

The Multiple Assessment of Coping Strategies Used  
by Dental Patients: A Validation Study of  
Three Coping Measures

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ABSTRACT

THE MULTIPLE ASSESSMENT OF COPING STRATEGIES USED  
BY DENTAL PATIENTS: A VALIDATION STUDY OF  
THREE COPING MEASURES

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The coping strategies used by dental patients were studied in an attempt to test the validity of three coping measures. The three measures purported to assess avoidant and vigilant coping strategies. They differed in their degree of situational specificity, with the process measure being the most situationally specific, the state scale moderately specific, and the trait measure the least specific. Concurrent validation was tested by an examination of the relationships between these coping measures and patients' responses to dental treatment. It was hypothesized that the coping measure's degree of validity would be positively associated with its level of situational specificity. Subjects were 50 patients who underwent either amalgam restoration, or crown preparation procedures. Measures of patients' stress responses at three points during treatment included subjective, observational, and physiological indices of anxiety. The results partially support the hypothesis in that the trait measure demonstrates no significant relationships with any stress response indices. However, both the state and process measures exhibit moderate associations with these indices. Nonetheless, the process measure is more informative about shifts in coping behaviors over the various assessment periods. It was also found that an avoidant coping method is most highly associated with low subjective distress ratings. Discussion concerns the implications of these

findings for preparatory programs to help patients cope effectively with dental treatment.

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Dedication

This thesis is dedicated to some very special people:

To my Mother and Father

who were so supportive and encouraging throughout this project;

To Daniel

for his friendship, encouragement, and his belief in me;

and

In fond memory of Jessica

whose great inner strength and determination were inspirations to me.

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### General Background

The study of coping strategies which individuals use to deal with stress has long been an area of interest in clinical psychology. A major issue in this area has been the question of generality.

Specifically, the issue concerns whether individuals have characteristic styles of coping which are exhibited over a variety of stressful situations or whether coping behaviors vary according to the specific demands of the stressful situation. The conceptualization of coping as a style rather than a strategy can be traced back to psychodynamic formulations of defense mechanisms.

In the psychodynamic tradition, stress was conceptualized as a state of anxiety generated by conflicts arising between an individual's needs and moral sanctions (Heilbrun, 1982). The ego was seen as the primary agent involved in the attenuation of this nervous tension, dissipating anxiety through defensive mechanisms (e.g., repression). This ego defense model embraced the notion that individuals engage in characteristic styles of coping (Heilbrun, 1982). At the pathological extreme, for example, the obsessive personality might typically engage in isolation as a defense against unacceptable impulses.

Given the traditional view of coping as a defensive style, it is not surprising that early measures of coping tended to embrace a trait approach to assessment (e.g., Gleser and Ihilevich's (1969) Defense Mechanisms Inventory). Indeed, one of the most widely used and researched measures of coping is Byrne's (1961) Repression-Sensitization (RS) Scale which combines a trait view of coping with an

information-processing model of stress perception (e.g., Weinstein, Averill, Opton, and Lazarus, 1968; Davidson and Bobey, 1970; Pagano, 1973). Specifically, this scale was based on the notion that individuals exhibit differential perceptual thresholds to threatening stimuli. Some individuals (i.e., repressors) require significantly longer time periods than others (i.e., sensitizers) to perceive stressful material. Repressors, therefore, demonstrate perceptual defensiveness to threatening stimuli while sensitizers exhibit perceptual vigilance. Byrne (1964) postulated that repressors characteristically use coping mechanisms such as denial and repression whereas sensitizers engage in intellectualization. In behavioral terms, repressors deny the presence of stressors while sensitizers actively approach them in order to gain some control over the situation. Thus, the basic paradigm underlying the RS scale is an avoidance-vigilance model of coping.

Byrne's (1961) RS scale was derived from the Minnesota Multiphasic Personality Inventory (MMPI). Research has indicated that sensitizers also tend to score low on the K and L scales of the MMPI, high on F minus K, and low on Hysteria while repressors score in the opposite direction (Byrne, 1961). The original 182-item RS scale, therefore, incorporated items related to the three validity scales (e.g., Lie) and to three clinical scales (i.e., Hysteria, Depression and Psychasthenia) in the MMPI. The concurrent validity of the RS scale was tested against an adjective checklist, Ullmann's Facilitation-Inhibition Scale (Byrne, 1961). On the conceptual basis of predicted differences in perceptual thresholds for threatening stimuli, it was assumed that inhibitors were analogous to repressors and that

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facilitators were similar to sensitizers. Subjects were 113 undergraduates who responded to both questionnaires. The correlation between the two scales was in the positive direction ( $r=.71$ ), indicating that the two measures assessed similar constructs (i.e., avoidance and vigilance).

Epstein and Fenz (1967) have developed a modified version of the RS scale in an attempt to eliminate the large number of items which had low face validity and/or were highly correlated with measures of anxiety. Four independent judges (e.g., clinical psychologists) chose 30 items which equally represented repression and sensitization. A maximum of five items were related to anxiety. The authors conducted a test of concurrent validity in which the galvanic skin responses (GSRs) of 40 undergraduates were measured as they were presented a word perception task. The stimuli included taboo, emotion-provoking words such as "orgasm" and "masturbation". All subjects were also given the modified RS scale. Results showed that sensitizers had significantly faster reaction times and lower GSRs to taboo words than repressors. These results were informative because they demonstrated a relationship between the two coping styles and autonomic response to stressors. Specifically, sensitizers exhibited lower autonomic arousal (GSRs) to the stressful words than did repressors. Thus, the modified RS scale succeeded in classifying subjects according to their perceptual thresholds and autonomic responses to threatening material.

The modified RS scale, like its predecessor, is a trait measure because it purports to assess pervasive behavioral tendencies of individuals to either avoid recognition of or to approach stressors. As such, this measure is fairly insensitive to shifts in coping

strategies which might occur as the individual adapts to changing situational demands. The underlying assumption of the RS scale, then, is that one responds in a characteristic manner to different types of stressful events. This conceptualization of coping as a trait has been seriously questioned in view of low correlations observed between trait scores of coping and actual stress responses (e.g., Cohen and Lazarus, 1973; Folkman and Lazarus, 1980; Billings and Moos, 1981; McCrae, 1982).

Recent conceptualizations of coping differ greatly from the traditional view of coping as a relatively mechanical, predetermined response to stress. In many recent formulations, coping is seen as flexible behavior which can be adapted to meet the specific situational demands of different stressors (e.g., Burchfield, 1979; Cohen and Lazarus, 1979; Billings and Moos, 1981; McCrae, 1982).

Billings and Moos (1981), for example, found that the type of coping response elicited is often dictated by the type of stressor encountered. They studied the types of strategies which 338 individuals used to attenuate the stresses of various life events. The results showed significant differences in coping behavior as a function of the type of stressor. For example, more subjects actively attempted to deal with illnesses rather than avoid confronting them. This finding is intuitively logical since it was more adaptive for these individuals to seek information about their illnesses and, thus, learn strategies to help their conditions. Alternatively, avoidance may be more adaptive when dealing with a death in the family since direct actions cannot alter the situation. Thus, the use and adaptiveness of coping strategies may be determined by the demands of

the specific stressor.

A state measure which focuses on the immediate situation can account for the relationship between specific demands of a stressor and the types of coping responses which these demands elicit. It is, therefore, not surprising that attention has been directed towards developing coping measures which pertain to specific stressful situations. McCubbin and his colleagues, for instance, have produced inventories which assess coping with separation among married couples (Coping with Separation Inventory) and coping with the care of a chronically ill child (Coping Health Inventory for Parents; Pearlin and Schooler, 1982).

Kaloupek, White, and Wong (1983) have recently developed the Modified Cope Scale which was based on Billings and Moos' (1981) conceptualization that coping can be classified according to the method and focus of the coping response. Methods of coping include:

- 1) active behavioral strategies which are overt actions that deal directly with the stressor or its emotional consequences; 2) avoidance which is characterized by attempts to avoid actively confronting the stressor or its emotional consequences; and 3) active cognitive strategies which attempt to manage the appraisal of the stressor or its emotional consequences (Table 1). The avoidant and behavioral methods of coping are conceptually analogous to avoidance and vigilance, respectively. The focus of the coping behavior can be the problem (i.e., modification or elimination of the sources of stress) or the emotion resulting from stress (i.e., management of the emotional consequences of stressors). Several combinations of methods and focuses of coping, then, are possible (e.g., active cognitive

Table 1

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Definitions of Coping  
Method and Focus According  
to the Billings and Moos Model

Method of Coping

- 1) Behavioral - overt behavior to deal directly with the stressor or its emotional consequences.

Examples: 1. Trying to find out more about the situation.  
2. Trying to relax.

- 2) Avoidant - attempts to avoid actively confronting the stressor or its emotional consequences.

Examples: 1. Denying the presence of a negative emotional or physical state.  
2. Thinking about or wishing to be elsewhere and/or doing something else.

- 3) Active Cognitive - attempts to manage one's appraisal of the stressor or its emotional consequences.

Examples: 1. Trying to see the positive side of the situation.  
2. Drawing on past experiences in similar situations.

Focus of Coping

- 1) Problem Focused - attempts to modify or eliminate the sources of stress.

Examples: 1. Taking things one step at a time.  
2. Explicitly trying to distract oneself away from the stressor.  
(e.g., "trying to keep my mind off all this...")

- 2) Emotion Focused - attempts to manage the emotional consequences of stressors and maintain one's emotional equilibrium.

Examples: 1. Referring to the emotional state being experienced.  
2. Trying to calm oneself.

coping strategy to manage the emotional consequences of the stressor).

Thus, while the RS scale assesses the individual's general coping style in a variety of stressful situations, the Modified Cope scale assesses the types of coping behaviors which the individual engages in during a specific stressful event (e.g., blood donation). The state measure (i.e., Modified Cope scale), therefore, can account for the interactional relationship between situational factors and coping to a greater degree than the trait measure (i.e., modified RS scale).

Lazarus and his colleagues, however, have argued that while a state measure might account for situational demands of specific stressors, this level of assessment cannot account for shifts in coping behaviors during a stressful situation (e.g., Lazarus, 1975; Cohen and Lazarus, 1979; Folkman and Lazarus, 1980). Lazarus has proposed that individuals continually guide their thoughts and actions in order to control potentially disruptive emotional and physiological responses to stressors. Specifically, they form appraisals of their environment and of their personal resources. Primary appraisals judge whether or not an event is dangerous, or threatening. Secondary appraisals, then, determine the nature and potency of the individual's resources for managing the threat. Coping can take the form of intrapsychic activity (e.g., denial, avoidance of the stressors), or it can be a direct action (e.g., seeking information about the stressor). Therefore, during a stressful situation, a continual process of appraisals and re-appraisals provides feedback on the transactions between the individual and the environment.

Given this conceptualization of coping as a fluid interchange between person and environment, it is clear that the assessment of



this behavior is no easy task. The measure, for example, should account for the flexibility of coping strategies as the individual responds to changing situational demands (Meichenbaum, Turk, and Burstein, 1975). Moreover, the measure must contend with the understanding of coping not as a single act but, rather, as a constellation of many acts and thoughts (Cohen and Lazarus, 1979).

Cohen and Lazarus (1973) have argued that neither trait nor state measures of coping can adequately assess the fluid coping process. These authors attempted to measure the active process of coping by having interviewers rate surgical patients on their use of avoidant or vigilant coping behaviors. They found only a slight correlation between this process rating of coping and the modified RS scale (Epstein and Fenz, 1967). Moreover, the process measure was more predictive of postsurgical recovery (i.e., length of hospital stay) than was the trait measure. Unfortunately, however, one can argue that the interviewers' ratings of the patients' coping responses, taken the day prior to surgery, were more analogous to a state measure than to a process measure. Specifically, the ratings did not assess the temporal shifts in coping responses.

