while individuals in the distraction group were given a mathematical task to complete. In the third ischemic pain study, subjects were randomly assigned to one of four groups, 1) complete sensation information, 2) partial sensation information, 3) false sensation information, and 4) a description of the procedure with no sensation information. No criteria were given for deciding which sensation to include, but those mentioned were the most prominent sensations of pressure and numbness. The subjects rated, on a subjective report scale, the amount of distress experienced. Also, there were repeated administrations of the mood adjective checklist which included a measure of fear of the procedure. Results from these measures indicated that subjects receiving complete or partial sensory descriptions reported significantly less emotional distress than those receiving false or procedural descriptions. A partial sensory description was found to reduce reported distress as much as a complete description (Johnson & Rice, 1974). This finding is helpful clinically because in practice, it is often difficult to anticipate every sensation the patient may experience. Another interesting point is that neither the general procedural or the sensation information significantly affected the level of reported fear. This suggests that the emotional response to painful stimuli may be

something other than fear. There was no significant effect for attention or distraction on distress ratings between information conditions.

The results of these laboratory experiments suggested that sensation information was helpful in reducing emotional reactions to painful stimuli. However, clinical application of these results are limited by the fact that they were done in a laboratory setting and that the subjects were male college students rather than patients. In addition, these studies examined responses to a painful procedure. Perhaps emotional reaction would be different in stressful procedures that are not painful. These studies relied completely on subjective report of emotional distress. Ratings of emotional response might have been more valid if a physiological or behavioral measure were added. Ethnic differences were considered and no significant interaction was found between ethnic origin and information conditions. The results of these laboratory experiments suggested the need for further study of clinical applications and the effect of sensation information was subsequently tested in several clinical settings.

Clinical Studies

The first of these clinical studies was conducted with adult hospitalized patients who were having upper gastrointestinal endoscopic examinations (Johnson & Leventhal, 1974). These patients were randomly assigned to one of the following four groups; 1) sensory information, 2) instruction in coping actions, 3) combined sensory

and coping instruction, and 4) no experimental information. A combination of behavioral and physiological measures of emotional response were used. Behavior such as resisting the passage of the tube, gagging, and hand and arm movements were observed during the passage of the tube. Heart rate and amount of tranquilizer needed were the physiological measures. There were no subjective measures of emotional distress.

Of the three information groups, the sensation information group had significantly lower scores on most indicators of emotional response. This benefit was not seen when sensation information was combined with coping instruction. Other groups did not significantly differ from the control. Sensory information significantly reduced the amount of gagging as compared to the control group and the behavioral group. For subjects under 50 years of age, the sensation information group received a significantly lower dose of tranquilizer than the other groups. For the over 50 years of age group, there was no significant difference between information groups.

Endoscopy may be a highly stressful but usually not painful procedure. Thus, this study helps to extend the usefulness of sensory information to situations that are stressful but not painful. The use of physiological and behavioral indicators of emotional distress is helpful. Perhaps these measures would be more useful if compared with some subjective data. Clinical significance is enhanced by the use of patients rather than college students as subjects.

In another clinical study, the effect of information on distress behavior in children, aged 6-11 years, who were having a cast removed, was studied (Johnson et al., 1975). Subjects were divided into three groups; 1) sensory description, 2) procedural description, and 3) no experimental information. Subjective report of fear, distress scores derived from behavioral observations during the procedure and heart rate were used to assess emotional response.

Distress scores were significantly lower in the group receiving sensation information as compared to the group receiving procedural information or no experimental information. Pulse rate during the procedure increased significantly in both the procedure and control groups but increases were not significant for the sensation group. Subjective report of fear did not significantly vary between information groups.

The Johnson et al. (1975) study helped to determine if previous findings on sensory information could be extended to children and related the theoretical base of sensation information to psychological research on the effect of cognitive processes on emotional behavior. It was hypothesized that emotional response to cognitive evaluation of a threatening event is reduced through sensation information by bringing expectations into congruence with actual experience. The results of this study indicate that sensation information is effective in reducing emotional distress. However, further study was indicated in order to determine the effectiveness of sensory information for other procedures and patient populations.

In an effort to test the effectiveness of sensation information in another clinical situation, a study was conducted of 24 young women having pelvic exams (Fuller et al., 1978). Subjects were randomly assigned to four groups who received, 1) sensation information alone, 2) sensation information with relaxation technique, 3) health education alone, and 4) relaxation technique with health education. Emotional response to the exam was measured in several ways; a self report scale, heart rate, and observed motor and distress behavior.

Each information condition was expected to influence patients in different ways. Health education and sensory information were intended to influence cognitive control, i.e. the way in which a threatening event is interpreted. Relaxation technique was intended to provide behavioral control over the event. Relaxation technique was expected to have an additive effect on sensory information in decreasing anxiety. However, the results did not support these hypotheses. Subjects who received sensory information alone demonstrated less overt behavior distress and change in heart rate than the other experimental groups. It is interesting to note that sensation information also reduced distress in subjects who had experienced the procedure before. Although self report of fear was included as a measure of individual differences, there were no significant differences between the groups. The lack of effect of sensation information on fear could be due to unreliable measures or perhaps fear is not the appropriate emotional response to measure for pelvic exam. Measurement of anxiety may be more appropriate in this

situation since the procedure is usually neither dangerous or painful, but somewhat embarrassing. This study was helpful in verifying the usefulness of sensation information and extending its implications to pelvic examination and to persons who have experienced a procedure before.

In a study by another group of investigators the effects of several types of preparatory information on adult hospitalized patients having nasogastric tube insertions was examined (Padilla, Grant, Rains, Hansen, Bergstrom, Wong, Hanson & Kubo, 1981). Johnson's (1978) sensation information hypothesis was one of the conceptual bases for this study. Fifty patients were divided into four groups which received, 1) procedural, 2) procedural and sensory information, 3) procedural and coping behavior, and 4) procedural, coping behavior and sensation information. Subjects were also grouped into two categories; those who desired control over the procedure and those who did not. Emotional distress levels were measured only by self report.

Results show that both those desiring control over the procedure and those not desiring control over the procedure, reported significantly less discomfort, distress, pain and anxiety when procedural, coping and sensation information were combined than with other conditions. Combining sensory and coping behavior information also significantly reduced reports of discomfort for both control and no control subjects. Procedural with sensory information significantly

lowered reports of anxiety for persons desiring control over the procedure but not for those desiring no control. A possible explanation for this finding is proposed by the investigator. In order to reduce emotional distress, sensory information must be neutral, (not implying distress or discomfort), but some of the sensations described in this study were not neutral. This suggests that non-neutral sensory information increases emotional distress for some people, particularly those desiring no control. It is not clear from these results how effective sensory information would have been alone. Also, it would be interesting to know if a neutral sensory-procedural message would have lowered anxiety more effectively.

Of particular interest to the present investigation are three studies which examined the effects of preparatory information on adult hospitalized patients having barium enema procedures. In a study conducted in London, Barnett (1978) divided 70 patients into two groups; 1) those receiving a prepared information sheet giving combined procedural and sensation information and 2) those receiving a visit from the researcher but no experimental information. The subjects were identified from the scheduling roster of the radiology department and assigned alternately to each group. No description was given of criteria for sample selection or characteristics of subjects.

The study did not directly test Johnson's congruency hypothesis but was based on the hypothesis that "reduction of the unknown has been shown to lessen the stress of events in the hospital" (Barnett,

1978, p. 37). The intention was not to examine the specific effects of sensation information but to provide useful general information to the patient. This information was derived from interviews with patients who had experienced the procedure. It is noteworthy that when patients were asked to describe the procedure, they included considerable sensory information.

Anxiety was measured, in the Barnett study, using an adjective checklist. Anxiety scores for the control group were significantly higher than those for the experimental group both immediately before and immediately after the procedure. There were no significant differences between groups in baseline anxiety scores or post information scores.

Barnett's (1978) study yields insight into emotional response patterns of patients having barium enema and demonstrates that anxiety levels are influenced by information given prior to the procedure. There are conflicting results on the efficacy of a combined procedural-sensation message as used in this study. Barnett (1978) demonstrated an anxiety reducing effect of a procedural-sensation message. However in the study by Padilla et al. (1981), the anxiety of some subjects was not reduced by the combined message. The effect of a combined sensation-procedural message will be further examined in the present study.

Hartfield and Cason (1981) completed a study comparing sensation and procedural information for 24 hospitalized adult patients having barium enemas. All subjects were ambulatory and hospitalized for

diagnostic testing. They were randomly assigned to three information conditions; 1) sensation information, 2) procedural, and 3) no information. Taped messages were used to limit variability in presentations. The sensation information was developed from interviews with patients after barium enema and then validated with other patients who had had the procedure. Although no reliability and validity measures were described for the sensory information, content validity was enhanced by obtaining descriptions from the persons who had experienced the procedure. Procedural information was developed from observations of techniques during a barium enema.

Hartfield and Cason used Spielberger's model of anxiety in which there is a distinction between anxiety as a personality characteristic (trait anxiety) and anxiety generated by a specific set of circumstances (state anxiety). Using the State-Trait Anxiety Inventory (STAI, 1966), trait anxiety was evaluated prior to the giving of information and state anxiety was evaluated after the procedure. This distinction between trait and state anxiety was made to control for the influence of individual differences in response to sensation information. Trait anxiety was treated as a control or baseline variable while state anxiety was the dependent variable. There were no behavioral or physiological measures.

When variability in trait anxiety was controlled, the sensation group reported the lowest state anxiety scores followed by the no information group and then the procedure group. The difference between the sensation and procedural group state anxiety means was

significant ($p \leq .05$). Subjects receiving procedural information had higher state anxiety scores than the other two groups. This finding requires further study to examine why the procedural information group reported the highest anxiety levels.

Hartfield and Cason's study was well designed with careful control of extraneous variables. Age, educational level and diagnosis were reported. Persons who had previous experience with barium enema were excluded. The sample included 18 females and only 6 males, although there were approximately equal numbers of men and women in each information group. The addition of behavioral and physiological measures of anxiety would have strengthened the study.

In this study, Hartfield & Cason (1981) explored the effects of sensation information for patients with different trait anxiety characteristics. Further study is needed to determine whether sensation information is helpful to all persons regardless of individual differences in trait anxiety. Also, it is likely that the no information group received routine explanations from radiology technicians, physicians and nurses which are primarily procedural. In addition, some procedure information must be included with sensation information, if the message is to be understandable to the patient. It may be more accurate to say that a procedural description was actually compared with a combined procedural-sensation message.

In a second study, Hartfield, Cason and Cason (1982) studied the expectations and intensity of anxiety of twenty adult patients having barium enemas. Subjects were identified and assigned to groups as in

the previous study. The STAI was again used with the addition of a sensation inventory which listed fifteen common sensations during a barium enema and asked subjects to rate the anticipated likelihood of experiencing those sensations. This scale was compiled from interviews with patients who had experienced barium enema. The subjects heard either the sensation or the procedural tape and the sensation inventory was used to determine whether the information had altered expectations. There were no behavioral or physiological measurements either before or during the procedure. Immediately after the barium enema, subjects completed the state anxiety inventory and the sensation inventory again.

It was hypothesized that patients receiving sensation information would report lower scores on state anxiety than subjects receiving procedural information when the influence of trait anxiety was controlled. The additional hypothesis for this study was that the greater the difference between expected and experienced sensations, the higher the state anxiety score was expected to be.

The results supported the hypotheses. Persons receiving sensation information prior to the procedure reported significantly less anxiety than those receiving procedural information. In addition, the sensory information group reported greater congruency between the expected and experienced sensations than the procedure group. These results support Johnson's hypothesis that sensory information improves congruency between what is expected and what is experienced. For all subjects, there was a significant negative correlation

between congruency scores and state anxiety scores (-0.51). This leads support to the hypothesis that emotional response is a function of the congruency between expected sensations and those actually experienced.

The Hartfield, Cason & Cason (1982) study provides a direct examination of Johnson's hypothesis. It also provides further evidence of the efficacy of sensation information in lowering the anxiety of patients undergoing barium enema. While this study lends valuable support to the usefulness of sensory information, there is still a need to examine whether it is useful for all patients regardless of individual differences in anxiety and to compare procedural information alone with a combined sensory-procedural message.

In summary, the use of sensation information has been studied in preparation for several stressful procedures and found to be helpful in reducing anxiety. In two of the barium enema studies, the modifying effects of trait anxiety were considered in measuring response to the procedure. The question remains whether a nurse can expect sensation-procedural information to effectively reduce anxiety in preparation for barium enema without first determining the characteristic anxiety response of the individual. Also, since patients do routinely receive procedural information, there is a need to determine the effects of a combined procedural-sensation message as compared to procedural only.

The Dependent Variable-Anxiety

Definitions of Anxiety

A universally accepted definition of anxiety is somewhat elusive. Krause (1961) states that most people can identify a subjective state of anxiety but would have difficulty differentiating it from fear, uneasiness, apprehension, dread anguish or terror. These emotions are grouped into a class of fear emotions, which are clearly distinguishable from other emotions, such as anger, grief, elation, or disgust. Spielberger (1966) conceptualizes two aspects of anxiety, trait anxiety, which is a dispositional tendency toward anxiety, and state anxiety, which is a subjective, consciously perceived feeling of apprehension and tension accompanied by or associated with activation or arousal of the autonomic nervous system. Bernstein (1976, p. 184) states the problem in identifying and measuring anxiety is that it is not a single entity but "a complex and variable pattern of behavior which occurs in response to cognitive or environmentally produced stimuli". There is no single manifestation of anxiety, but it may appear in all or any of three response channels; self report, physiological and behavioral.

Measurement of Anxiety

A further question of how best to measure anxiety must be considered. At this stage in the development of psychological measures, emotions cannot be assessed with absolute certainty. Many investigators identify three channels for the expression of anxiety;

physiological, self report and behavioral (Bernstein, 1976; Lazarus & Opton, 1970; Spielberger & Sarason, 1975; Krause, 1961; Scott et al., 1980). Krause (1961) gives a particularly complete description of the advantages and disadvantages of measuring each of the three channels. Each of these manifestations are measurable and help to verify the presence of anxiety.

Subjective report is commonly used as an indicator for the presence of anxiety. It is generally accepted in the psychological literature that a person who reports feeling anxious is actually anxious (Krause, 1961). However, there are still some problems in using subjective report as a sole criterion for measuring anxiety (Bernstein, 1976). A person can be anxious without being consciously aware of that anxiety. Krause (1961) refers to a number of authors proposing the concept of unconscious anxiety. In addition, a person may be aware of a subjective feeling of apprehension or tension but may not label it anxiety. Persons experience emotions in different ways and a variety of feelings may be labelled as anxiety by a particular individual. Also, some persons are not skilled in self observation and may not accurately report their subjective feelings. Occasionally, a subject may be unwilling to report honestly, although it is possible to diminish this factor in the setting for the study and by the instruction given (Krause, 1961). Because of these factors, self report should not be used alone as an indicator of the presence of anxiety.

Physiological measures may also be used as an indicator of anxiety. For some time physiological evidence of emotions such as heart rate, respiratory rate, palmar sweat, galvanic skin response and muscle tension have been studied but there has been no clear identification of signs specific to anxiety (Krause, 1961). Usually autonomic nervous system (ANS) arousal is equated with anxiety. But there is a problem with attributing ANS changes to anxiety because other emotions, particularly anger, are known to arouse the ANS also. In addition, there may be individual variability in ANS response to the emotion of anxiety (Krause, 1961). Therefore, although they are useful indicators, ANS arousal and other physiological changes when used alone have not been considered sufficient evidence of anxiety (Bernstein, 1976, Krause, 1961).

Behavioral observation by experienced clinicians is sometimes relied upon to assess anxiety states. The problem with this approach is that an observer has no access to the inner feelings of the subject and must infer the emotional state from observation. This inference is open to more error than subjective report. An observer may identify "molar" behaviors such as body posture, gestures, speech characteristics, and facial expression as indicative of anxiety. Although some conventions exist for interpretation of such behaviors, there is the problem of individual variability in expression. Also, many of these behaviors can be voluntarily inhibited, thereby confusing the observer. Because of these problems, no single behavioral pattern has been identified as sufficient evidence of

anxiety. However, behavioral observation may be quite useful when used in conjunction with other measures of anxiety (Bernstein, 1976; Lazarus, 1970).

How then, can anxiety be accurately assessed? Because each type of measure has inherent problems, a combination of measures may increase accuracy of assessment (Bernstein, 1976; Krause, 1961). Krause (1961) states that the strongest evidence of anxiety is subjective report, despite the problems of honesty and accuracy. Spielberger (1966) supports this view and developed the STAI for the purpose of measuring subjective anxiety. Validity of these subjective measures would be enhanced by the addition of measures of physiological arousal or behavioral observation. Also, it is suggested that pre-testing of initial anxiety level provides a baseline from which to assess individual variations. Krause (1961) also points out that response to a stressor that is familiar or has been experienced before may be less marked, particularly in autonomic nervous system arousal and therefore less measurable. This suggests that when measuring changes in anxiety levels, observation of subjects on first exposure to a threatening event may give clearer results than observation of those who have experience with the event.

Although assessment of all three response channels may increase knowledge of the patient's emotional response, results do not always correlate. In the study of children having casts removed (Johnson et al., 1975) self report of fear and behavioral distress scores were positively correlated for the procedure information group (.43) and

the change in pulse from pre-procedure to fifteen seconds after the start of the procedure was significantly correlated with distress scores (.40). In the study of patients having endoscopic exams neither behavioral observation (hand and arm movements) nor heart rate varied significantly with conditions (Johnson & Leventhal, 1974). The study of patients having pelvic exams revealed significantly less observed distress and change in heart rate in the sensory information group. No information on correlation was given. The three studies of patients having barium enemas used self report only. Although results from the different response channels may vary, much useful information is gained from using more than one approach to assessment. This lack of specificity in measurement is considered in the interpretation of results.

Measurement of Anxiety in the Nursing Literature

Although anxiety is discussed frequently in the nursing literature, studies in which it is measured often do not give a clear definition. In a study of the effect of therapeutic touch on the anxiety level of hospitalized patients, anxiety was described primarily as physiological, resulting from imbalance of the sympathetic parasympathetic nervous system (Heidt, 1981). However, the instrument used to measure anxiety was the self report STAI and physiological response was not evaluated. Anxiety was described under definition of terms as a "transitory emotional state of the human organism that varies in intensity and fluctuates over time" (Heidt, 1981). Another nursing study compared the anxiety-reducing potential of two techniques of

bathing (Barsevick & Llewellyn, 1982). Anxiety is described in this study as a "transitory emotional state characterized by subjective feelings of apprehension and autonomic nervous system arousal". All three channels of anxiety response were assessed; palmar sweat index for physiological, A-state anxiety inventory for subjective and a behavioral cues checklist for behavioral evidence. Although this second study measured anxiety more comprehensively, only the A-state anxiety scale revealed a significant change in anxiety from pre-bath to post-bath.

Johnson and associates describe the emotional response to stress as distress (Johnson, 1973; Johnson, 1974; Johnson et al., 1975; Fuller et al., 1978). It was acknowledged in these studies that emotional reactions to stress are usually described within some model of anxiety, but anxiety was viewed as suggesting pathology or a non-healthy state (Johnson, et al., 1975). The position was taken that since anxiety is a somewhat non-specific concept, the term distress would be used instead. No conceptual definition of emotional distress is offered. Emotional behavior and the way it is altered by cognitive processes was measured without labelling the specific emotion.

Emotional distress is measured in each of the studies by Johnson and associates using one or more of the three response channels discussed earlier. In the ischemic pain laboratory studies, subjective self report was used exclusively (Johnson, 1973; Johnson & Rice, 1974). In the clinical study of patients having endoscopic exam

(Johnson & Leventhal, 1974), a combination of a scored behavioral scale and the physiological parameters of heart rate and amount of tranquilizer were used. For the cast removal study all three response channels were assessed (Johnson et al., 1975). Measures of emotional behavior were adapted for the age group. Behavior observed during the procedure was divided into major signs such as kicking, pulling away, crying or screaming and minor signs such as grimacing, frowning, tightly closed eyes, clenching hands or covering face. These behaviors were scored and inter-rater reliability was reported. A stick figure scale was used to elicit a subjective report of fear. The reliability of this measure is unknown and no significant difference in self-report fear was seen between groups.