Kaloupek et al. (1983), for instance, asked subjects to describe what they were thinking about at two separate points during a blood donation procedure. The results showed that a number of subjects were indeed flexible in their coping responses. For instance, some subjects attempted to learn more about the procedure prior to actual donation. However, many of these same subjects tended to avoid focusing on the blood donation procedure while they were actually giving blood. Perhaps, an avoidant attitude was more adaptive at this

point since the subject could do little to alter the situation (i.e., apart from leaving). Thus, this process measure was able to tap the transition of these subjects' coping responses from a vigilant attitude to an avoidant one as a function of the changing demands of the stressful situation. Clearly, an important direction in the assessment of coping is the refinement and validation of process measures that can account for the flexibility of coping strategies.

#### Coping with Dental Treatment

Dental treatment represents an extremely stressful situation for a significant portion of the general population (Freidson and Feldman, 1958). A major cause of distress among dental patients seems to be the exposure to highly fear-provoking stimuli. For example, Hentschel, Allander, and Winholt (1971) found that a group of 60 patients tended to rate the smell of the dental operatory and the sound of high-speed drilling as extremely anxiety-provoking. Kleinknecht, Klepac, and Alexander (1973) similarly reported that, among the 487 subjects they sampled, the sound, sight, and feel of the dental drill were highly salient fear stimuli. These subjects, however, rated the sight of the syringe and the sensation of the anesthetic injection as the most fear-producing stimulus complex in dental treatment.

The findings from these two studies suggest some degree of fear conditioning since the sights, sounds, and smells associated with dental treatment were rated nearly as anxiety-provoking as actual sensations due to treatment. That is, physical presentation of stimuli associated with dental treatment was no longer needed to produce fear responses. Perhaps, a process of higher-order conditioning had taken place over a sufficient number of dental visits.

so that relatively remote cues (e.g., dentist's waiting room) had become anxiety-provoking. Given this postulation of a fear conditioning process, stress may be a very pervasive factor in dental treatment.

An investigation into the coping strategies of dental patients becomes very important when one considers the disruptive effects of negative affective responses (e.g., anxiety) on dental treatment. For instance, negative emotional states can affect the patient's subjective perception of pain (e.g., Melzack, 1973). Indeed, Hentschel et al. (1977) found that patients who reported high levels of distress during treatment tended to demonstrate lower pain thresholds in the tooth during drilling. This higher sensitivity level, in turn, necessitated more frequent use of anesthetics for these patients. Physiological manifestations of negative affective states can also adversely influence the course of treatment. Kleinknecht et al.'s (1973) subjects reported that muscle tension was a frequent symptom of dental fear. Excessive muscular tension can contribute to gagging and, hence, disrupt treatment. Thus, higher sensitivity to pain and physiological concomitants of fear can result in unnecessary difficulties in performing dental procedures.

The importance of reducing the patient's negative emotional response to treatment has led to a great interest in the development of techniques to help the patient prepare for treatment. The main focus in dentistry, however, seems to have been on teaching patients coping skills without any prior assessment of naturally occurring coping strategies. For example, techniques such as imaginal flooding (e.g., Mathews and Rezin, 1971), modeling (e.g., Melamed, Yurcheson,

Fleece, Hutcherson, and Hawes, 1978), and relaxation (e.g., Siegel and Peterson, 1980) have been used to attenuate dental stress with little concern for individual differences in untrained coping styles. It has been assumed that any type of preparatory training will benefit the patient, whether or not the technique is compatible with the individual's personal coping style.

The fallacy of this assumption has been demonstrated most clearly in the literature on stressful medical procedures. Shipley, Butt, Horwitz, and Farbray (1978), for example, studied the effects of viewing a videotape of an endoscopic examination on the subsequent reactions of patients undergoing such an examination. Two groups were distinguished according to their scores on the modified RS scale. Results showed that repressors who saw the videotape only once displayed the highest mean heart rate increase during the endoscopic examination. However, repressors who viewed the same tape three times exhibited little heart rate increase. Conversely, sensitizers exhibited less heart rate increase as the number of viewings increased. The authors suggested that single exposure to the stressor may have disrupted the repressors' avoidant coping style whereas three exposures may have led to extinction or habituation to the stressor. An alternative explanation is that the longer exposure condition may have permitted the repressors more time to engage in and master an avoidant response. Conversely, while three exposures maximally benefited the sensitizer group, single exposures did not adversely affect these individuals. These results, therefore, supported the contention that preparatory techniques are generally more effective when they are congruent with patients' untrained coping strategies.

Andrew (1970) has similarly reported that surgical patients who used either an avoidant or vigilant style of coping responded differently to receiving information about their condition prior to surgery. The avoidant group which received this information required more analgesics post-operatively than avoiders who did not receive such preparation. Conversely, vigilant patients were unaffected by exposure to this information. Hence, it appeared that the avoidant group's cognitive coping style had been disrupted by exposure to stressful information. However, this type of preparation was not incompatible with the vigilant group's tendency to seek information concerning the stressful situation. Therefore, it appears that the effectiveness of psychological preparations for stressful treatments varies according to the untrained coping repertoire of the individual patient.

Given the various procedural similarities (e.g., use of analgesics, involvement of pain, physical discomfort) between many medical and dental treatments, it seems fair to assume that the need for assessment of untrained coping strategies is an equally important consideration in dentistry. It would be particularly useful to determine the types of coping strategies which are generally associated with low anxiety in patients. If, for instance, an avoidant strategy during dental treatment is associated with low distress, then it might be beneficial to instruct patients to engage in distraction strategies (e.g., pleasant imagery). Thus, information concerning the relationship between different coping strategies and patients' affective and physiological responses to dental treatment has important implications for providing guidelines for psychological

preparation programs.

### Present Study

The aim of the present study was to evaluate the validity of three objective measures of coping which were administered to dental patients. The three measures were similar in that they focused on an avoidance-vigilance model of coping activity. They differed primarily in the degree to which they were situationally specific. The three levels of measurement examined in this study were: 1) trait; 2) state; and 3) process (Kaloupek et al., 1983).

The trait level of coping represented the lowest degree of situational specificity because it measured the general tendency of an individual to respond to stressors in a certain manner. The state measure represented a higher level of situational specificity since the items pertained directly to the patient's behavior during dental treatment. Finally, the process measure accounted for the highest degree of situational factors because it was administered at several points during actual treatment. Hence, the process scores could conceivably monitor fluctuations in patients' coping strategies as treatment progressed.

It was first necessary to determine whether or not the three measures actually assessed similar types of behavior. Indeed, a comparative study of these coping measures made sense only if there was a common basis (i.e., avoidance-vigilance) for comparison. Campbell and Fiske (1959) have argued that validation is typically convergent; specifically, that a correlation should be shown between independent measures of a construct. Hence, it was expected that the relationships between similar coping variables assessed by the three

measures would be generally positive and the associations between dissimilar coping variables (e.g., avoidance vs. vigilance) would be negative, irrespective of the significance of these relationships. In fact, a large number of significant intertest correlations would suggest that the measures were redundant and, thus, not necessarily distinguishable in terms of their degrees of situational specificity.

In order to further assess the validity of the coping measures in terms of concurrent validation, it was necessary to consider a nomological net (Cronbach and Meehl, 1955) which could relate the construct of coping to some observable behaviors. Coping can be conceptualized as an action which attempts to manage the manifestations of stress (Lazarus, 1979; Burchfield, 1979; Kimball, 1982). Therefore, there should be a specific relationship between subjects' scores on the coping measures and their stress responses (i.e., physiological responses, self-reports of distress, and overt behaviors) during dental treatment. For example, using a process measure, Kaloupek et al. (1983) found that self-reports of distress and nurses' ratings of patients' anxiety were higher for vigilant subjects than for those who used avoidant strategies.

In the present study, there were no specific hypotheses proposed about the directions of the relationships between the coping measures and patients' stress responses. Folkman and Lazarus (1980) have postulated that coping is any cognitive or behavioral attempt to manage or tolerate external and internal demands imposed upon the individual. Given this conceptualization of coping as an attempt at stress management, no a priori judgements could be made concerning the most effective coping strategy in the dental situation. Moreover,

little is known about the relationship between specific situational factors and effectiveness of a particular coping strategy. Therefore, it was expected that some relationships would be demonstrated between coping variables and observable manifestations of coping (e.g., patients' self-reports of distress) but the directions of these relationships were not hypothesized in advance.

One way to assess concurrent validity is to determine the ability of the coping measure to discriminate among subjects, based on their observational, affective and autonomic stress response scores. It was hypothesized that there would be a direct relationship between the level of situational specificity characteristic of the coping measure and its degree of concurrent validity (e.g., Kaloupek and Levens, 1980). This hypothesis was tested by subjecting the coping and stress response scores to discriminant analyses. The hypothesis would be supported if it were shown that the trait measure of coping was least able to discriminate groups on the basis of their stress scores, the process measure was maximally able to classify groups, and the state measure's discriminant power fell somewhere between those of the trait and process measures.

A second hypothesis concerned the tendency of repressors to underestimate their physiological responsivity to stressors. In their review of six studies on the autonomic responsivity of repressors and sensitizers who viewed an unpleasant film, Weinstein et al. (1968) found that repressors tended to report less subjective distress than they demonstrated physiologically (e.g., high mean heart rate). Sensitizers did not exhibit such a marked discrepancy between self-report of distress and autonomic arousal. The apparent tendency of



repressors to underestimate their physiological response to stressors has also been demonstrated by Pagano (1973) and Weinberger, Schwartz, and Davidson (1979). Underestimation or denial of one's physiological stress response may be detrimental because prolonged autonomic arousal which is left unattended might predispose the individual to serious health risks such as cancer (Dattore, Shontz, and Coyne, 1980), or chronic hypertension (Sterling and Eyer, 1981). Therefore, information is needed regarding the degree to which repressors are generally aware of their autonomic states.

A widely used measure of autonomic self-perception is the Autonomic Perception Questionnaire (APQ; Mandler, Mandler, and Uviller, 1958). This scale purports to measure an individual's awareness of physiological states during periods of stress. The original APQ consisted of three sections: 1) free response descriptions by the respondent of feelings and reactions during states of anxiety and pleasure; 2) 30 scale items which dealt with the perception of bodily activity (e.g., heart rate) during states of anxiety and pleasure; and 3) 70 MMPI items dealing with internal bodily perceptions.

The original APQ scale was validated on a group of 166 undergraduates who were presented a series of difficult intelligence and reasoning tests (Mandler et al., 1958). Physiological measures of heart rate, respiration, face temperature, blood volume, and galvanic skin response were conducted on these subjects during the test situations. Results showed that high APQ scorers exhibited significantly greater autonomic reactivity during testing than did low scorers. In addition, high perceivers tended to overestimate their

autonomic responses while low perceivers tended to underestimate them.

A short form of the APQ was subsequently developed which consisted of 20 items pertaining to awareness of bodily states during periods of stress (e.g., Borkovec and O'Brien, 1977). Validation studies conducted by Borkovec and O'Brien (1977) showed that this short form of the APQ demonstrates good sensitivity to situational factors. That is, subjects' scores on the APQ were related to both their resting conditions prior to exposure to the stressor (i.e., instructions to make a speech) and to their reactivity to the stressor. For example, high APQ scorers showed the lowest levels of resting heart rate as well as the greatest increases in skin conductance level during anticipation of the stressor.

The short form of the APQ also seems to assess more than simply the subject's level of anxiety. Kaloupek, Peterson, and Levis (1981), for instance, showed that subjects' scores on the APQ were not correlated significantly with their scores on several fear scales (i.e., Snake, Spider, and Mutilation Questionnaires). These results supported the premise that the APQ measures the degree of awareness of bodily sensations during anxiety states rather than level of anxiety, per se.

In the present study, this short form of the APQ was used to determine the degree to which repressors and sensitizers reported on their autonomic responses during periods of stress. It was proposed that repressors would report less awareness of their bodily reactions than sensitizers. Moreover, it was of particular interest to investigate whether or not repressors and sensitizers exhibit different levels of physiological responsivity to an actual stressor

(i.e., dental treatment).