In the pelvic exam study (Fuller, et al., 1978), subjects were asked to report how nervous and how scared they were on a two item scale and a self report fear score was computed. This scale was repeated after the procedure also. Reliability and validity of this measure were not reported. A 15 second radial pulse was taken before and during the procedure and change in pulse rate was evaluated. Overt motor and vocal distress behaviors were recorded in a checklist during the procedure and a score was computed. Inter-rater reliability for this scale was reported to average 97 percent.

Padilla et al., (1981) also speaks of distress reduction rather than anxiety. Emotional distress in response to nasogastric tube insertion was assessed using two scales; a visual analogue scale to rate pain, discomfort and anxiety, and a Nasogastric Intubation

Checklist (NICL), developed for the study, which rated the distressfulness of sensations experienced. Validity of the scales was determined through significant positive correlation of scores between the two scales. Additional validity of the NICL was established through a study which identified patient's common distressful sensations during tube insertions. The Mood Adjective Checklist was also used. No reports of physiological measures or behavioral observations were included. No conceptual definition was given for the concept of distress.

In the three studies of patients having barium enemas, anxiety is identified as the variable of interest. Barnett (1978) used an adjective checklist which assessed anxiety, depression, fatigue, vigor and hostility, with anxiety identified as the primary focus for the study. The other emotional responses were included to mask the intent of the research. The researcher does not define anxiety. The rationale for focusing on anxiety was based on a previous study by Barnett in which the barium enema procedure was described as uncomfortable, embarrassing and anxiety generating by 90 percent of the patients interviewed.

The studies by Hartfield and Cason (1981) and Hartfield, Cason and Cason (1982) relied completely on subjective self report. The conceptual basis for the studies was Johnson's congruency hypothesis. However, the emotional response generated by the stressful event was labelled anxiety. The intent was to determine whether the effects of sensation information would be the same as those shown by Johnson if

anxiety were used as a measure of emotional responses. The study clearly proposed to examine anxiety rather than the more general concept of emotional distress. The operational definition of anxiety was derived from Spielberger's (1966) state-trait anxiety theory, with state anxiety being viewed as a measure of emotional distress and trait anxiety viewed as a measure of individual differences. State anxiety was defined as a transitory state which fluctuates over time and was measured using the A-state scale of the STAI.

In summary, it is generally agreed in both psychological and nursing literature that there is an emotional response to stress. Although the exact definition of this response is variable, there is agreement that emotional response manifests itself in any or all of three response channels. All studies reviewed here incorporated at least one and sometimes all of these channels in measuring emotional response. A combination of behavioral, subjective, and physiological measures is recommended for greater validity in the assessment of anxiety even though these measures do not always correlate. Some investigators have labelled the emotional response to stress as anxiety, particularly those studying patients having barium enemas. There is support in both the psychological and the nursing literature for identifying anxiety as the predominant emotion resulting from the perception of stress.

The present study will explore the question of whether a sensation-procedural description of a barium enema is more effective in

reducing anxiety than procedural information alone, regardless of individual differences.

Hypotheses

1. Persons given sensation-procedural information in preparation for a barium enema will report significantly less subjective anxiety than persons given procedural information only.
2. Persons given sensation-procedural information in preparation for a barium enema will exhibit significantly less increase in heart rate during the procedure than persons given only procedural information.
3. Persons given sensation-procedural information in preparation for a barium enema will exhibit significantly less observed behavioral expressions of anxiety during the procedure than persons given only procedural information.

CHAPTER II

METHODS

Sample and Setting

The sample was drawn from inpatients and outpatients treated in three facilities; two private community hospitals, and a private clinic in Oregon. These facilities serve both an urban and a rural population. The urban population is largely upper middle class. The rural population is primarily middle class. Subjects were inpatients on the general medical units of the hospitals and outpatients coming to the hospital or clinic radiology departments on the day of the examination. Patients scheduled for barium enema were identified from the radiology department scheduling rosters of the hospitals and clinic.

Subjects were included in this study if they met the following criteria: they were adults (age 18 and above) with no severe sensory impairment such as blindness, deafness or disorientation, English speaking and able to read and write, and no previous barium enema. Because of the small size of the accessible population, a convenience sample was used. There is some suggestion in the literature that there may be a difference between men and women in levels of state anxiety (Hartfield & Cason, 1981; Spielberger, 1966). For this reason, approximately equal numbers of men and women were assigned to

each information group. Patients who met the basic criteria were randomly assigned to groups using a table of random numbers.

Design and Procedure

The study was an experimental, pre-test, post-test control group design. The independent variable was the information condition, sensation-procedural, with a comparison group receiving only procedural information. The dependent variable, anxiety, was operationally defined as 1) the change in level of state anxiety from pre- to post-procedural measurement, 2) the change in a one minute radial pulse rate between a baseline measurement taken prior to the procedure and measurements during and after the procedure, and 3) a description of the frequency of distress behavior observed during the procedure including vocalizations, facial expression, and hand and arm movements.

Potential inpatients were visited in their rooms one-half hour prior to going to the radiology department. In one facility outpatients were asked to come in one-half hour early to participate in a study. A copy of the instructions for asking subjects to participate is provided in Appendix E. Two of the facilities were unable to approach patients about coming in early. In these two facilities potential subjects were identified by the investigator from the scheduling roster and contacted by telephone the evening before the procedure. They were then asked to come in one-half hour

early to participate in the study. No procedural or sensation information was given during these telephone conversations. All subjects were told that a study of individual's experiences with a barium enema was being conducted. The subjects were invited to participate and written consent was obtained from those who volunteered (Appendix F). After consent was given, one minute baseline radial pulse was taken and the Spielberger A-state anxiety scale was completed by the patient. Demographic information was gathered and the subject was questioned regarding drugs taken in the past 24 hours, major symptoms and diagnosis. A list of drugs was used to identify those that might alter heart rate. This list is provided in Appendix G. Each group was then offered additional information through use of a taped message with the explanation that it may be helpful in preparing for the procedure. Subjects were assigned to one of the two informational tapes using a schedule developed from a table of random numbers. The investigator was not present during the playing of the tape and thus was not aware of which experimental condition the patient received. The sensation-procedural message describes the procedure and sensations commonly experienced by patients having barium enemas. The procedural message describes the barium enema procedure only. A taped message was used to reduce variability in the presentation of information. Outpatient subjects were seen in an office in the radiology department while inpatients were seen in their own rooms.

During the procedure, the investigator obtained a one minute radial pulse after the rectal tube was inserted and before the barium began to flow. The observer also noted behavioral manifestations such as verbalizations, hand and arm movements, and facial expressions, using a checklist (Appendix C). Factors such as length of procedure, comments from the technician or radiologist regarding the ease or success of the procedure, and complications or deviations from the expected sequence were recorded.

Within one half hour of the conclusion of the procedure, subjects were again asked to complete the Spielberger state anxiety scale with instructions to recall how they felt during the barium enema. A one minute radial pulse was taken at that time. The scale was then collected by the investigator and any questions about the study were answered.

Independent Variables

Sensation-Procedural Information

This information was presented in a three minute taped message prepared by the investigator in which typical sensations experienced during a barium enema and the steps of the procedure are described. The script was compiled from observation, by the investigator, of three barium enemas and from the scripts used in two previous barium enema studies. (Hartfield & Cason, 1981; Barnett, 1978). The message was brief enough to be useful on a nursing unit and incorporates predominant sensations with a description of the

procedure as carried out in the facilities used for the study. A copy of the script is available in Appendix A and includes a description of the sequence of events, length of the procedure, sights, sounds and sensations commonly experienced during a barium enema.

Procedural Information

This information was presented in a two minute taped message prepared by the investigator in which the steps of the barium enema procedure are described. The script was compiled from the description in the hospital procedure manual, observation of three barium enemas and the scripts used in two previous barium enema studies (Hartfield, Cason & Cason, 1982, Barnett, 1978). The message was designed to give a brief description of the procedure alone, including a description of the sequence of events and length of the barium enema procedure. A copy of the script is included in Appendix A.

Dependent Variables

Subjective, Self Report

The state anxiety inventory (Spielberger, Gorsuch & Lushene, 1968) was used to measure subjective anxiety immediately prior to the barium enema and within one-half hour following the procedure. There are two parts to this tool, the state anxiety scale and the trait anxiety scale. The state anxiety scale alone was used for this study

since a change in state anxiety is the phenomenon of interest. The state scale has been widely used and tested with a variety of subjects including medical-surgical patients. It has also been used effectively in two other studies that examine patients having barium enemas (Hartfield & Cason, 1981; Hartfield, Cason & Cason, 1982). It is of reasonable length and easy for patients to complete.

Spielberger et al., (1970) state that instructions for the A-state scale may be modified to evaluate anxiety in the recent past or anxiety during a task that has been completed. It is further stated that it is not difficult for persons to describe how they felt in a past situation provided it was recent and they wish to cooperate. Therefore, the directions of the state anxiety inventory were modified for the post-procedure measurement in the present study, as follows.

Directions: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you felt during the barium enema. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to best describe your feelings during the barium enema.

A copy of the scale is provided in Appendix B. For information on reliability and validity refer to Appendix D.

Physiological Measure

A one minute radial pulse was taken at three separate times; before the procedure, during the procedure when the rectal tube had been inserted but the flow of barium had not begun, and within one-

half hour after the conclusion of the procedure. Heart rate was assessed as a reflection of autonomic nervous system arousal during an anxiety state. The change in heart rate from one measurement to the next was expected to indicate the level of anxiety generated by the procedure.

Behavioral Anxiety Measure

Behavioral signs of anxiety which include hand and arm movements, vocalization and facial expression, were assessed by the investigator during the procedure. The three behaviors were observed at 30 second intervals for a five minute period, beginning when the flow of barium was started, using a checklist (see Appendix C). The time intervals were recorded on tape and used by the investigator to signal the beginning and end of observation for each interval. Time intervals were determined after testing the scale during two barium enemas. Behavioral distress scores were then derived for each behavior by totalling the number of intervals in which the behaviors occurred. A score of 0 to 10 was possible for each of the three behaviors. The checklist was adapted from the behavioral assessment described in Johnson and Leventhal (1974) in the study of patients experiencing endoscopic examination. The scale was further described, with suggestions for establishing interrater reliability, in a research-based distress reduction protocol developed by the staff of the CURN Project (CURN Project, 1981).