The Social Desirability (SD) scale was also given as a check against the subject's tendency to respond to questionnaire items in a socially desirable manner (Crowne and Marlowe, 1960). It was particularly important to determine whether or not patients' and observers' ratings of anxiety were influenced by a response set to present favorable impressions (e.g., low anxiety). It was expected that there would be only slight correlations between SD scores and both patients' and observers' stress ratings since these ratings presumably assessed attributes which are distinct from the desire to present socially desirable impressions. For example, patients' fear ratings assessed subjective level of anxiety which, if scored veridically, should not be significantly associated with social desirability. However, repressors tend to deny their negative emotional responses to stressors and, therefore, this group may attempt to present itself in a favorable manner (Kaloupek et al., 1983). Consequently, one might expect scores on the SD scale to be positively related to repression (i.e., low scores on the modified RS scale).

#### Summary


In summary, the major aim of the present study was to determine the concurrent validity of three objective measures of coping. The three measures assessed vigilant and avoidant methods of coping. They differed primarily in their degrees of situational specificity; the trait measure being least situationally specific, the process scale maximally so, and the state measure moderately so.

The primary hypothesis was that there exists a positive

relationship between the degree of situational specificity of the coping measures and their concurrent validity. To address this hypothesis, two forms of validity were examined:

- 1) Convergent validity would be shown if the intertest correlations between similar coping variables were in positive directions. Moreover, dissimilar coping variables were expected to be negatively associated. This type of validation provided some evidence that the three measures assessed common constructs and that, hence, there was a basis for comparison regarding their degree of concurrent validity.
- 2) Concurrent validity would be shown by the ability of the coping measure to discriminate subjects according to their stress response scores. The trait measure was expected to demonstrate the least discriminant power, the process measure to discriminate maximally, and the state measure's discriminant power was expected to be moderate.

The secondary hypothesis was that repressors and sensitizers differ in the degree to which they report awareness of autonomic responsiveness to stressors. It was proposed that repressors would report less awareness of bodily reactions to stress than sensitizers.



## METHOD

### Subjects

Subjects were solicited from a private dental practice in Westmount, Quebec. All patients who were scheduled for either amalgam restorations or gold crown preparations and who were between the ages of 18 years to 65 years were solicited for participation in this study. Patients who volunteered to participate were presented a consent form which provided details concerning the measures which were to be administered. Refusals to participate were most often attributed to lack of time needed to complete the test battery.

Subjects were 20 male and 30 female adult volunteers. They ranged in age from 19 to 63 years, with a mean age of 41.7 years. The types of treatment were: 1) silver fillings ( $n = 32$ ); 2) gold crown preparations ( $n = 17$ ); and 3) filling and crown preparation ( $n = 1$ ). All subjects were administered an anesthetic injection during the course of treatment.

### Observers

The two observers who rated patients' anxiety levels were the dentist and chairside assistant. The dentist has been in private practice for 27 years while the assistant has had three years of experience working in a dental operatory. These individuals have been working together as a team for 18 months.

### Materials

#### Measures of Coping

The trait measure of coping was the modified Repression-Sensitization (RS) Scale (Epstein and Fenz, 1967; Appendix A). The

potential range of scores was from 0 to 30; high scores were associated with sensitizers and low scores with repressors.

The state measure was the Modified Cope Scale which is an adapted version of Billings and Moos' (1981) Cope Scale (Kaloupek et al., 1983; Appendix A). The 19-item questionnaire was modified in minor ways to accomodate the dental treatment situation. The Modified Cope scale was administered after treatment and items focused on what the subject actually did or thought about during or prior to dental treatment. The scale is relatively new and, therefore, its factor structure has not yet been established. Hence, subjects' scores on the Modified Cope scale were subjected to principal components analysis to distinguish the types of coping strategies measured.

The process measure was the Process Cope Scale which was developed for the present study and was also based on Billings and Moos' (1981) conceptualization of the methods and focuses of coping responses (Appendix A). The items were derived from the most representative responses of Kaloupek et al.'s (1983) blood donor subjects to the question, "What are you thinking about at this time?" These responses had been categorized by three independent judges according to the coping method and focus they best represented (Kaloupek et al., 1983). In the Process Cope scale, each method and focus was represented by two statements and the order of these statements was randomized to control for effects due to positioning of items. Subjects were asked to endorse one method and one focus of coping which best characterized their behavior during a particular 1-min period. The process scale was administered at three points during dental treatment.

In summary, the three coping measures which assessed avoidant and vigilant coping strategies but which differed in their degree of situational specificity were: 1) the modified RS scale (Epstein and Fenz, 1967; trait); 2) Modified Cope scale (Kaloupek et al., 1983; state); and 3) Process Cope scale (process).

#### Measures of Stress Response

In order to assess subjects' emotional reactions to dental treatment, their stress responses were assessed on three levels: 1) self-report of distress; 2) behavioral observations; and 3) physiological responses.

Self-report measures. Subjects were administered a Fear Thermometer (FT) on which they rated the highest level of anxiety they experienced during a particular 1-min period (e.g. Walk, 1956; Appendix C). The scale, developed for this study, was a 12-point rating system from "slightly" to "extremely" anxious. The FT was administered at four different points during treatment and, thus, was an immediate assessment of fluctuations in the patient's subjective level of distress during various phases of the procedure.

Behavioral observations. Subjects' behavioral responses to the dental treatment were recorded on a Behavior Checklist (BC) by the dentist and the dental assistant (Appendix C). The checklist was developed for this study and assessed signs of muscle tension (e.g., gagging), resistance (e.g., drawing back), and autonomic arousal (e.g., rapid breathing). The subject's score on this checklist was the total number of behaviors checked off by the observer relative to a particular observation period.

The dentist and assistant also rated the degree of resistance on

a Resistance Thermometer (RT) and the highest level of anxiety which the subject exhibited during a particular 1-min period on a Fear Thermometer form comparable to the one administered to the subjects. The two raters were blind to the subject's ranking on the coping measures.

Physiological measures. The subject's blood pressure was monitored with a sphygmomanometer and cuff by the dental assistant. In addition, a Lafayette Instruments heart rate monitor (Model 77067) was used to record the subject's pulse rate for 1-min blocks during treatment. A photoplethysmograph was placed on the index finger of the subject's nondominant hand. If the finger clip was bothersome or uncomfortable, it was removed temporarily between assessment periods. The heart rate monitor was manually activated by the assistant and a Lafayette Instruments two-amplifier pen recorder (Model 76101) provided written outputs for each recording period.

Heart rate was recorded in two forms: 1) beat-to-beat heart rate; and 2) analog heart beat signal, or beat frequency. For the purposes of the present study, heart rate was scored from the beat-to-beat recordings. Large deviations in the readings due to faulty recording or sudden movements were easily distinguishable and ranged from 10 bpm to 40 bpm.

Each of the three 1-min recording blocks was first divided into six 10-sec intervals and the maximum heart rate score (bpm) was determined for each interval. Maximum heart rates were chosen since they were readily scoreable and because a main objective in assessing this autonomic response was to determine patients' heart rate responses in the direction of acceleration. A minimum of four



scoreable intervals was required to be included in the study. The median heart rate score for the six intervals was then calculated; the mean was not used since this statistic is more influenced by variability in the scores.

Each subject's stress response was also measured by analysis of a saliva sample. Morse, Schacterle, Esposito, Furst, and Bose (1981) have shown that analyses of dental patients' saliva can be valid measures of their levels of distress. Specifically, decreased salivary pH, decreased salivary translucency, and decreased saliva volume all indicate the effects of sympathetic enervation in response to some stressor. Morse et al. (1981) had their subjects expectorate into a paper cup for 1 min. This procedure, however, was not possible in this study, given the practical and time limitations of the private dental practice. Therefore, only pH level of the subject's saliva was measured. Subjects simply placed strips of litmus paper (Duotest pH indicator sticks) in their mouths for 5 sec. Approximately 10 sec. later, the assistant compared the results to a colorometric code which indicated various levels of acidity. The potential range was from 5.0 to 8.0, with a score of 7.0 representing a neutral level of salivary pH. High scores indicated base levels (i.e., minimal physiological stress response) and low scores indicated acidity (i.e., responsivity to stress).

#### Additional Measures

Past treatment measures. The Dental History questionnaire, developed for this study, assessed subjects' usual responses to dental treatment (Appendix C). For example, it allowed subjects to rate the level of anxiety which they generally feel when undergoing dental

treatment. The measure includes 12-point scales assessing whether or not the patient has had traumatic experiences during previous dental treatments and the level of anxiety which the patient experiences when given an anesthetic injection.

Present treatment measures. Variables related to the present treatment were noted by the assistant on the Dental Data sheet (Appendix C). For example, patient status (regular = 0; first-time = 1), type of treatment (filling = 1; gold work = 2; filling and gold = 3), and duration of treatment (in minutes) were recorded. Moreover, the type and dose of local anesthetic used was noted. The patient was given an injection of either Black Citnest, or Xylocaine. = Black Citnest does not contain epinephrine while Xylocaine does, so that Xylocaine produces longer lasting anesthesia (Black Citnest = 1, Xylocaine = 2). The majority (96%) of subjects was administered Black Citnest ( $n = 48$ ). Dosage was coded on an ordinal scale, ranging from 1 = .45 ml to 9 = 3.6 ml<sup>1</sup>. It was important to monitor type and dosage of anesthetic in order to determine possible effects of the medication on physiological, affective, and observational stress response scores (e.g., heart rate).

Personality measures. The APQ was administered to subjects in order to assess their general levels of autonomic self-perception (Borkovec and O'Brien, 1977; Appendix B). The potential range of scores was from 0 to 180, with high scores indicating high levels of autonomic self-perception.

The SD scale assessed subjects' sets to respond in a socially desirable manner (Crowne and Marlowe, 1960; Appendix B). The potential range of scores was from 0 to 33. High scores indicated a

desire to present oneself in a favorable manner while low scores indicated no such desire.

### Procedure

#### Pretreatment

Each subject read and signed an informed consent sheet (Appendix C). Subjects were then given a test battery which included the Dental History sheet, modified RS scale, Crowne-Marlowe SD scale, and APQ. (See Figure 1 for flow chart of the procedure.) At this point, subjects also completed the first Fear Thermometer (pretreatment FT), indicating their highest level of anxiety during the past minute. Hence, the pretreatment FT served as a quasi-baseline measure of the subject's anxiety level. The test package required approximately 20 minutes to complete. There were six random orderings of these questionnaires in order to control for response biases due to the sequence in which they were presented. However, the Dental History sheet which included the pretreatment FT was consistently given last. Hence, the order of the modified RS scale, SD scale, and APQ was randomized. In some cases ( $n = 14$ ) where there was insufficient time prior to treatment, subjects were given the test battery after treatment. Nonetheless, the Dental History sheet and pretreatment FT were always administered prior to treatment.

#### Anticipatory Period

The period in which patients were first seated in the dental operatory was designated as an anticipatory period because they were exposed to cues which signalled forthcoming treatment (e.g., the dental chair and bib).

Once seated in the chair, the subject's blood pressure was

Figure 1

Flow Chart of Procedure

Period:		Anticipatory		Injection		Posttreatment	
Pretreatment							
<u>Subject:</u>	TB, FT	BP, Salivary, HR pH	1-min	HR	1-min	HR	1-min
			FT, PC		FT, PC	FT, PC	FT, PC
							BP, Salivary, Modified pH Cope
<u>Assistant:</u>			1-min	1-min	1-min	1-min	1-min
			FT, RT, BC	FT, RT, BC	FT, RT, BC	FT, RT, BC	FT, RT, BC
<u>Dentist:</u>			1-min	1-min	1-min	1-min	1-min
			FT, RT, BC	FT, RT, BC	FT, RT, BC	FT, RT, BC	FT, RT, BC

- Notes. 1. Test Battery (TB)=Dental History sheet, modified RS scale, Social Desirability scale, and Autonomic Perception Questionnaire;  
2. BP=Blood Pressure; 3. HR=Heart Rate; 4. FT=Fear Thermometer;  
5. RT=Resistance Thermometer; 6. BC=Behavior Checklist;  
7. PC=Process Cope scale.

assessed by the dental assistant. The patient was then given a strip of litmus paper to be placed in the mouth for 5 sec. Salivary pH was read and recorded by the assistant, who then placed the clip on the patient's nondominant index finger and activated the heart rate monitor which automatically recorded the subject's pulse rate for a 1-min period. When the 1-min period ended, the assistant completed the BC, FT, and RT ratings of the patient. (The dentist was not available to complete the anticipatory BC, FT, and RT.)