Interrater reliability was established for the scale by including an additional observer during the procedure for 10 subjects. The

investigator met with the second observer prior to the observations to review the behavior distress scale. The investigator and second observer agreed that the patient's position and facial expression prior to the beginning of the procedure would be observed as a baseline and changes in position of hand and arms or facial expression would be recorded starting when the flow of barium was begun. Specific behaviors that comprised the observation are listed in the distress scale in Appendix C. The scale was completed by each observer independently during the procedure with the investigator giving a hand signal at the beginning of each time interval. Agreement was defined as a total behavioral score by each observer that was within one point of agreement. Using this method, interrater reliability was found to be 80 percent.

Demographic Information

Demographic information was collected from the subject's medical record and from a personal interview. This information included age, sex, occupation, educational level, medical diagnosis and type of barium enema. An effort was made to obtain the official medical diagnosis for all patients but this information was not available for many outpatients. Diagnoses were obtained from the patient in these instances. Variations in demographic characteristics between the information groups were considered in interpreting the results of the study. A copy of the data collection tool is included in Appendix C.

Extraneous Variables

Several variables were identified which could influence the results of the study. The observer's estimate of complications such as pain or debilitation was rated on a scale of 1 to 4 with 1 representing none and 4 representing extreme complications (Appendix C). The radiologist's estimate of the ease of the procedure and the adequacy of bowel preparation was also rated on a scale from 1 to 4 with 1 representing very easy and 4 representing very difficult and 1 representing adequate and 4 representing very inadequate respectively, (Appendix C). Other variables that were recorded include the length of the procedure, whether the patient was given sensory information by the technician or radiologist, the type of barium enema (single or double contrast), whether the subject was an outpatient or inpatient, whether the subject was contacted by telephone prior to the day of the procedure, in which of the three agencies the procedure was performed, whether the subject had taken specific drugs within 24 hours of the procedure and whether the subject received a glucagon injection during the procedure. The form for recording these variables may be seen in Appendix C.

Data Analysis

The data were analyzed using several statistical approaches. Initially frequency distributions for all variables were computed. In addition to the anxiety measures of A-state scale, heart rate and behavior, the demographic and extraneous variables were also analyzed

to determine the distribution of values for all variables in each group. An analysis of covariance was calculated for hypotheses 1 and 2. Two baseline values, pre-procedural A-state anxiety and pre-procedural heart rate were identified as covariates. The initial state of anxiety, as measured before the procedure, was identified as a state that could influence the values of the dependent variable, i.e. anxiety response to the procedure. Baseline heart rate was also considered to be an individual variation that would influence heart rate values during and after the procedure. The significance of difference between group means on the A-state scale and heart rate was analyzed after first adjusting the scores to account for the effects of the covariates. T-tests were then computed for hypothesis 3, using the criterion of $\alpha=0.05$, to determine whether differences in mean values between the groups on this variable were statistically significant. A correlation matrix was generated and Pearson's correlations were computed to determine the degree of relationships between the three measures of anxiety. Also correlations among the extraneous variables and among the extraneous variables and the anxiety measures were evaluated. Initially the three behavioral scores (vocalization, facial expression, and hand and arm movements) were analyzed separately. Since correlations between these three behavior scores were high (Cronbach's alpha 0.67), they were combined into a single behavior distress score and correlations with the other variables were reevaluated.

CHAPTER III

RESULTS

In this section the results of the study are presented by describing (1) the study population in reference to demographic, socioeconomic and health-related characteristics, (2) the findings on each dependent variable, (3) the intercorrelations among the three anxiety measures and (4) the intercorrelations of the dependent variables and the extraneous variables.

Description of Subjects

The subjects of the study were 42 medical-surgical patients who received barium enemas at two community hospitals and a private clinic in August and November of 1982. Two potential subjects refused to participate because they did not feel well enough. Refer to Table 2 for a summary of demographic data.

Fifteen subjects were from one community hospital, 10 were from the private clinic and 17 were from the other community hospital. Subjects were equally distributed between the three facilities in the sensation-procedural information group but somewhat unevenly distributed in the procedural information only group. There were 33 outpatients and nine inpatients and the distribution was approximately equal between groups. Among these subjects there were more females than males with slightly more males in the sensation-procedural

Table 2

Demographic Characteristic of Patients Receiving Barium Enemas

Characteristic	Information Groups			Percentage
	Sensation- Procedural	Procedural Only	All subjects	
Age (years)				
Range 19-85 years				
Mean - 51.2	52.2	50.3		
S.D. - 17.8	18.9	16.8		
Sex				
Male	10	8	18	43
Female	11	13	24	57
Occupation				
Unskilled	11	11	22	52
Skilled	7	6	13	31
Professional	3	4	7	17
Education (years)				
Range 4-19 years				
Mean - 12.3	12.3	12.1		
S.D. - 3.0	3.2	3.0		
Main Symptom				
Abdominal Pain	11	7	18	43
Rectal Bleeding	6	6	12	29
Diarrhea	1	4	5	12
Other	3	4	7	16
Patient Status				
Inpatient	5	4	9	21
Outpatient	16	17	33	79
Agency				
Community Hospital A	7	8	15	36
Community Hospital B	7	10	17	40
Private Clinic	7	3	10	24

information group and slightly more females in the procedural information only group. Although ages ranged widely most subjects were middle aged. Subjects in the sensation-procedural information group were slightly older and there was a wider range of ages than in the procedural information only group. The majority of subjects were unskilled workers followed by skilled workers and then professionals. These occupational groups were distributed almost equally between information groups.

There was a wide range of educational levels but the mean level was approximately equal for each information group. The main symptoms experienced by the subjects were abdominal pain, rectal bleeding and diarrhea. There are no recorded diagnoses for 24 outpatient subjects because their medical records were not available. For those diagnoses that were available, the most common were diverticulosis, peptic ulcer, inflammatory bowel disease, spastic colon and polyps. Subjects were asked about drugs taken prior to the procedure. Two individuals had taken beta-blocking drugs and four had taken tranquilizers but none of these drugs were taken within eight hours of the procedure.

Results for Major Variables

Subjective Report of Anxiety

The first hypothesis stated that persons given sensation-procedural information in preparation for barium enema will report

significantly less subjective anxiety than persons given procedural information only. The results of the study indicated that there were no significant differences between information groups in subjective anxiety. Subjective anxiety, using the A-state anxiety scale (Spielberger, 1966), was measured twice; before the procedure as a baseline and again after the procedure as a measure of response to the procedure.

The data were analyzed to determine any critical differences among groups. Means and standard deviations are presented in Table 3. In order to control for any initial differences between groups on pre-procedural state anxiety scores, an analysis of covariance was done using the pre-procedural A-state anxiety scores as the covariate. This analysis revealed no significant differences between information groups on the post-procedural A-state when pre-procedural variability was controlled. The results of this test may be seen in Table 4.

Because there were differences between males and females in the normative data on A-state scores, (Spielberger et al., 1970) a separate t-test of group means on the post procedural A-state was computed for males only and for females only. This analysis also revealed no significant differences between information groups. The variable of inpatient or outpatient status was also identified as a possible influence in state anxiety. There were 5 inpatients in the sensation-procedural information group and 4 in the procedural information only group. The t-tests comparing inpatients and outpatient

Table 3

Means and Standard Deviations for A-State Anxiety by
Information Groups.

Anxiety Scores	Information Groups			
	Sensation- Procedural		Procedural Only	
	\bar{x}	S.D.	\bar{x}	S.D.
<u>All Subjects</u>				
A-State 1	43.4	12.7	45.1	12.9
A-State 2	44.2	12.8	45.3	13.8
<u>Females Only</u>				
A-State 2	41.5	14.0	45.3	14.1
<u>Males Only</u>				
A-State 2	47.3	11.1	45.3	14.4

Table 4

Analysis of Covariance on Post-Procedural A-State Using Pre-Procedural A-State as the Covariate

Source	df	SS	MS	F	P
Pre-Procedural A-State (Co- variate)	1	4457.44	4457.44	65.82 ^a	.001
Between Groups	1	1.39	1.39	.021	.887
Error	39	2640.78	67.71		
Total	41	7099.61	173.16		

^aF test for the significance of the correlation between the covariate (Pre-Procedural A-State) and the dependent variable (Post-Procedural A-State).

on A-state mean scores revealed that inpatients had significantly higher scores than outpatients for both pre-procedural A-state anxiety ($p = .009$) and for post-procedural A-state anxiety ($p = .005$). Examination of these data indicated that the first hypothesis was not supported by the results of the study.

Heart Rate

The second hypothesis stated that persons given sensation-procedural information in preparation for a barium enema will exhibit significantly less increase in heart rate during the procedure than persons given only procedural information. The results of the study indicated that there were no significant differences in heart rate between the treatment groups. Heart rate was measured prior to the procedure (P_1), during the procedure (P_2), and after the procedure (P_3). It was anticipated that there would be an increase in heart rate during the procedure and a subsequent decrease after the procedure. However, 14 subjects experienced a decrease in heart rate during the procedure. Eight of these were in the procedural information only group and six were in the sensation-procedural information group. In addition, the mean post-procedural heart rate (P_3) for both groups was greater than both P_1 and P_2 . Means and standard deviations are presented in Table 5. In order to control for initial differences in heart rate before the procedure, two analyses of covariance were computed using P_1 as the covariate and P_2 and P_3 respectively, as the dependent variables. This analysis revealed no

Table 5

Means and Standard Deviations for Heart Rate by
Information Group

	Information Groups			
	Sensation- Procedural		Procedural Only	
Heart Rate	\bar{x}	S.D.	\bar{x}	S.D.
Before (P1)	77.5	15.2	75.5	10.6
During (P2)	78.7	18.2	77.8	12.9
After (P3)	82.3	19.5	78.4	13.5

significant differences between information groups on P_2 or on P_3 after controlling for P_1 scores. These results may be seen in Table 6. In order to examine possible differences in responses between males and females, separate t-tests of information group means were completed for each. No significant differences were found in heart rate between information groups for males only or for females only. The differences between inpatients and outpatients were also explored for heart rate. One-tailed t-tests were computed comparing mean heart rates of inpatients with outpatients on each measure of heart rate. No significant differences between inpatients and outpatients were found. Analysis of these data indicates that hypothesis two was not supported by the results of the study.