While the assistant completed the behavioral measures, the patient filled out the FT and the Process Cope scale. The order of these two scales was randomized but the same order was maintained for administration of these scales throughout the session for a particular patient.

The procedure during the anticipatory period was arranged such that the self-report measure (i.e., FT), behavioral observations (i.e., BC, FT, and RT), and physiological recording of heart rate all assessed the subject's stress response during the same 1-min period.

#### Anesthetic Injection Period

Kleinknecht et al. (1973) found that the sight and feel of the syringe used for anesthetic injection were highly anxiety-provoking stimuli during dental treatment. Hence, the second point of assessment in the present study was at the completion of the anesthetic injection.

The dental assistant activated the heart rate monitor while the dentist administered the injection so that the injection was completed within the 1-min recording period. Immediately after the 1-min period, the subject completed the FT and Process Cope scale while the

dentist and assistant independently filled out the BC, FT, and RR. The self-report and behavioral measures assessed the subject's stress response during the "past minute" and, thus, coincided temporally with the heart rate recording. This second assessment point, therefore, recorded subjects' responses to one of the most stressful events in dental treatment, the anesthetic injection.

#### Posttreatment

The dentist signalled the end of the treatment procedure by announcing that the work was completed. At this point, the assistant activated the heart rate monitor. At the end of this 1-min recording period, the subject was given the FT and Process-Cope scale while the dentist and assistant independently completed the BC, FT, and RR. The dentist then left the room. The subject's blood pressure was again assessed and a second saliva test was performed. This posttreatment period was presumed to represent an assessment of recovery from stress.

Finally, the subject was escorted to another room where the Modified Cope scale (and test battery, if necessary) was completed.

## RESULTS

### Sample Characteristics

Descriptive statistics were calculated for all non-coping variables prior to correlational analyses. The means, standard deviations, and ranges of the demographic, personality, and treatment-related variables are presented in Table 2.

Examination of the table shows that this sample is comprised of relatively middle-aged individuals who tend to score slightly above the mean on the social desirability measure. They, however, tend to report relatively low levels of awareness of their own bodily responses to stress (e.g. Borkovec and O'Brien, 1977).

In regard to past treatment, these subjects tend to visit their dentists fairly regularly and report having had few traumatic dental visits in the past. They rate an anesthetic injection as slightly more fear-provoking than undergoing general dental treatment (e.g., amalgam restoration). During the present treatment procedure, there was great variance in duration of treatment. This variance is probably due to the relatively lengthy procedure ( $M = 106.4$  min.) of cementing gold crowns and the comparatively shorter time ( $M = 42.0$  min.) needed to fill a tooth. The type of anesthetic typically used was Black Citnest which does not contain epinephrine, and the dosage tended to be less than one carpule (i.e., 1.8 ml.).

### Stress Response Characteristics<sup>2,3</sup>

Descriptive statistics in the form of means, standard deviations, and ranges were calculated for all stress measures. These statistics are listed in Table 3.

Table 2  
Descriptive Statistics for Demographic,  
Personality, and Treatment Variables (N=50)

Variable	Mean	Standard Deviation	Range
<u>Demographic</u>			
Age	41.7	12.5	Min    Max 19 - 63
<u>Personality</u>			
SD Scale <sup>a</sup>	17.0	5.4	6 - 29
APQ <sup>b</sup>	70.0	30.0	0 - 180
<u>Past Treatment</u>			
Last Dental Visit (mo.)	8.3	10.0	0 - 60
Average Dental Visits per Year	1.7	1.0	0 - 5
No. of Traumatic Visits	1.9	3.3	0 - 18
Worst Experience Rating	5.9	3.3	1 - 12
Injection Fear Rating	7.4	2.1	1 - 11
Treatment Fear Rating	6.9	2.4	1 - 12
<u>Present Treatment</u>			
Duration (min.)	65.2	44.5	15 - 210
Anesthetic (Dose)	4.9	2.1	1 - 9

<sup>a</sup>SD Scale = Social Desirability Scale

<sup>b</sup>APQ = Autonomic Perception Questionnaire



**Table 3**  
**Descriptive Statistics for Stress Variables (N=50)**

Variable	Mean	Standard Deviation	Range	
			<u>Min</u>	<u>Max</u>
<u>Pretreatment</u>				
Patient FT	2.8	2.5	1	9
<u>Anticipatory</u>				
Patient FT	2.0	1.9	1	9
Assistant FT	1.9	1.0	1	6
Assistant RT	1.3	0.6	1	4
Systolic BP (mm/Hg)	111.0	12.9	83	140
Diastolic BP (mm/Hg)	72.8	7.3	58	90
HR (bpm)	83.8	7.0	71	98
Salivary pH	6.6	0.5	5.9	8.0
<u>Injection</u>				
Patient FT	3.7	2.7	1	10
Assistant FT	2.7	1.4	1	8
Dentist FT	2.7	1.7	1	9
Assistant RT	1.4	0.6	1	4
Dentist RT	2.2	0.7	1	5
HR (bpm)	84.4	8.7	71	99
<u>Posttreatment</u>				
Patient FT	3.4	2.8	1	12
Assistant FT	3.2	2.0	1	11
Dentist FT	2.6	2.0	1	10
Assistant RT	1.5	0.6	1	3
Dentist RT	2.5	1.9	1	9
Systolic BP (mm/Hg)	111.8	14.5	83	140
Diastolic BP (mm/Hg)	74.0	8.3	55	95
HR (bpm)	86.5	6.3	73	101
Salivary pH	7.0	0.7	5.0	8.0

Notes. 1. All heart rate scores based on 32 subjects.

2. FT = Fear Thermometer; RT = Resistance Thermometer;  
 BP = Blood Pressure; HR = Heart Rate

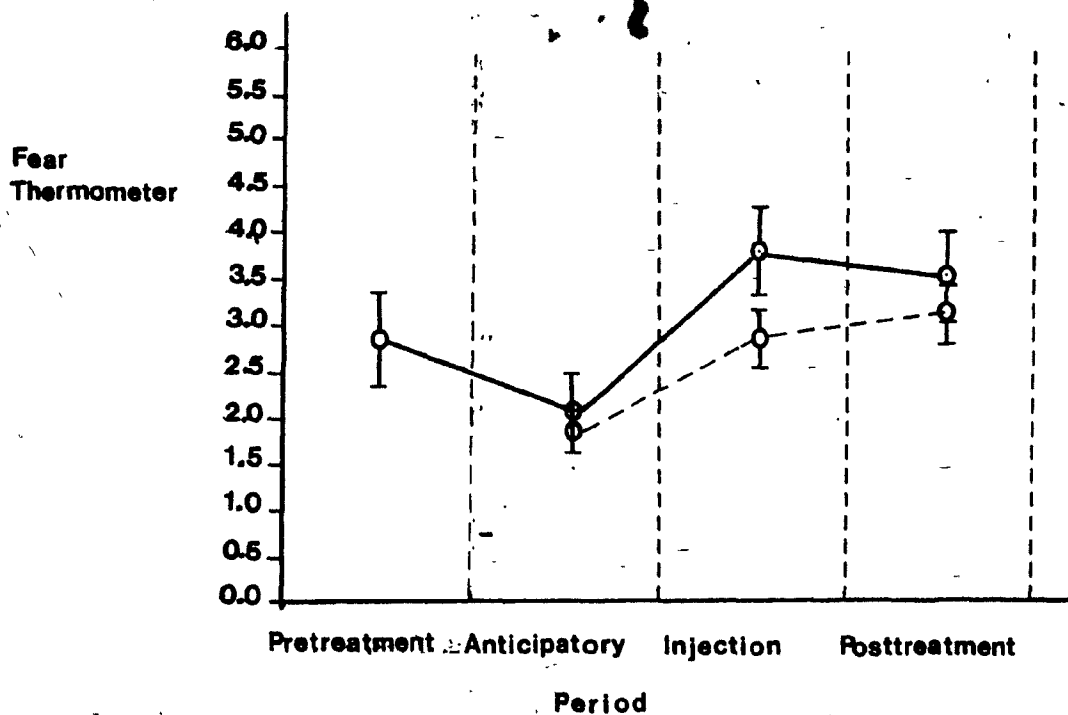
In general, means of the stress response scores indicate that the present treatment procedure was not particularly stressful. For example, patients' self-reports of their highest levels of anxiety tend to cluster below four on a 12-point scale. Similarly, the dentist and assistant both often rated the patients as only slightly fearful and minimally resistant. These findings may be related to the fact that only five (10%) of the 50 subjects were actually first-time patients while 45 (90%) subjects had made previous visits to this dentist.

Although the absolute values of the stress response scores are low, an examination of fluctuations in stress responses across periods proved to be of interest. T tests were conducted on all pairwise combinations of similar stress measures (e.g., pretreatment Patient FT vs. anticipatory Patient FT). The results reveal that patients' self-reports of anxiety, assistant's ratings of patient anxiety, HR, and salivary acidity were significantly different across the three assessment periods (Figures 2 and 3). The t-test results are presented in Table 4.

An examination of Figures 2 and 3 and Table 4 shows that, according to patients' self-reports and the assistant's ratings, patients evidenced least anxiety during the anticipatory period. However, patients rated themselves as most anxious during the anesthetic injection while the assistant perceived the patients as most anxious during posttreatment. The HR scores support the assistant's ratings since HR was higher during posttreatment than during anticipation (injection HR scores were intermediate between anticipatory and posttreatment scores).