Behavioral Distress

The third hypothesis states that persons given sensation-procedural information in preparation for a barium enema will exhibit significantly less observed behavioral expressions of anxiety during the procedure than persons given only procedural information. Initially a one-tailed t-test of group means of the information groups was computed for each separate behavior: facial expression, hand and arm movement and vocalization. Table 7 presents a summary of the results of the behavioral distress scale. The results approached significance for vocalization ($p = .07$) and for facial expression ($p = .06$) and were clearly not significant for hand and arm movements. In order to evaluate whether a composite of the three behaviors was a

Table 6

Analysis of Covariance on Pulse 2 and Pulse 3, Using Pulse 1 as the Covariate

Source	df	ss	M.S.	F	P
<u>Comparison of Information Groups on P₂</u>					
Pulse 1 (Covariate)	1	6900.54	6900.54	86.76 ^a	.001
Between Groups	1	11.70	11.70	.147	.703
Error	39	3101.86	79.53		
Total	41	10,014.11	244.24		
<u>Comparison of Information Groups on P₃</u>					
Pulse 1 (Covariate)	1	7359.65	7359.65	85.99 ^b	.001
Between Groups	1	109.40	109.40	1.27	.265
Error	37	3166.43	85.57		
Total	39	10,635.50	272.70		

^aF test for the significance of the correlation between the covariate (P₁) and the dependent variable (P₂)

^bF test for the significance of the correlation between the covariate (P₁) and the dependent variable (P₃)

Table 7

Mean Behavioral Distress Scores with Standard Deviations and
t-values by Information Group

Distress Scores	Information Groups				t-value	Significance of t ^a
	Sensation- Procedural		Procedural			
	\bar{X}	S.D.	\bar{X}	S.D.		
<u>Separate Distress Scores</u>						
Vocalization	2.3	2.4	3.6	2.9	-1.53	n.s.
Facial Express.	1.3	2.2	2.6	3.0	-1.60	n.s.
Hand and Arm	2.0	1.8	2.2	2.4	- .36	n.s.
<u>Total Behavior Score</u>	1.8	1.2	2.8	2.4	-1.67	.05
<u>Total Behavior Score for Females</u>	1.4	1.5	2.9	2.4	-1.75	.05
<u>Total Behavior Score for Males</u>	2.2	.7	2.6	2.4	- .44	n.s.

a - one-tailed test

more accurate reflection of behavioral distress, they were combined into a single score for each subject. Cronbach's alpha was computed to determine the internal consistency reliability of the behavior scale as a whole and yielded a value equal to .67. The group means of the information groups on the total behavioral score were then compared using a t-test and a significant difference between groups was found ($p = .05$). Since the data support significant differences between the information groups, the third hypothesis was supported.

A t-test for males and females separately was also done in order to determine whether there was a difference in behavioral response. The t-test comparing females only from each information group revealed a significant difference between groups ($p = .05$), while there were no significant differences between groups for males. Inpatient or outpatient status was again identified as a possible significant variable influencing behavioral distress. A t-test comparing group means of inpatients with outpatients revealed that inpatients expressed significantly more behavioral distress ($p = .03$). A separate t-test of group means for outpatients only in each information group revealed no significant differences between groups. Inpatients were not compared separately because the total number of subjects was too small to be meaningfully analyzed ($n = 9$).

Correlations Among Anxiety Measures

A correlation matrix composed of Pearson's r between all pairs of anxiety measures was constructed. Pearson's correlations were

analyzed to determine the significance between pairs of the three anxiety measures. These results may be seen in Table 7. There was a significant correlation between both pre-procedural and post procedural anxiety scores and the behavioral distress scores. With the exception of a significant negative correlation (-.27) between the behavioral distress score and P_3 , there were no significant correlations of the three values for heart rate with state anxiety scores or the behavioral distress scores.

Correlations of the Anxiety Measures and Extraneous Variables

A correlation matrix composed of Pearson's r between the anxiety measures and the extraneous variable was constructed. Several extraneous variables were significantly correlated with the measurements of anxiety. These data are presented in Table 9. For the observer's estimate of complications such as pain or debilitation, there was a significant, positive correlation of both the pre-procedural and post procedural A-state scores and the behavioral distress scores but a significant negative correlation with post-procedural heart rate. The radiologist's estimate of ease of the procedure for himself and the patient was also correlated with the anxiety measures. This score was positively correlated with the post-procedural A-state score and the behavioral score but negatively correlated with the heart rate during and after the procedure. Another variable, the length of the procedure, was positively correlated with the behavioral distress score.

Table 8

Correlations Between Measures of Anxiety; A-State Scores, Heart Rate, and Behavioral Distress Score.

	A-State 1	A-State 2	Heart Rate 1	Heart Rate 2	Heart Rate 3	Behavior Distress
A-State 1		.79**	.17	.18	-.02	.37*
A-State 2			.05	.09	-.11	.58**
Heart Rate 1				.83**	.83**	-.15
Heart Rate 2					.81**	.02
Heart Rate 3						-.27*
Behavioral Distress						---

* $p \leq .05$

** $p \leq .001$

Table 9
 Correlations Between Anxiety Measures and Other Extraneous Variables

Variable	A-State 1	A-State 2	Heart Rate 1	Heart Rate 2	Heart Rate 3	Behavioral Distress
Observer's estimate of Complications	.37*	.44*	-.08	.13	-.28*	.70**
Radiologist's Estimate of Ease	.12	.33*	-.24	-.29*	-.29*	.37*
Patient Status (Inpatient-Outpatient)	.36*	-.40*	.03	-.03	.01	-.31*
Length of Procedure	.09	.15	-.17	-.09	-.10	.42*

* $p \leq .05$

** $p \leq .001$

the heart rate during and after the procedure. Another variable, the length of the procedure, was positively correlated with the behavioral distress score.

CHAPTER IV

DISCUSSION

Of the three measures of anxiety in this study, there were significant differences between the information groups in expressions of behavioral distress but no differences for subjective report of anxiety or for heart rate. Discussion of these results will be presented in regard to (1) the sample for the study, (2) factors influencing each anxiety measure, (3) the impact of the extraneous variables and (4) methodological issues.

Characteristics of the Subjects

Generally, the characteristics of the subjects were evenly distributed between the information groups (see Table 2). It is likely that such variables as age, occupation and educational level influenced the response of subjects to the preparatory information. The variable of age seemed to be of importance in that some older subjects did appear to the investigator to be calmer and more accepting of the procedure. However, no correlation was found between the age of the subject and measures of anxiety. Occupation and educational levels were assessed as indicators of socio-economic status. Perhaps there are differences in response to preparatory information among socio-economic levels. However, this study did not attempt to evaluate these differences. In addition, since both treatment groups

were similar in socio-economic characteristics, it was concluded that this variable probably did not differentially affect the information groups.

There was an unequal distribution between the groups as to the agency in which the procedure was done. This could represent a difference in the treatment of one group over another if the agencies were dissimilar. However, no obvious differences between the agencies were identified. More patients in the sensation-procedural group had abdominal pain as their main symptom prior to the barium enema. It is possible that these patients experienced more pain during the procedure. If this is so, the experience of pain could raise anxiety scores and mask the effects of the sensation-procedural information. However, this group of patients was too small to be meaningfully analyzed statistically.

Discussion of Major Variables

Subjective Report of Anxiety

It was anticipated that the sensation-procedural information group would report less subjective anxiety than the procedural information only group. Thus, the lack of significant difference between the groups was unexpected. The actual mean scores on the A-state anxiety scale were similar to the normative data provided by Spielberger et al (1970). The mean score for non-psychiatric general medical-surgical patients was 42.68 with a standard deviation of

13.76. The mean scores in the present investigation were from 0.72 to 2.62 points above the norm.

These results differ from the two previous studies using the A-state scale for patients having barium enemas. (Hartfield & Cason, 1981; Hartfield, Cason & Cason, 1982). In both studies significant differences were demonstrated in state anxiety scores between the sensation and procedural groups with the sensation group having the lowest scores.

There are several possible explanations for the lack of significant differences in A-state anxiety scores between information groups in the present study. The A-state 2 scale was given within one-half hour after the procedure. Subjects were instructed to recall how they felt during the barium enema. It is possible that the immediate relief of having finished the procedure interfered with accurate recall. However, in the two previous studies of patients having barium enemas, (Hartfield & Cason, 1981; Hartfield, Cason & Cason, 1982) the A-state scale was also given within one-half hour after the procedure with the same instructions. Another possible explanation is that some subjects in the current study felt that it was unacceptable to admit strong feelings of anxiety. Several individuals made comments that suggested some social constraints on admission of these feelings. Also, the presence of the investigator during the completion of both the pre-procedural and post procedural state anxiety scales may have influenced the subjects to be less candid in their responses. Perhaps subjects would have more freely

expressed their feelings of anxiety if the investigator had not been present. In the Hartfield and Cason (1981) and the Hartfield, Cason and Cason (1982) studies the A-state scale was left for the subject to complete alone. It is also possible that the A-state scale did not adequately measure the emotional responses of the subjects. This possibility will be considered in the discussion of methodological issues.

Heart Rate

Heart rate was conceptualized for this study as a physiological indicator of anxiety in response to the barium enema. Since it was anticipated that heart rate would rise during the procedure and then decrease after, the fact that it decreased during the procedure in fourteen subjects and varied so little in others, is unexpected. Although the increase in mean heart rate from before to during the procedure was greater for the procedural information only group, this difference was not statistically significant.

Heart rate was not measured in the three previous studies on barium enema, so that it is not possible to compare results. However, in studies of patients having endoscopic examinations, casts removed and pelvic examinations (Johnson & Leventhal, 1974; Johnson et al., 1975; Fuller et al., 1978) heart rate was found to significantly vary with information conditions.

There are several possible explanations for lack of significant differences in heart rate in the present study. The barium enema

itself may have influenced heart rate. Anxiety results in arousal of the sympathetic nervous system, the "fight or flight" mechanism, and generally is manifested by an increased heart rate along with other physiological changes (Guyton, 1971, pp. 166-167). However, the barium enema causes distension of the colon. This distension may cause an increase in parasympathetic stimulation which could potentially compete with sympathetic activation (Guyton, 1971, pp. 696-697). In addition, a tube was placed in the rectum just prior to the measurement of heart rate during the procedure. This may have resulted in vagal stimulation which has a braking action on heart rate. Although these influences equally affected both information groups, the competing effects of physiological stimulation of the parasympathetic nervous system and anxiety stimulating the sympathetic nervous system, may have reduced the amount of variability of heart rate. Heart rate may, therefore, not be a useful indicator of anxiety in procedures that involve competing physiological stimulation.

It is also possible that the timing of the P_2 reading was a factor. This value was obtained just prior to the beginning of the flow of barium when the patient was lying on the table with the rectal tube in place. It was not possible to take the pulse while the procedure was actually in progress because of the danger of interfering with the procedure and increasing exposure of the investigator to radiation. Perhaps the heart rate actually increased later in the procedure. Heart rate after the procedure (P_3) was expected to decrease to pre-procedural (P_1) levels. In fact, P_3 mean

heart rate was higher in both treatment groups. A possible explanation may be found in the timing of this reading. In most cases, the P₃ heart rate was measured immediately after the subject expelled the barium. It is possible that the physical stress of that activity caused heart rate to increase and there had not been enough time to return to a baseline rate. In two of the studies using observation of heart rate (Johnson & Leventhal, 1974; Fuller et al., 1978), there were no post procedural measurements. In the study of children having casts removed, (Johnson et al., 1975) a post procedural heart rate was measured but not reported. It seems reasonable to conclude that the post-procedural reading is not useful as an indicator of anxiety unless additional time is allowed for the effects of physical exertion to decrease.

Behavioral Distress

As hypothesized, the sensation-procedural information group expressed significantly less behavioral distress than the procedural information only group (see Table 8). Because observation of behavior may be open to bias, a number of steps were taken to enhance the validity and reliability of the distress rating tool. Specific behaviors were identified and operationally defined as indicating anxiety. The validity of these behaviors is supported by the fact that they were identified from observations of patients having barium enemas. Also, another observer was present during the procedure for the first six subjects and for the last four subjects to evaluate

interrater reliability for the distress scale. The fact that two independent observers agreed 80 percent of the time increases confidence in the reliability of the scale. It is likely then, that the scale measures objective behaviors that can be reliably identified by more than one observer. Also, in an effort to reduce bias in observations, the two observers were unaware of which information tape the subject received.

It is possible that the behavioral distress scale identified anxiety that the other measures did not. Some subjects who were unable to identify their own subjective feelings of anxiety, may have unconsciously expressed it in behavioral channels. Individual subjects varied in their responses. Some gave no observable evidence of anxiety, while others expressed themselves in all three channels. Individuals who were very verbal about their feelings prior to the procedure generally expressed more anxiety in all three measures.

These results agree with other studies using observation of behavior (Johnson & Leventhal, 1974; Johnson et al., 1975; Fuller et al., 1978). In the study of patients having endoscopic examinations (Johnson & Leventhal, 1974), hand and arm positions did not significantly vary with information groups but gagging and the time needed to pass the tube did vary significantly between groups. For children having casts removed, sensation information significantly reduced behavioral distress scores (Johnson et al., 1975). Also, patients having pelvic examinations expressed significantly less motor and vocal distress when given sensation information (Fuller et al.,

1978). The results of the present study relating to measures of behavioral distress coincided with other studies of behavioral response to threatening procedures, suggesting that observation of behavior may be a useful method for estimating anxiety.

The literature on measurement of anxiety indicates that these measures are often inexact and the three channels of expression, self report, behavioral and physiological, often do not correlate (Bernstein, 1976; Cohen & Lazarus, 1980; Krause, 1961). This situation is represented in the present investigation. Two measures, behavioral distress and state anxiety do significantly correlate. Because of this correlation, significant differences between groups on A-state anxiety as well as behavior would be anticipated. However, there were no significant differences between information groups on A-state anxiety and the reason for this is not clear.

Influence of Extraneous Variables

Although the extraneous variables were not the primary focus of this investigation, they do allow consideration of factors which may have influenced the results of the study. The observer's estimate of complications was a subjective judgment of the amount of pain or debilitation experienced by subjects during the barium enema procedure. This variable was significantly correlated with state anxiety and behavioral distress. The correlation of these three measures supports their validity as useful indicators of anxiety. It should be noted, however, that the observer's estimate of complications and

the behavioral score are not completely independent measurements since behavior was probably one reference point used to estimate complications. In addition, the judgment of the observer was not intended to be a refined tool but only to alert the investigator to any unusual complications that may have influenced the study results.

The radiologist's estimate of ease of the procedure was found to be significantly correlated with A-state 2, heart rate and behavioral distress (see Table 9). This was an informal, highly subjective opinion. With this variable, as with observer's estimate of complications, the subject who was highly anxious may have exhibited behavioral distress that influenced the radiologist's opinion of the ease of the procedure.

The differences between inpatients and outpatients is of interest. The number of inpatients was almost equal for each information group (see Table 2). Because it was anticipated that inpatients and outpatients might differ in level of anxiety, group means on measures of anxiety were compared. Inpatients scored significantly higher on the A-state 1 scale ($p = .009$), the A-state 2 scale ($p = .005$) and the behavioral distress score ($p = .03$). The data also indicate that inpatients entered the study with higher state anxiety scores than outpatients and their post-procedural state anxiety scores remained higher. Their behavioral distress scores were also higher than those of outpatients. However, since inpatients were almost equally distributed between the two information groups, it is likely that these differences in response equally affected the two information groups.

The present investigation differed from previous studies of patients having barium enemas in that all subjects in those studies were inpatients. However, in the Johnson et al. (1975) study on cast removal and in the study on pelvic examination (Fuller et al., 1978), all the subjects were outpatients. In both of these studies outpatient subjects were also found to be more responsive to sensation information than to other preparatory information.

That inpatients expressed significantly more anxiety is not surprising. Few patients are admitted to the hospital for diagnostic studies unless they are too ill or debilitated to remain at home. These patients are likely to experience more anxiety from the experience of hospitalization and the uncertainty of their illnesses, making it more difficult to tolerate the procedure.

The sex of the subject was considered as a possible variable influencing anxiety. Spielberger et al. (1970) states that females may score higher on the A-state scale than males, but this did not occur in the present study. However, females in the procedural information only group scored significantly higher in behavioral distress than females in the sensation-procedural information group. The reason for this difference is not clear. Perhaps females respond more positively than males to a description of sensations because they are permitted, in our culture, to express more awareness of bodily sensations. Also, because females exhibited more behavioral distress, it was thought that heart rate may differ between males and females.

However, analysis of the data revealed no significant correlations between sex and heart rate.

The influence of the observer in the room was of some concern during the study. Many patients looked at and talked to the observer while waiting for the procedure to begin. The exact effect of this factor is unknown. Once the procedure began, most subjects seemed less aware of the observer and many freely expressed their distress. The observer also made an effort to stand out of direct view to minimize awareness of her presence.

Finally, the type of barium enema is a variable that warrants consideration. Eight of the 42 subjects had air contrast studies rather than single contrast. The length of the air contrast studies is approximately 20 minutes while the single contrast study lasts five to seven minutes. These longer studies also involve inflation of the bowel with air after the barium is removed. Some individuals experience more cramping sensations with this procedure than with the single contrast barium enemas. Since the single contrast study is the most common, the observation time was set to end when that procedure was finished. The observation of subjects having the longer air contrast studies was completed 10-15 minutes before the conclusion of the procedure. Some subjects exhibited observable behavioral distress after the conclusion of the observation period. Since there were an equal number of air contrast studies in each group, this different experience was distributed to both information conditions. It seems, however, that air contrast studies are gaining

acceptance and may be the more common procedure in the future. This raises the question of what differences in experience there are for the patient having the air contrast procedure, and how to address these differences in the preparatory information given and measurement of responses.

Methodological Issues

Preparatory Information

The independent variable in the present study is the preparatory information given to the subjects. It was hypothesized that subjects given the sensation-procedural message would experience less anxiety than those given procedural information only. The efficacy of sensation information was not as clearly demonstrated in the present investigation as it has been in other studies. Two aspects are important in considering the impact of the information conditions; the content of the tapes and the selection of the information conditions.

The actual messages used by Johnson et al. (1975), Fuller et al. (1978) and Johnson and Leventhal (1974) were not provided but there was a general description of the content. The sensation messages were designed to give an objective description of what was seen, felt, tasted and heard. The procedural messages gave a description of the steps of the procedure only. An actual transcript of the preparatory messages was obtained from Hartfield and Cason (1981). They developed two messages; a sensation information only message and a

procedural information only message. The Barnett (1978) study also provided an exact transcript which was a combined procedural-sensation information message. These scripts together with observation and interviews by the investigator, were used to develop the messages for the present study. Sensation and procedural information were combined in the experimental message because it was felt that sensation information alone did not adequately describe the procedure. Only one other study was found in which a combined sensation-procedural message was compared with procedural information alone (Padilla et al., 1981). In that study, the procedural information was presented in a filmstrip visually depicting the insertion of a nasogastric tube. In the present study the messages are presented in an audiotape. The procedural-sensation message for the Padilla et al. (1981) study added a description of sensations but no information was given as to the source of the sensation information. Johnson stresses the importance of obtaining information about sensations from the patient. The sensation information for the present study was obtained from patients. There were, therefore, some distinct differences between the Padilla et al. (1981) study and the present investigation.

Two articles were reviewed which summarized the research of Johnson and associates on sensation information and presented guidelines for developing sensation information (McHugh, Christman and Johnson, 1982; "A Better Way, 1971). These guidelines were considered in developing the messages for the present study. Particular

attention was given to recommendations for insuring congruency of the information with the actual experience, describing sensations from the patient's perspective and avoiding evaluative descriptions of the sensation.

In light of the results of the present study, several characteristics of the taped messages must be considered. The two messages were of approximately the same length and began with the same introductory sentences. Perhaps the differences between them were not distinct enough. The procedural information in each tape was more detailed and lengthy than in the Hartfield and Cason (1981) and the Hartfield, Cason and Cason (1982) studies. It is possible that the detail of the procedural information obscured the sensation content in the combined sensation-procedural message. This might have been remedied by repetition of the sensation information, increased emphasis vocally or verbally calling greater attention to the sensation information portions of the message. It may also be that the sensation-procedural message allowed the subject to select appropriate coping behavior, thus reducing behavioral distress, but did not affect subjective feelings of anxiety or physiological responses. The choice of the two information conditions seems appropriate. However, a more distinct comparison could be obtained by using a control group that received only the usual, non-experimental preparation.