Figure 2

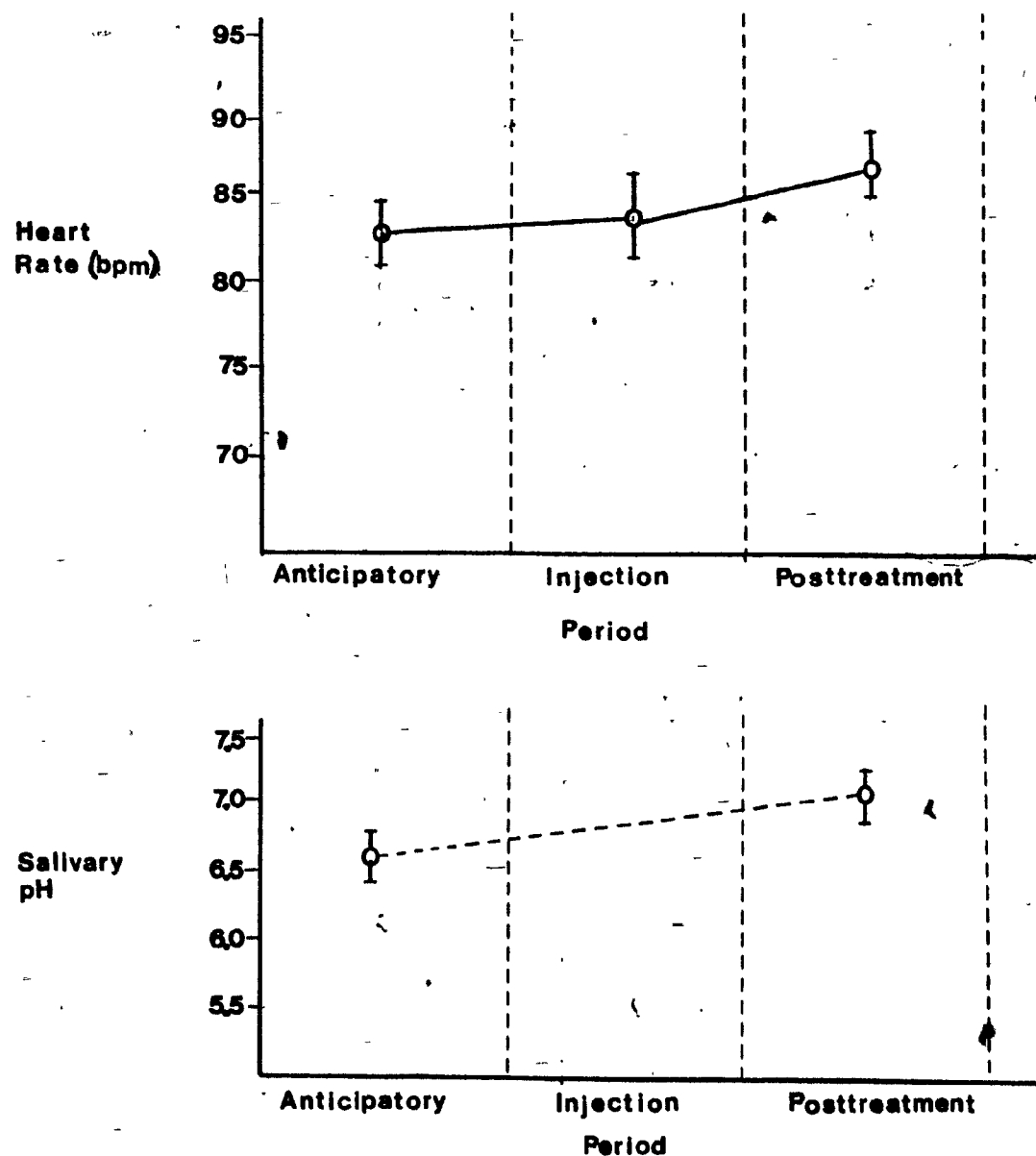
Means and Standard Errors for Patients' and  
Assistant's Anxiety Ratings Across Periods (N=50)



- Notes. 1. — = Patient FT ratings  
----- = Assistant FT ratings  
2. FT = Fear Thermometer

Figure 3

Means and Standard Errors for Heart Rate  
and Salivary Acidity Scores Across Periods ( $N=50$ )



Note. 1. All heart rate data are based on 32 subjects.

Table 4

Significant Results of T-test Comparisons of  
Stress Scores Between Periods (N=50)

Variables	Means	Mean Difference	df	t-value	2-tailed probability
<u>Patient FT</u>					
Pretreatment	2.8	0.8	49	2.8	.01
Anticipatory	2.0				
Pretreatment	2.8	-0.9	48	-2.7	.01
Injection	3.7				
Anticipation	2.0	-1.7	48	-5.4	.01
Injection	3.7				
Anticipation	2.0	-1.4	49	-4.3	.01
Posttreatment	3.4				
<u>Assistant FT</u>					
Anticipation	1.9	-0.8	49	-6.1	.01
Injection	2.7				
Anticipation	1.9	-1.3	49	-4.6	.01
Posttreatment	3.2				
<u>Heart Rate</u>					
Anticipation	83.8	-2.7	31	-2.4	.03
Posttreatment	86.5				
<u>Salivary pH</u>					
Anticipation	6.6	-0.4	49	-4.8	.01
Posttreatment	7.0				

Notes. 1. All heart rate scores based on 32 subjects  
2. FT = Fear Thermometer

The salivary acidity scores are most puzzling since they suggest that patients were more aroused during the anticipatory period than during posttreatment. This finding is contrary to both the assistant's ratings and HR scores. Further analyses, therefore, were conducted in order to determine whether or not salivary pH scores were influenced by age, sex, or treatment-related variables (e.g., type of treatment). Product-moment correlation coefficients between salivary pH change scores and sex, age, and all treatment variables show no significant relationships.

#### Observer Reliability

It was important to determine whether or not the assistant's and dentist's observations are reliable, particularly since only assistant ratings are available for the anticipatory period. Product-moment correlation coefficients were calculated between Dentist and Assistant FT scores and between their RT ratings. The results show that the assistant's and dentist's ratings of patient anxiety strongly agreed during the injection period ( $r = .58, p < .01$ ) and during posttreatment ( $r = .72, p < .01$ ). Their ratings of patient resistance were significantly related during posttreatment ( $r = .50, p < .01$ ). Thus, there is a moderate degree of interrater agreement which supports the reliance on the assistant's ratings for the anticipatory period.

#### Effects of Test Order

It was also important to determine whether or not the test order in the initial battery had any effect on patients' responses to these measures. One-way analysis of variance was, therefore, performed on scores on the modified RS-scale, SD scale, and APQ, and on items

from the Dental History sheet as a function of the six different test orders. The results indicate that only patients' ratings of their worst dental experience, an item from the Dental History sheet, was significantly different across the six groups,  $F(5,44) = 6.2, p < .01$ . This significant effect of test order on Patients' Worst Experience Ratings was not considered particularly important, given the auxiliary nature of this test item. One-way analyses similarly conducted on all observers' and patients' reports of anxiety show no significant effects of test order. Therefore, the order of tests in the initial battery had no marked effect on either responses to the battery or to stress ratings and is not included in further analyses.

It was also necessary to determine whether or not the order of administration for the Process Coping scale and Patient FT had any effect on patients' responses to these measures. One-way analysis of variance conducted on Process Coping scores and patients' fear ratings as a function of the two different test orders yield no significant differences. Similar analyses performed on observers' ratings of patient fear, however, showed a significant effect of test order on dentist's ratings of patient's resistance during the injection period,  $F(1,48) = 9.7, p < .01$ . It is difficult to explain how test order could have influenced the observer's ratings of patients' resistance. Indeed, this finding may simply represent a chance occurrence. More importantly, the order of these two scales had no significant effect on patients' endorsements of these tests. Test order is, therefore, not included in subsequent analyses of the relationships between the coping measures and all stress and other non-coping (e.g., treatment) variables.

Product-moment correlation coefficients were calculated between SD scale scores and all coping and non-physiological stress variables. No significant coefficients were found ( $p > .10$ ). Thus, endorsement of the coping scales, patients' self-reports of anxiety, and observers' ratings of patients do not appear to be associated with a social desirability response set.

Analyses of Relationships between Demographic and  
Treatment-Related Variables and Stress Scores

The large number of correlation coefficients generated for this and subsequent analyses required an adjustment of the probability level for statistical significance. A  $p$ -value of .02 (two-tailed) was, therefore, selected as a moderately conservative statistical criterion.

Correlational analyses were conducted to determine the relationships between the stress scores and sex, age, and treatment variables. Product-moment correlation coefficients between observers' stress ratings and the non-stress variables are found in Table 5. A most interesting finding is the relationship between patients' anxiety ratings of undergoing dental treatment and all Assistant and Dentist FT scores. That is, patients who reported high anxiety about undergoing dental treatment were also perceived as highly anxious during actual treatment. These patients were also rated as more resistant during posttreatment by both observers.

Product-moment correlation coefficients between patients' ratings and physiological measures relative to demographic and treatment variables are listed in Table 6. It is noteworthy that patients who



Table 5  
Bivariate Correlation Coefficients Between Observer Ratings  
and Patient Demographic/Treatment Variables (N=50)

	Anticipatory				Injection				Posttreatment			
	Assist RT	Assist FT	Assist RT	Dent RT	Assist FT	Dent RT	Assist FT	Dent FT	Assist RT	Dent RT	Assist FT	Dent FT
<u>Demographic</u>												
Age	.03	.03		-.05	-.11	-.20	-.27	-.31	-.11	-.37*		
Sex	.01	.12	.03	-.01	.02	.21	.16	.27	.21	.23		
<u>Past Treatment</u>												
Last Dental Visit (Mo.)	.00	-.06	.02	-.00	-.07	-.06	.01	.17	-.09	.09		
Average Dental Visits Per Year	.02	.13	.12	.12	.12	.11	.32*	.05	.14	.08		
No. of Traumatic Visits	.07	.07	.36*	.01	.02	-.04	.34*	-.17	-.05	-.15		
Worst Experience Rating	.13	.22	.25	.12	.24	.31	.39*	.21	.29	.29		
Injection Year Rating	-.12	-.03	-.10	.22	.10	.29	.24	.12	.26	.13		
Treatment Year Rating	.13	.35*	.22	.21	.50*	.36*	.48**	.37*	.48**	.42**		
<u>Present Treatment</u>												
Patient Status (Repeat or New)	.22	.21	.18	.02	.09	-.05	-.03	-.04	-.08	-.06		
Duration (Min.)	.09	.07	-.05	.19	-.11	.11	-.11	-.09	.02	-.16		
Type (Filling or Gold)	.34*	.25	.18	.13	-.09	.02	-.05	-.16	-.00	-.24		
Anesthetic (Dose)	.15	.26	.12	.27	.26	.21	.26	.26	.21	.21		

Note. 1. FT = Fear Thermometer; RT = Resistance Thermometer; Assist = Assistant; Dent = Dentist  
 \*p < .02 (two-tailed)  
 \*\*p < .01 (two-tailed)

rated dental treatment as highly anxiety-provoking also reported high levels of anxiety during all periods of the actual treatment. This finding provides some corroboration for the relationship found between Patient Treatment Fear Ratings and observers' FT scores since patients who score high in the treatment fear variable were rated as more anxious by the observers and also rated themselves as more anxious. Patients' FT scores in all periods are also associated with their ratings of their worst dental experience.

Further examination of Table 6 reveals a significant relationship between age and blood pressure. Essentially, older patients exhibited higher systolic and diastolic blood pressure. However, during posttreatment, older patients evidenced lower heart rates (bpm) than younger patients. Given the smaller sample size ( $n = 32$ ) of patients with complete heart rate data, this latter finding must be evaluated with some caution. Finally, the female patients had lower systolic and diastolic blood pressure than did males.

#### Analyses of Coping Measures

##### Process Cope Scale

Initially, it was necessary to determine the degree of internal consistency between the two test items which comprise each method of coping. However, Item 5 (avoidance) and Item 4 (active cognitive) are excluded from further analyses due to low rates of endorsement (i.e., 3 and 4 overall, respectively). Consequently, the sample sizes for all analyses concerning Process Cope methods remain at 50 during the anticipatory period but decrease to 44 in the injection period and 49 during posttreatment. Subsequent analyses, therefore, focus on the relationship between Items 3 and 6 which pertain to a behavioral coping

Table 6

## Bivariate Correlation Coefficients Between

## Demographic/Treatment Variables and both Patient's

## Self-Report and Physiological Stress Scores (N=50)

	Pretreatment Anticipatory				Injection Posttreatment							
	FT	Sys BP	Dias BP	HR	Salivary pH	FT	HR	FT	Sys BP	Dias BP	HR	Salivary pH
<u>Demographic</u>												
Age	.17	-.06	.52**	.49**	-.34	-.12	-.21	-.18	-.39*	.59**	-.50*	-.25
Sex	-.13	.04	-.47**	-.22	.09	.37*	.17	.14	.09	-.49**	-.43**	.23
<u>Past Treatment</u>												
Last Dental Visit (No.)	.07	-.02	-.09	-.25	-.03	.04	-.19	.16	.15	-.10	-.20	.03
Average Dental Visits Per Year	.11	.24	.09	.23	-.03	-.06	.10	.23	.13	.04	.09	-.08
No. of Traumatic Visits	.11	.23	.25	.29	-.33	-.06	.14	-.21	.07	.16	.08	-.09
Worst Experience Rating	.45**	.42**	.15	.18	-.21	.04	.37*	.02	.33*	.09	.05	.09
Injection Fear Rating	.03	-.20	-.23	-.19	.10	-.15	.47	.13	.04	-.20	-.01	-.03
Treatment Fear Rating	.48**	.39*	-.12	-.16	.12	.29	.53**	.09	.34*	-.17	-.05	.30
<u>Present Treatment</u>												
Patient Status (Repeat or New)	.19	-.07	-.15	-.08	.06	-.04	-.02	-.08	-.02	-.03	-.07	.00
Duration (Min.)	-.03	-.24	-.11	-.01	-.02	-.03	.05	-.01	-.31	-.06	-.29	-.29
Type (Filling or Gold)	-.09	.16	-.04	.06	-.02	-.11	-.03	.05	-.38*	-.04	-.01	-.32
Anesthetic (Dose)	.24	.02	-.20	-.13	.01	-.02	.12	-.02	.07	-.21	-.04	-.21

Notes. 1. All heart rate data based on 32 subjects.