Measurement of Subjective Anxiety

Another factor that must be considered is whether the A-state scale adequately measured the emotional state of the patient. The scale focuses only on anxiety. It may be that there were other emotions present such as fear and embarrassment, that influenced the individual's response but were not assessed. A number of subjects, particularly those under 30 years of age, commented on feelings of embarrassment. Many individuals, across age groups, expressed fear of not being able to retain the barium. While these feelings could theoretically result in increased anxiety levels, it is not possible to say that they were assessed by the A-state anxiety scale. Johnson and associates in many studies using sensation information, avoided identifying specific emotions and used the term emotional distress instead. These investigators used a variety of measures including the Mood adjective checklist and behavioral and physiological assessment. However, Hartfield and Cason (1981) and Hartfield, Cason and Cason (1982) preferred to identify the emotion which occurs in response to threatening procedures as anxiety. They accepted Spielberger's (1966) concept that emotional response to a threatening event is composed of acquired behavioral disposition (trait anxiety) and the response to the present situation (state anxiety). They noted that fear and anxiety are often used interchangeably. Fear was identified, by Hartfield and Cason, as an individual variable which would be included in the measurement of trait anxiety.

The present study focused only on state anxiety. It was the intention here, to examine whether sensation information was helpful to all patients regardless of their trait anxiety characteristics. However, in light of the lack of significant differences between information groups on state anxiety, perhaps trait anxiety should be measured because it represents the coping style of the individual and significantly influences the way the individual processes preparatory information. The results of this study suggest that the A-state scale, in measuring anxiety specifically, may not adequately represent the subject's emotional response to the barium enema procedure.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Nurses are often responsible for preparing patients for potentially stressful procedures. It is not clear as to what kind of information is most helpful. This study compared the anxiety-reducing effects of two types of preparatory messages in patients having barium enemas. The patient was viewed as preparing for a potentially stressful event by the process of cognitive appraisal which involved estimating the potential of that event for causing harm, loss or threat. This appraisal is influenced not only by the personal characteristics of the individual, but also by the kind of information obtained about the event. It is at this point that the nurse may intervene to reduce anxiety by giving information that allows the individual to form accurate expectations of the procedure. Prior research in this area suggests that a description of sensations, (what is seen, heard, felt and smelled) with the description of the procedure would more effectively reduce the patient's anxiety than a procedural description alone. Thus it was hypothesized that subjects given sensation-procedural information prior to barium enemas would experience less anxiety than those given procedural information only.

The subjects of the study were 42 adult male and female medical or surgical inpatients and outpatients. They were scheduled for barium enemas for diagnosis of a variety of gastro-intestinal complaints. These subjects were randomly divided into two groups; the sensation-procedural information group and the procedural information only group. Three measures of anxiety were used; self report, heart rate and behavioral distress observation. Data were assessed using analysis of covariance for subjective anxiety and heart rate, t-tests of group means for behavioral distress and Pearson's r for correlations between anxiety measures and between anxiety measures and other variables.

The results of the study were as follows. First, the group receiving the sensation-procedural message expressed significantly less behavioral distress than those who received procedural information only. Second, there were no significant differences between groups in self report of anxiety or heart rate.

Conclusions

The significant differences in behavior between information groups are consistent with other sensation information studies which used behavioral distress measures. This agreement supports assessment of behavioral distress as a valid tool for measuring the effects of sensation information. Since behavioral assessment had not been used before in studies of patients having barium enemas, the results of this investigation contribute to a clearer understanding

of behavioral responses to this procedure. These findings also suggest that sensation-procedural information is more effective in reducing behavioral distress during barium enema than is procedural information alone.

However, the lack of significant differences in self report of anxiety differs from previous studies of patients having barium enemas. The reason for this difference is not clear, but does raise the question as to whether the A-state scale was the instrument of choice in this situation.

The lack of significant differences in heart rate between groups may be explained by the fact that the barium enema itself caused significant physiological stimulation that may have interfered with assessment of anxiety generated changes in heart rate. Thus, heart rate may not be an appropriate index of anxiety in patients having barium enemas.

Implications for Nursing

This study contributes additional insight into the responses of patients to preparatory information and to stressful procedures. The significant differences between inpatients and outpatients merit consideration. The increased anxiety responses of inpatients is not surprising, however, the study results provide confirmation of the special needs of this group of patients. Certainly, these results emphasize the need for careful preparation of these hospitalized patients. In addition, this study supports the validity of behavior

as an indicator of emotional distress. Perhaps the behavioral distress assessment tool might be useful for nurses observing patients in other situations. Use of a reliable tool would enhance assessment and reduce subjectivity.

How can these results be used to help patients prepare for procedures? Sensation information should be incorporated into nurses' explanations of procedures. The present study contributes to a growing research base exploring the efficacy of sensation information. Guidelines derived from this body of research may be used by nurses to develop sensation messages for other procedures. For patients having barium enemas, it is possible that preparatory tapes could be developed that include sensation information. These could be used by the nurse to form a foundation for pre-procedural teaching. The tapes would be particularly useful in outpatient settings where there is no contact with a nurse prior to the procedure. An ideal situation would be to have a nurse working with the radiology department to explain and to interpret procedures to patients. An alternative approach would be to provide sensation-procedural information to nurses employed in physician's offices, so that they may more actively participate in preparing patients. Very few of the subjects in this present study received preparatory information from office nurses.

All patients have contact with the radiology technician prior to the procedure. It seems appropriate, particularly in settings where patients have little contact with nurses, to share these research

findings in inservice programs, so that the technicians may incorporate sensation information into their preparatory messages. The technicians in one of the community hospitals which participated in this study, have requested such an inservice program.

Limitations of the Study

There are several limitations to this study. The first was the lack of specificity of the anxiety measures. Because of the abstract and elusive nature of the variable of anxiety, it was not possible to obtain precise measurement. However, this problem exists in all studies measuring psychological states of subjects. A related problem is the absence of any measure of coping styles or individual disposition in this study. Although this aspect was deliberately omitted, after analyzing the results it seems that assessment of these individual characteristics may be an essential component of understanding emotional responses to stressful procedures. Thirdly, perhaps it would have been useful to have a third group who received no experimental information. This may have allowed a clearer comparison of the sensation-procedural preparation with the usual, non-experimental, treatment. Fourth, the small size of the inpatient sample ($n = 9$) precluded any meaningful analysis of differences in their responses to the information conditions as a separate group. It was also not possible to effectively analyze differences between subjects from the three agencies in which data was collected, because these subgroups were too small.

Recommendations for Further Study

The following recommendations for further research are suggested as a result of this study. Because it is not clear whether the A-state anxiety scale adequately assessed the emotional state of the patient, another study using a different self report scale or using a different self report tool with the A-state scale, may be of value. It would also be most interesting to explore the coping mechanisms that individuals use when experiencing a stressful procedure. Informal conversations with subjects after the procedure yielded a number of interesting comments on how they conceptualized the event and what they did to get ready. Some patients were very embarrassed. Further research could be conducted to explore the effect of embarrassment on the response of patients to barium enema and to test interventions that would be helpful. Further study of patient's experiences with the air-contrast procedure is needed with particular attention to how these experiences differ from experiences during the single contrast procedure. Finally, sensation information related to other threatening procedures needs to be developed and tested in order to adequately prepare patients for these experiences.

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APPENDICES

APPENDIX A

Sensation-Procedural Information

Good morning. Thank you for participating in this study. This message was prepared by a nurse after talking with patients who have had a barium enema. It is intended to be helpful to you in preparing for this test. The purpose of the test is to obtain X-ray pictures of your bowel. A white, harmless liquid called barium is passed into your bowel through a tube placed in your rectum so that an outline of the inside of your bowel can be seen. The next section of this tape will tell you about what you can expect to feel during the barium enema. The exam will take place in a dimly lit room. You will be asked to lie on a table which feels hard and cool. You may hear humming or buzzing sounds from the X-ray machine. The doctor stands beside the table and directs the procedure.

The technician will insert the tip of the enema tube into your rectum and will allow the solution to flow in. This part is much like any other enema, if you have had one before. You may expect to feel fullness, or bloating and possibly some cramping for a minute. You will retain the barium while X-rays are taken. You may feel a need to empty your bowels. This usually does not happen, but if so, the protective pad under you will catch any leakage. You may be asked to change your position and periodically to hold your breath while pictures are being taken. You may have to wait for a few

minutes while the pictures are developed. The barium is then drained out into the bag with the tube still in place and you will feel less full and bloated. After two more pictures you may get up to the bathroom. The procedure will take about thirty minutes to one hour, and once it is over you may eat. Thus, the typical sensations which you should expect to feel during the barium enema are pressure and fullness. This is the conclusion of the message.

Procedural Information

Good morning. Thank you for participating in this study. This message was prepared by a nurse after talking with patients who have had a barium enema. It is intended to be helpful to you in preparing for this test. The purpose of the test is to obtain X-ray pictures of your bowel. A white harmless liquid called barium is passed into your bowel through a tube placed in your rectum, so that an outline of the inside of your bowel can be seen. The next section of this tape will tell you about the barium enema procedure. You will lie down on a table and the technician will insert the tip of the enema tube into your rectum and will allow the barium solution to flow in. You will retain the barium while X-rays are taken. A pad is under you to catch any leakage that may occur. The doctor will stand beside the table on which you are lying and direct the procedure. While your bowel is filled with barium, several pictures will be taken. The barium is then drained out and after one more film, you may get up to the bathroom. The procedure will take about thirty

minutes to one hour, and once it is over and you have returned to your room, you may eat. This is what you should expect to happen during the barium enema. This is the conclusion of the message.

SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorsuch and R. Lushene

STAI FORM X-1

Subject Number _____ DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *feel* right now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	①	②	③	④
2. I feel secure	①	②	③	④
3. I am tense	①	②	③	④
4. I am regretful	①	②	③	④
5. I feel at ease	①	②	③	④
6. I feel upset	①	②	③	④
7. I am presently worrying over possible misfortunes	①	②	③	④
8. I feel rested	①	②	③	④
9. I feel anxious	①	②	③	④
10. I feel comfortable	①	②	③	④
11. I feel self-confident	①	②	③	④
12. I feel nervous	①	②	③	④
13. I am jittery	①	②	③	④
14. I feel "high strung"	①	②	③	④
15. I am relaxed	①	②	③	④
16. I feel content	①	②	③	④
17. I am worried	①	②	③	④
18. I feel over-excited and "rattled"	①	②	③	④
19. I feel joyful	①	②	③	④
20. I feel pleasant	①	②	③	④



SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorsuch and R. Lushene

STAI FORM X-1

Subject Number _____ DATE _____

Directions: Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you felt during the barium enema. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to best describe your feelings during the barium enema.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	①	②	③	④
2. I feel secure	①	②	③	④
3. I am tense	①	②	③	④
4. I am regretful	①	②	③	④
5. I feel at ease	①	②	③	④
6. I feel upset	①	②	③	④
7. I am presently worrying over possible misfortunes	①	②	③	④
8. I feel rested	①	②	③	④
9. I feel anxious	①	②	③	④
10. I feel comfortable	①	②	③	④
11. I feel self-confident	①	②	③	④
12. I feel nervous	①	②	③	④
13. I am jittery	①	②	③	④
14. I feel "high strung"	①	②	③	④
15. I am relaxed	①	②	③	④
16. I feel content	①	②	③	④
17. I am worried	①	②	③	④
18. I feel over-excited and "rattled"	①	②	③	④
19. I feel joyful	①	②	③	④
20. I feel pleasant	①	②	③	④



Data Collection Form

Tape Number _____

Subject Number _____

A. Information from medical record and patient interview.

1. Age at last birthday _____ years

2. Sex M _____ F _____

3. Occupation _____

If retired give last type of employment, if a housewife give husband's employment)

4. Education (Years of formal education)
_____ years

5. Medical Diagnosis (List current diagnoses)

6. Medication taken in past 24 hours (See list of drugs Appendix E

Beta adrenergic Blocking Agent yes _____ no _____

Tranquilizer yes _____ no _____

B. Anxiety assessment information

1. A-state anxiety score

Pre-procedural (AS₁) _____ Post-procedural (AS₂) _____

2. Radial pulse values (Count radial pulse for one minute)

Pre-procedural (P₁) _____

During procedure (P₂) _____

Post-procedural (P₃) _____

3. Behavioral observation - Vocalization _____

scores

Facial expression _____

Hand and arm movement _____

C. Behavioral Assessment Record (Observe for 5 minutes)

Intervals	1	2	3	4	5	6	7	8	9	10
Vocalization (Sighing, gasping, moaning crying out, verbalizing about the experience)										
Facial Expression (Forehead creased, lips pursed, lip biting eyes closed tightly, grimacing)										
Hand and Arm movements (Clasping hands, wringing hands, hands gripping, extension of fingers, movement to push equipment or operator away)										

D. Length of procedure Minutes _____ Seconds _____

Using a stopwatch record exact time that the barium began to flow and the exact time the films were completed except for the post evacuation film)

E. Comments of radiologist regarding adequacy of bowel preparation or ease of procedure

1	2	3	4
Adequate	Somewhat Adequate	Somewhat Inadequate	Inadequate
1	2	3	4
Very easy	Somewhat Easy	Somewhat Difficult	Very Difficult

F. Observations by investigator of complications (Obstruction, excessive pain, patient debilitated. (If procedure must be repeated, patient is eliminated from the study)

1	2	3	4
None	Slight	Significant	Extreme

G. Sensory information given to the patient by the radiologist or technician.

Yes _____ No _____

APPENDIX D

The State Anxiety Scale

The state anxiety scale is a self-report scale designed to test a single dimension of anxiety. There are twenty statements that describe various affective responses. The qualities evaluated by the scale are feelings of tension, nervousness, worry and apprehension. Numerical values are assigned to the responses so that a total score may be computed. Some items are reverse scored to prevent the influence of acquiescence set. Scores on the scale range from 20-80 with a high score representing high state anxiety, and a low score representing low state anxiety. The scale can be completed by most persons in six to eight minutes. Since development, the scale has been used extensively for a wide variety of populations, including acutely ill patients, psychiatric patients and children.

Test-retest reliability of the A-state scale ranges from .16-.54 (Buros, 1978). This is because the state anxiety scale is designed to reflect a transient response to environmental factors at the time of testing. However, the alpha coefficient for the A-state scale is .82-.92 (Spielberger et al., 1968). The alpha reliability coefficients are usually higher in the A-state scale when it is given under conditions of psychological stress. The scale has been correlated with the IPAT Anxiety Scale (Cattell & Scheier, 1963), the Taylor Manifest Anxiety Scale (TMAS, 1963), and the Zuckerman Affect Adjective

checklist (AACL), 1960). The correlations of the A-state scale with the IPAT and the TMAS ranged from .75 to .85 for samples of college students and patients. Construct validity was tested using A-state anxiety scale for undergraduate college students. When the scale was administered at separate times under normal and then examination conditions, the mean A-state score was higher in the examination condition than in the normal condition (Spielberger et al., 1968).

Instructions to Agencies

For all patients scheduled for barium enemas
Beginning August 9, 1982

When taking call to schedule a barium enema ask

Has the patient had a barium enema before?

If the answer is no, say,

We are conducting a study to help prepare patients
for a barium enema and would like to schedule you one
half hour before your barium enema. Would this be
alright with you?

(The rest of the study will be explained to the
patient upon arrival at the department.



UNIVERSITY OF OREGON

HEALTH SCIENCES CENTER

CONSENT FOR HUMAN RESEARCH STUDY

Judith Kraft R.N. is conducting a study titled "The effects of information in preparation for barium enema" under the supervision of Joyce Crane R.N.,M.S. The purpose of the study is to explore the type of information nurses should give patients to prepare them for barium enema.

I understand that, during the study, the investigator will (1) ask me to complete a brief questionnaire describing my feelings before and after the barium enema, (2) take my wrist pulse for one minute before, during and after the procedure, (3) observe and record events during the procedure, (4) ask me to listen to a five minute tape recording of information about the barium enema procedure, (5) ask me for information about my age, diagnosis and current medications and (6) review my medical record for information about current diagnosis and medications.

The time required for my participation will be thirty minutes before the procedure and fifteen minutes after the procedure.

I may benefit from participation by having a better understanding of the procedure. No risk to me is expected, although individuals may vary in their response to information. The results of the study will be used to help others having barium enemas.

All information that I give will be handled confidentially. All documents will be identified by means of code numbers and my name will not be used.

Judith Kraft will be available to answer any questions I may have and will share the results of the study when complete if requested. She may be reached at 752-6930, in Corvallis, Oregon.

I understand that I may refuse to participate or withdraw from the study at any time without affecting my relationship with or treatment at the (Name of the Agency) Corvallis, Oregon.

I have read the above explanation and agree to participate as a patient in the study described.

Date _____

Signature of Subject

Witness

APPENDIX G

List of Drugs That May Affect Change in Heart
Rate in Response to AnxietyBeta Adrenergic Blocking Agents

Metoprolol tartrate (Lopressor)

Nadolol (Corgard)

Propranolol Hydrochloride (Inderal)

Sympathetic Agents

Terbutaline sulfate (Bricanyl sulfate, Brethine)

Metaproterenol sulfate (Alupent, Metaprel)

Tranquilizers

Chlorpromazine (Thorazine)

Trifluoperazine HCl (Stelazine)

Thioridazine (Mellaril)

Haloperidol (Haldol)

Thiothixene (Navane)

Chlordiazepoxide (Librium)

Chlorazepate dipotassium (Tranxene)

Diazepam (Valium)

Lorazepam (Ativan)

Lithium carbonate (Lithane, Lithonate)

APPENDIX H

Protocol

1. Greet patient -introduce self
2. Ask if subject has had a barium enema before? (If yes, do not proceed)
3. Explain study (use consent outline)
Study of how nurses can prepare patients
Will be giving you some information about the barium enema
4. Ask if subject would be willing to participate?
5. To conference room (inpatients seen in their rooms)
 - a. Consent
 - b. Demographic information (record)
 - c. Heart rate (record)
 - d. Patient completes:
A-state inventory
Taped message
Select and record tape one or tape two using random assignment method.
Instruct patient to return to waiting room after listening to the tape.
6. Observation of procedure
 - a. Take pulse
 - b. Record time procedure began

- c. Distress rating - begin when barium begins to flow and continue observing for 5 minutes.
 - d. Record time finished
 - e. Complete assessment form (Appendix C)
7. Post procedural - within one-half hour after completion of procedure.
- Take pulse
 - A-state inventory
 - Answer questions

Equipment

Two tape players, tapes - two information tapes and time interval tape.

Ear phone

STAI inventories (Pre & Post)

Consent forms

Stop watch

Data Collection forms

AN ABSTRACT OF THE THESIS OF

Judith E. Kraft

For the Master of Nursing

Title: THE EFFECTS OF INFORMATION IN PREPARATION FOR
BARIUM ENEMA

Approved _____

An experimental study was conducted to examine the anxiety-reducing effects of information prior to barium enema. It was hypothesized that subjects receiving sensation-procedural information (a description of the timing, onset and steps of the procedure combined with a description of what is seen, heard, felt and smelled) would exhibit less subjective, physiological and behavioral evidence of anxiety than persons receiving only procedural information.

Subjects were forty-two adult patients scheduled for barium enemas in the radiology departments of two community hospitals and a private clinic. Subjects were randomly assigned to one of two groups, (1) sensation-procedural information and (2) procedural information only. Three measures of anxiety were used; administration of the Spielberger A-state anxiety inventory before and after the procedure, a radial pulse taken before, during and after the procedure, and a behavioral distress score based on observations during the procedure.

Selected demographic data including age, sex, educational level, occupation, diagnosis, and current medications were also obtained. Subjects receiving sensation-procedural information expressed significantly less behavioral distress (in a t-test of group means, significance - .05) than those receiving procedural information only. However, there were no significant differences between information groups (using analysis of covariance) for measures of heart rate or state anxiety. These results partially support previous studies demonstrating the efficacy of sensation information in reducing anxiety.