2. FT = Fear Thermometer; Sys BP = Systolic Blood Pressure; Dias BP = Diastolic Blood Pressure; HR = Heart Rate

\* $p < .02$  (two-tailed)

\*\* $p < .01$  (two-tailed)

method.

To test the internal consistency of the behavioral category, it was not entirely feasible to examine relationships between the two items across periods since this analysis assumes some degree of consistency in patients' coping strategies across the three periods. Such consistency has not been evident in recent studies which used similar process ratings (Kaloupek et al, 1983; Kaloupek and Stoupakis, Note 1). Alternatively, analyses were conducted to determine whether or not the two items share similar relationships with the stress variables. Product-moment correlation coefficients between each item and stress variable for each period are provided in Table A (Appendix D). The two items correlate in similar directions with 12 of the 22 stress variables examined (54.5%). This finding is somewhat expected given the assumption that although the two items measure a similar (i.e., behavioral) method of coping, they also represent different aspects (e.g., information-seeking vs. active participation) of this method. Therefore, in all subsequent analyses, the two items are collapsed together to form the behavioral method category.

Frequencies for each method and focus of coping were then calculated for each period. The percentages of respondents for each method and focus of coping are presented in Table 7, along with the scale items which comprise each classification. It appears that the avoidant method was most consistently endorsed across the three periods. However, variations across periods suggest that major modes of coping shifted from avoidance during anticipation to behavioral during injection and, finally, to an avoidant or behavioral method during posttreatment. The focus of coping most frequently endorsed in

Table 7

## Item Content and Frequencies of Process Cope Groups (N=50)

<u>Method</u>	<u>Descriptive Label</u>	<u>Item Number and Content</u>	<u>Frequencies (%)</u>		
			Anticipatory	Injection	Posttreatment
Behavioral		3. ...trying to find out what was going to happen next.	14	8	6
		6. ... trying to prepare myself for, or co <sup>1</sup> operate with treatment.	24	30	40
			38	38	46
Avoidance		1. ...not feeling bad or upset; not thinking about unpleasant things.	46	26	46
		2. ... thinking that this is not pleasant but it is necessary for my health.	16	24	6
Active Cognitive					
Focus	Problem	1. ...focusing on the treatment procedure.	50	54	50
	Emotional	2. ...focusing on how I felt.	14	32	16
	No Focus	3. ...not thinking about anything.	36	12	34

Note. Item 5 (Avoidance; n=4) and Item 4 (Active Cognitive; n=3) were eliminated from all analyses due to low rates of endorsement.

Modified Cope Scale

Initially, it was important to determine whether or not the dimensions of coping method and focus would emerge from analysis of the Modified Cope scale as proposed by Billings and Moos (1981). They had established the correspondence between scale items and the general coping dimensions "according to cluster analyses, the ratings of several judges, and previous research" (p.145). Following the rationale presented by Kaloupek et al. (1983), principal components analysis (e.g., Amick and Walberg, 1975) was used in the present study to test for item clusters under the assumption that if the items were strongly linked to the categories proposed by Billings and Moos, there would be four independent factors comprised of items in accordance with the scheme listed in Table 1 (p.146) of their article.

Principal components analysis (unities on the diagonal; no iteration) was applied to item scores (i.e., 0 or 1) from the Modified Cope scale. The sample used for this analysis included 21 additional dental patients who did not participate in the study but who did consent to complete the Modified Cope scale after treatment. The data drawn from these 21 subjects were necessary in order to have a more suitable sample size ( $N = 71$ ) to support the analysis. These additional subjects were primarily seen for cleaning and X-ray examinations rather than for fillings or gold work. Hence, variables for type of treatment and for sample or origin were included in separate analyses to determine whether or not the inclusion of these variables would alter the factor solution. Given that virtually identical solutions were found irrespective of the inclusion of these

variables, it was concluded that all treatments and both samples generate comparable factor structures.

Determination of a factor solution was based on the eigenvalue-one criterion, supplemented by the Scree test (Cattell, 1966). Factor rotations were accomplished through the varimax (orthogonal) method. The criterion for inclusion of an item was an absolute factor loading of .45. A five-factor rotation was selected as the final solution. It accounts for 55.6% of the item variance and all communality values are 0.32 or greater. The resulting factors are presented in Table 8, along with notation indicating the item classification according to the Billings and Moos (1981) scheme. Descriptive factor labels are also provided.

It appears that the factor labeled Direct Action is the largest and most related to a behavioral method and problem focus in the Billings and Moos (1981) formulation. The second largest factor, Suppression, seems most related to an avoidant method and emotional focus of coping. Positive Cognition appears to represent a cognitive method and emotional focus of coping. There are less consistent patterns of classification for items loading on Social Support and Resignation.

The frequencies of item endorsement and the means for each factor are presented in Table 9. In general, all three items comprising Positive Cognition were most consistently endorsed as "True". Conversely, the two Social Support items were most frequently endorsed as "False".

#### Modified Repression-Sensitization Scale

Subjects were assigned to one of three groups based on their

Table 8

Factors Resulting from Principal Components Analysis  
of the Modified Copé Scale (N=71)

Factor	Item Number	Item Content	Response	Billing & Moos Classification <sup>a</sup>
Direct Action	5	I considered several alternatives for handling the situation.	True	C P
	7	I tried to find out more about the upcoming treatment.	True	B P
	8	I talked with a professional person (e.g., dentist or assistant).	True	B P
	9	I took some positive action to prepare myself.	True	B P
	10	I watched the dentist or assistant perform the treatment procedure.	True	B P M
	12	I tried to relax myself.	True	B E M
Suppression	15	I tried to reduce tension by not thinking about the situation.	True	(A E)
	16	I tried to reduce the tension by imagining that I was elsewhere.	True	(A E)
	17	I kept my feelings to myself.	True	A E
	18	I got busy with other things in order to keep my mind off the upcoming treatment.	True	E

(con't...)



Table 8 (con't)

Factors Resulting from Principal Components Analysis  
of the Modified Cope Scale (N=71)

Positive Cognition	1	I tried to see the positive side.	True	G E
	2	I tried to step back from the situation and be more objective.	True	C E
	19	I didn't worry about it; figured everything would probably work out fine.	True	E
Social Support	6	I drew on my past experiences: I was in a similar situation before.	False	C P
	11	I talked with a friend(s) about the upcoming treatment.	True	B E
Resignation	3	I prayed or hoped for guidance and strength.	True	C E
	4	I took things one step at a time.	True	C P
	13	I prepared for the worst.	True	A E

Notes: 1. C = Cognitive method; B = Behavioral method; A = Avoidant method; P = Problem focus; E = Emotion focus; M = Modified item not listed by Billings and Moos; ( ) = Modified item similar to Billings and Moos.

2. Item 14 = I felt angry about the way I was treated.

\*Classification based on endorsement of the item as true.

Table 9  
Frequencies and Means of Modified Cope Factor Items (N=50)

Factor	No. of Items Endorsed	Frequencies of Endorsement (%)	Mean No. of Items Endorsed
Direct Action	0	4	3
	1	8	
	2	24	
	3	12	
	4	26	
	5	18	
	6	8	
Suppression	0	22	1
	1	40	
	2	22	
	3	8	
	4	8	
Positive Cognition	0	2	3
	1	2	
	2	18	
	3	78	
Social Support	0	72	0
	1	22	
	2	6	
Resignation	0	6	1
	1	60	
	2	26	
	3	8	

modified RS scale scores ( $M = 12.7$ ). Sensitizers scored in the upper range ( $n = 12$ ;  $M = 16.0$ ), repressors scored in the lower range ( $n=15$ ;  $M = 9.3$ ), and the intermediate group scored within the mid-range ( $n = 23$ ;  $M = 12.9$ ). The range of scores for the sensitizer, intermediate, and repressor groups was 6-11, 12-14, and 16-20, respectively.

#### Intertest Correlational Analysis

It was important to determine whether or not the three coping measures could demonstrate some degree of convergent validity. Given the assumption that the three scales measure similar constructs (i.e., vigilant and avoidant coping strategies), one would expect positive correlations between comparable coping variables. Alternatively, negative relationships were expected between conceptually dissimilar variables. Bivariate product-moment correlation coefficients were calculated between all coping variables derived from the three coping measures and are presented in Table 10.

There is an overall trend for distinct measures of vigilance and avoidance to correlate in the appropriate directions. In particular, there is a significant negative correlation between the Process Cope anticipatory avoidance variable and RS scores. This finding suggests that anticipatory avoidance and repression are associated. Similarly, posttreatment behavioral method (Process Cope scale) is positively related to the RS scale (i.e., behavioral method relates to sensitization). The process posttreatment behavioral and avoidant methods also correlate in the appropriate direction with the Direct Action factor. Although no significant relationships are found between the Modified Cope and modified RS scales, Direct Action and

Table 10  
Bivariate Correlation Coefficients Between All Trait, State  
and Process Coping Measures (N=50)

	<u>Modified Coping Factors</u>					
	RS Scale	Direct Action	Suppression	Positive Cognition	Social Support	Resignation
<u>RS Scale</u>	-	.23	-.08	.17	.12	.17
<u>Process Coping Scale</u>						
<u>Anticipatory Method</u>						
Behavioral	.26	.01	.16	-.12	.11	.07
Avoidance	-.38*	-.27	-.01	-.04	-.12	-.24
Active Cognitive	.17	.35*	-.20	.20	.03	.24
<u>Focus</u>						
Problem	.08	.21	-.10	.13	-.10	-.11
Emotion	-.08	.02	.21	-.29	.16	.20
No Focus	-.03	-.24	-.04	.07	-.01	-.03
<u>Injection Method</u>						
Behavioral	.10	.22	.23	.09	.04	.12
Avoidance	-.23	-.30	.15	.05	-.03	-.30
Active Cognitive	.04	-.09	-.28	.11	-.01	-.02
<u>Focus</u>						
Problem	-.06	.05	.04	.10	-.22	.07
Emotion	-.04	.10	-.05	-.04	.33*	.01
No Focus	.08	-.16	.09	-.03	-.11	-.01
<u>Posttreatment Method</u>						
Behavioral	.39*	.49**	.13	.03	-.06	.38*
Avoidance	-.30	-.35*	-.11	-.04	-.06	-.30
Active Cognitive	-.23	-.16	-.01	-.02	.28	-.13
<u>Focus</u>						
Problem	.07	.16	0	0	.03	-.06
Emotion	.19	.11	.04	-.07	.03	.09
No Focus	-.21	-.26	-.03	.05	-.06	-.01

\* $p < .02$  (two-tailed)

\*\* $p < .01$  (two-tailed)

Suppression are related in appropriate directions with sensitization and repression, respectively.

#### Coping and Primary Non-Stress Variables:

##### Correlational Analyses

Initial analyses were conducted to determine the relationships between the coping variables and primary non-stress variables (e.g., age, sex). Product-moment correlation coefficients between RS scores and the five Modified Cope factors relative to these non-stress variables are presented in Table B (Appendix D). The correlation coefficients between Process Cope methods and focuses relative to these non-stress variables are provided in Tables C and D, respectively (Appendix D).

In general, few significant relationships exist between the coping and non-stress variables. It is, however, of some interest that patients who engage in Direct Action tend to score high on social desirability. Moreover, subjects who endorse avoidant strategies during the anticipatory and posttreatment periods tend to report low levels of self-awareness of their bodily responses to stress.

#### Coping and Stress Measures:

##### Correlational Analyses

##### Process Cope Scale

A major feature of the present study is the simultaneous assessment of coping and stress variables across three different periods of dental treatment. Initial analyses were conducted to determine the relationship between these two sets of variables within each period. Product-moment correlation coefficients between coping method and stress scores are listed in Table E (Appendix D) and

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the correlation coefficients between coping focus and stress scores are presented in Table F (Appendix D).

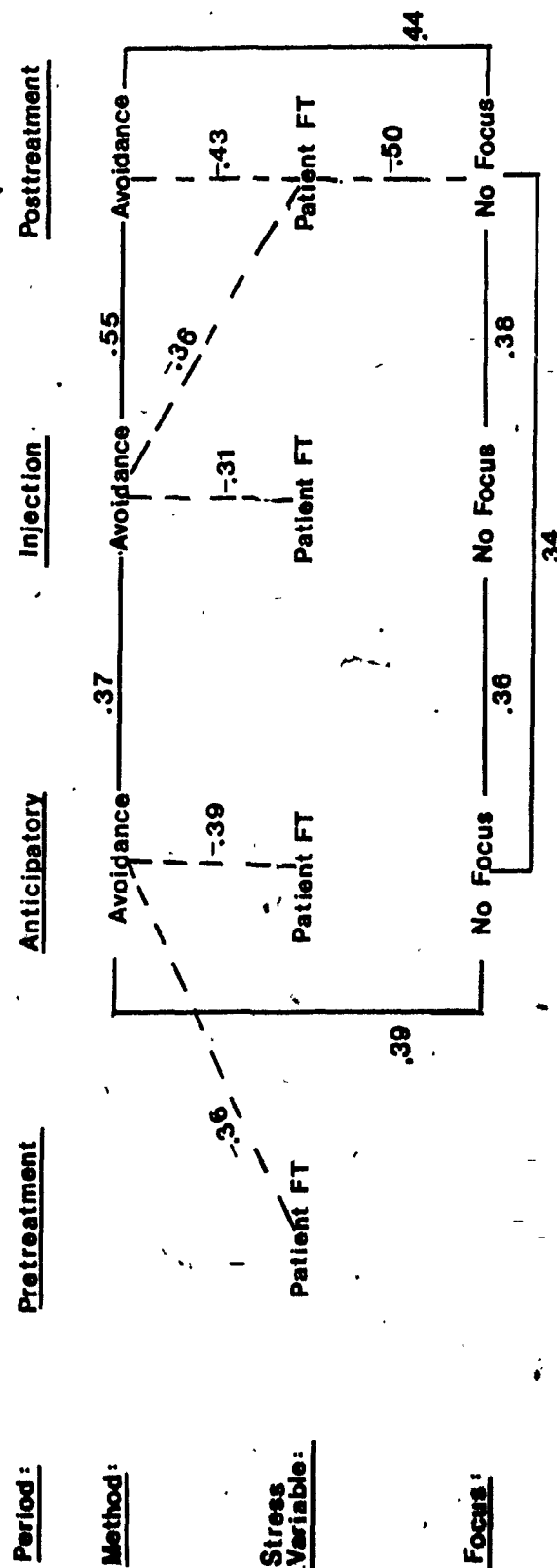
It was of particular interest, however, to complement these initial analyses with an examination of the relationships among method and focus of coping and stress measures both across and within periods. This type of examination explores the temporal relationship between these measures. Avoidant method and No Focus are considered together in view of their close association within each period (Figure 4). Although they are less cohesive combinations, behavioral method and problem focus are considered together (Figure 5), as are active cognitive and emotional focus (Figure 6). Figures 4, 5, and 6 represent flow charts of the temporal relationships between the three method-focus groups and stress scores within and across periods.

Overall, the Avoidance-No Focus combination is the most strongly interrelated. Moreover, the primary feature of this coping strategy is its negative relationship with patients' anxiety ratings. That is, within all periods, an avoidant strategy was associated with lower Patient FT ratings. No Focus was related to lower anxiety ratings by patients only in the posttreatment period. Lower pretreatment anxiety scores by patients were also related with endorsement of an avoidant strategy in the anticipatory period.

The behavioral method and problem focus correlate significantly only during posttreatment. However, it is of interest that, contrary to the avoidant strategy, the behavioral method is associated with higher Patient FT ratings. Moreover, a problem focus is associated with higher anxiety and resistance ratings by the dentist.

The Active Cognitive-Emotion combination is the least cohesive

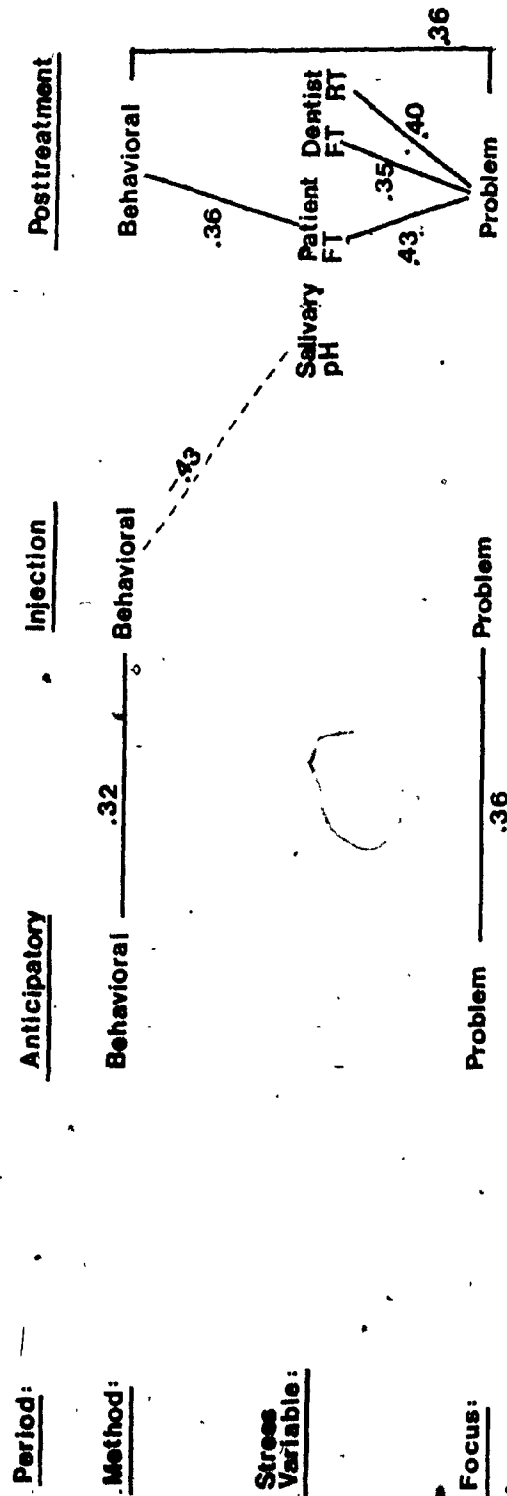
Figure 4  
Significant Correlational Relationships Between Process Cope  
Avoidant-No Focus and Stress Variables  
Within and Across Periods (N=50)



Notes. 1. FT=Fear Thermometer

2. For all correlation coefficients,  $p < .02$  (two-tailed)

Figure 5  
Significant Correlational Relationships Between Process Cope  
Behavioral-Problem and Stress Variables  
Within and Across Periods (N=50)

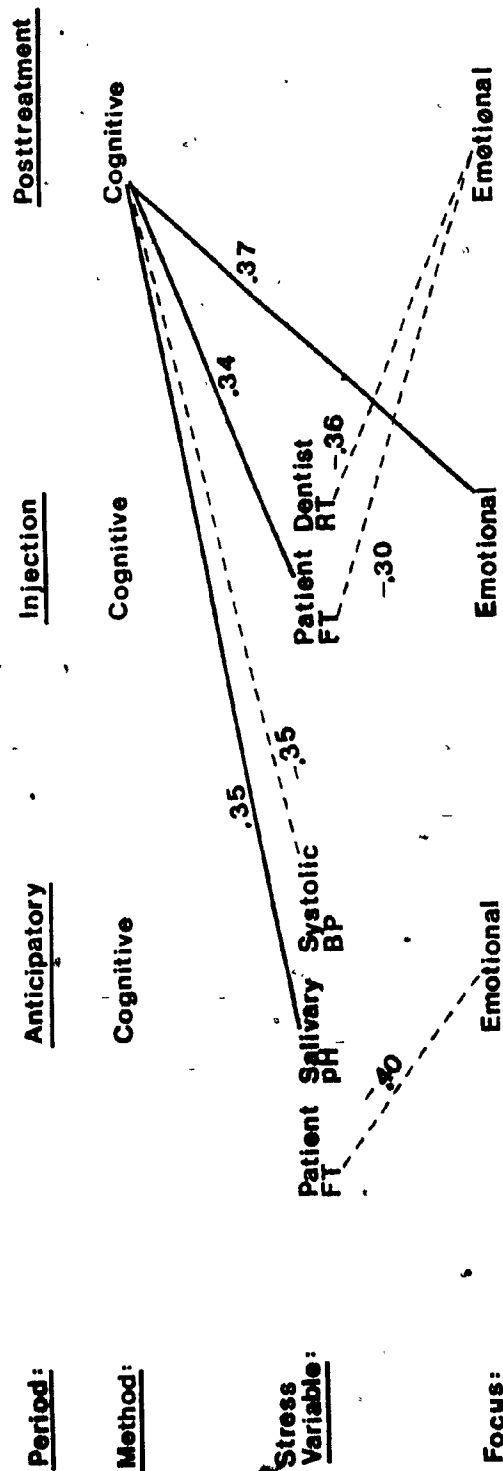


Notes. 1) FT= Fear Thermometer; RT= Resistance Thermometer

2) For all correlation coefficients,  $p < .02$  (two-tailed)



Figure 6  
Significant Correlational Relationships Between Process Cope  
Cognitive-Emotion and Stress Variables  
Within and Across Periods (N=50)



Notes: 1. FT=Fear Thermometer; RT=Resistance Thermometer; BP=Blood Pressure

2. For all correlation coefficients,  $p \leq .02$  (two-tailed)

component, with only emotional focus during injection associated with active cognitive method during posttreatment. It generally appears that this method and focus of coping is associated with lower stress scores (e.g., lower anticipatory systolic blood pressure with posttreatment active cognitive method). The temporal directions between the stress and coping measures, however, are somewhat less clear here than are found in Avoidance-No Focus. For instance, it may be difficult to explain why posttreatment active cognitive method should be associated with low anticipatory salivary acidity.

#### Modified Cope Scale

The product-moment correlation coefficients between the Modified Cope factors and stress scores are listed in Table 11. An examination of this table reveals that the Positive Cognition factor is most highly associated with stress scores. For instance, this factor is significantly related to lower Patient FT ratings during the anticipatory period, lower Dentist FT ratings during injection and posttreatment, and lower Assistant FT ratings during posttreatment.

#### Modified Repression-Sensitization Scale

The product-moment correlation coefficients between the modified RS scale and stress scores are also listed in Table 11. No significant relationships exist between this trait measure and the stress scores. However, the correlation coefficients between RS scale scores and HR scores during the injection and posttreatment periods are notable in terms of their moderate magnitude ( $r = .37$ ,  $p < .02$ ).

#### Coping and Stress Measures:

##### Discriminant Analyses

Discriminant analyses were used to further elaborate the

Table 11  
Bivariate Correlation Coefficients Between  
All Stress Scores and Both Trait and State Coping Variables (N=50)

	<u>Modified Coping Factors</u>					
	<u>RS</u> <u>Scale</u>	<u>Direct</u> <u>Action</u>	<u>Suppression</u>	<u>Positive</u> <u>Cognition</u>	<u>Social</u> <u>Support</u>	<u>Resignation</u>
<u>Pre-Treatment</u>						
Patient FT	.06	.09	-.04	-.29	.15	.27
<u>Anticipatory</u>						
Patient FT	.17	.11	.01	-.41**	.09	.13
Assistant FT	-.01	.19	.15	-.21	.29	.18
Assistant RT	-.03	-.08	.18	-.14	.28	.02
Systolic BP (mm/Hg)	.01	-.13	.13	.16	-.19	-.14
Diastolic BP (mm/Hg)	-.10	-.31	.15	.01	-.16	-.23
HR (bpm)	-.24	.14	-.15	-.04	.01	.02
Salivary pH	.04	-.04	.21	.07	.50**	-.07
<u>Injection</u>						
Patient FT	-.03	-.07	-.13	-.31	.44**	.16
Assistant FT	.03	.15	-.05	-.24	.16	.22
Dentist FT	-.25	.05	-.07	-.40**	.17	.23
Assistant RT	.10	-.08	.24	-.06	.21	.02
Dentist RT	-.07	-.05	-.07	-.30	.18	.10
HR (bpm)	-.37	-.12	-.25	-.20	-.04	-.06
<u>Posttreatment</u>						
Patient FT	.10	.16	-.24	-.29	.05	.18
Assistant FT	-.12	.13	-.08	-.34*	.11	.21
Dentist FT	-.10	.21	-.30	-.36*	-.05	.18
Assistant RT	.05	.14	.05	-.26	.19	.33*
Dentist RT	-.09	.21	-.25	-.38*	.01	.17
Systolic BP (mm/Hg)	-.03	-.20	.13	.22	-.16	-.17
Diastolic BP (mm/Hg)	-.03	-.22	.10	.10	-.18	-.13
HR (bpm)	-.37	-.17	-.21	.04	-.04	-.04
Salivary pH	-.08	-.03	.06	-.03	-.01	.01

Notes. 1. All heart rate scores based on 32 subjects  
2. FT = Fear Thermometer; RT = Resistance Thermometer; BP = Blood Pressure; HR = Heart Rate

\*  $p < .02$  (two-tailed)

\*\*  $p < .01$  (two-tailed)

relationships between the coping and stress measures. Specifically, analyses were conducted to determine whether or not stress measures could statistically distinguish coping groups. Discriminant analysis does this by forming one or more linear combinations of the discriminating (i.e., stress) variables which maximally differentiates among groups (Klecka, 1975). A stepwise method was selected in order to obtain a reduced set of discriminating variables. The reduced number of variables also helps to accommodate the fairly small sample size. The stepwise selection criterion chosen was Wilk's lambda which maximizes the differences between group centroids. The minimum significance of  $F$ -to-enter in the stepwise analysis was 0.10.

#### Process Cope Scale

The discriminant analyses on process coping variables presented here are intended to provide further elaboration about the relationships between an avoidant method, No Focus, and stress variables. This particular method and focus of coping is emphasized because these coping variables have demonstrated significant relationships with lower patient anxiety ratings.

Discriminant analysis was first used to distinguish groups based on an avoidant method of coping. Individuals in the avoidant group ( $n = 18$ ) endorsed the avoidant method at least twice over the three periods and those in the non-avoidant group ( $n = 32$ ) endorsed one or no avoidant items over all periods. All stress variables were included in the analysis, except HR which has substantial incomplete data. Results show that the avoidant group is distinguished from the non-avoidant group by lower anticipatory diastolic blood pressure,<sup>8</sup> lower patients' posttreatment anxiety ratings, and higher anticipatory

systolic blood pressure,  $F(1,3) = 6.4$ ,  $p < .01$ , Wilk's lambda = .70.

This function correctly classifies 80% of all subjects (Table 12).

Similar analyses were performed on two groups based on the No Focus classification. The non-focused group ( $n = 12$ ) endorsed "no focus" at least twice and the focused group ( $n = 38$ ) endorsed "no focus" only once or not at all. Again, all stress variables, except HR, were entered into the analysis. The two groups are maximally distinguished by higher patients' anticipatory anxiety rating, higher assistant's anxiety rating during injection, lower assistant's rating of anxiety during anticipation, and lower patients' posttreatment anxiety rating in the non-focused group,  $F(1,4) = 4.8$ ,  $p < .01$ , Wilk's lambda = .69. This function correctly classifies 82% of all subjects (Table 13).

Thus, the discriminant analyses show the existence of relationships between stress (e.g., blood pressure) variables and avoidance and No Focus which were not apparent in simple bivariate correlational analyses. For instance, No Focus is associated with lower patients' posttreatment anxiety ratings but it is also related with higher patients' anticipatory anxiety ratings. The simple correlational analysis suggested only a relationship between No Focus and low patients' posttreatment anxiety ratings.

#### Modified Cope Scale

The bivariate correlational analyses suggest that the Positive Cognition factor is most associated with stress scores. Discriminant analysis, therefore, was used to elaborate on this initial finding. The low Positive Cognition group ( $n = 11$ ) endorsed two or fewer of the three items as "True" and the high Positive Cognition group ( $n = 39$ )

Table 12

Discriminant Function and Subject Classification  
for Avoidant and Non-Avoidant Groups (N=50)

Discriminant Function

<u>Variable</u>	<u>Standardized Canonical Coefficient</u>
Posttreatment Diastolic BP	1.41
Posttreatment Patient FT	0.62
Anticipatory Systolic BP	-1.18

Subject Classification

Avoidant n=18  
Non-Avoidant n=32

	<u>Predicted Group</u>	
	<u>Avoidant</u>	<u>Non-Avoidant</u>
<u>Avoidant</u>	13 (72.2%)	5 (27.8%)
<u>Actual Group</u>		
<u>Non-Avoidant</u>	5 (15.6%)	27 (84.4%)

Notes. 1. FT = Fear Thermometer; BP = Blood Pressure  
2. For all standardized canonical coefficients,  $p < .01$

Table 13

## Discriminant Function and Subject Classification

for No Focus and Focus Groups(N=50)

Discriminant FunctionVariableStandardized Canonical Coefficient

Posttreatment Patient FT	1.27
Anticipatory Assistant FT	1.18
Injection Assistant FT	-1.17
Anticipatory Patient FT	-0.71

Subject Classification

No Focus n=12

Focus n=38

Predicted Group

	<u>No Focus</u>	<u>Focus</u>
<u>No Focus</u>	6 (50.0%)	6 (50.0%)
<u>Focus</u>	3 (7.9%)	35 (92.1%)

Actual GroupNotes. 1. FT = Fear Thermometer2. For all standardized canonical coefficients,  $p < .05$

endorsed all three items as "True". All stress variables, except heart rate, were entered into the analysis. The high Positive Cognition group is distinguished by lower patients' anticipatory anxiety ratings, lower dentist's rating of patients' anxiety during injection, and higher assistant's anxiety ratings during injection than found for the low Positive Cognition group,  $F(1,3) = 8.0$ ,  $p < .001$ , Wilk's lambda = .65. This function correctly classifies 82% of all subjects (Table 14). Thus, this discriminant function supports and elaborates on the correlational analysis which demonstrated significant relationships between Positive Cognition and several stress variables.

An additional discriminant analysis which is most interesting is that which explored the relationship between stress variables and Suppression groups. This analysis demonstrates relationships which did not appear in the bivariate correlational analyses. The low Suppression group ( $n = 31$ ) endorsed either none or only one of the four items as "True" while the high Suppression group ( $n = 19$ ) endorsed two or more of these items as "True". The resulting discriminant function includes eight stress variables. The sample size ( $N = 50$ ) is probably too small for a function involving eight variables. Hence, only the first five stress variables which entered the analysis are considered here. The high Suppression group is distinguished by higher diastolic blood pressure during anticipation, higher assistant's posttreatment anxiety and resistance ratings, lower dentist's posttreatment anxiety rating, and lower salivary pH during posttreatment,  $F(1,5) = 5.0$ ,  $p < .01$ , Wilk's lambda = .63. The resulting function involving these five variables correctly classifies



Table 14

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Discriminant Function and Subject Classification  
for Low and High Positive Cognition Groups ( $N=50$ )

Discriminant FunctionVariableStandardized Canonical Coefficient

Injection Dentist FT	1.15
Anticipatory Patient FT	1.13
Injection Assistant FT	-1.33

Subject Classification

Low Positive Cognition  $n=11$   
High Positive Cognition  $n=39$

Predicted Group

	<u>Low Positive Cognition</u>	<u>High Positive Cognition</u>
<u>Low Positive Cognition</u>	4 (36.4%)	7 (63.6%)
<u>Actual Group</u>		
<u>High Positive Cognition</u>	2 (5.1%)	37 (94.9%)

- Notes.
1. FT = Fear Thermometer
  2. For all standardized canonical coefficients,  $p < .01$

78% of all subjects (Table 15). Thus, contrary to the process avoidant method which is generally associated with lower stress ratings, this Modified Cope avoidant-type strategy is basically related to higher stress scores.

#### Modified Repression-Sensitization Scale

Discriminant analysis yields no significant function to distinguish repressors, sensitizers, and intermediates. This finding was somewhat expected since RS scores do not correlate significantly with any stress variables.

### DISCUSSION

#### Review of the Findings

A general review of the results suggests that patients in the present study did not experience either pronounced emotional or physiological arousal during dental treatment. Nonetheless, fluctuations in the self-reports, observational and autonomic stress scores across the assessment periods indicate that patients were responsive to changes in situational demands. A most interesting finding is that patients who rated general dental treatment as highly anxiety-provoking also reported high levels of distress during actual treatment. The dentist and assistant also rated these individuals as more anxious and resistant. Thus, this measure of general dental treatment anxiety is a very good predictor of patients' fear responses and co-operativeness during actual treatment.

In regards to patients' coping strategies, the Process Cope measure indicates that an avoidant method was most consistently used during treatment. This process measure also shows that coping behaviors shift as situational demands change. For example, the

Table 15

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**Discriminant Function and Subject Classification**  
for Low and High Suppression Groups (N=50)

Discriminant Function

<u>Variable</u>	<u>Standardized Canonical Coefficient</u>
Posttreatment Assistant FT	1.02
Posttreatment Salivary pH	0.90
Anticipatory Diastolic BP	0.62
Posttreatment Assistant RT	0.47
Posttreatment Dentist FT	-1.55

Subject Classification

Low Suppression n=31  
High Suppression n=19

	<u>Predicted Group</u>	
	<u>Low Suppression</u>	<u>High Suppression</u>
<u>Low Suppression</u>	23 (74.2%)	8 (25.8%)
<u>High Suppression</u>	3 (15.8%)	16 (84.2%)

Notes. 1. FT = Fear Thermometer; RT = Resistance Thermometer;  
BP = Blood Pressure  
2. For all standardized canonical coefficients,  $p < .05$

predominant coping strategy shifted from avoidance during the anticipatory period to a behavioral method during injection. The Modified Cope scale scores, on the other hand, suggest that patients typically engage in a cognitive method of coping in an attempt to manage negative emotional consequences of treatment (i.e., Positive Cognition). Finally, the modified RS scores show that the majority of patients in this study exhibit trait coping styles which are neither extremely avoidant or excessively vigilant.

The interrelationships between the avoidant and vigilant components of the three coping measures generally indicate positive associations between conceptually similar coping behaviors and negative relationships between dissimilar behaviors. A major exception, however, is the basically negative relationship between the process avoidant method and the Suppression factor. In fact, Suppression is positively associated with the behavioral method.

The relationships between the coping measures and the self-report, observational, and physiological stress scores show that the modified RS scale scores are not associated with any stress response variables. Conversely, the Process Cope methods and focuses (e.g., avoidance and No Focus), and the Modified Cope factors (e.g., Positive Cognition) are more closely related to patients' distress ratings, observers' anxiety scores, and physiological stress measures. Most prominently, the process avoidant method is associated with lower anxiety ratings by patients.

#### Patients' Responses to Treatment

The results generally indicate that the patients in the present study were not particularly stressed by the dental treatment.

Specifically, self-reports over all periods suggest that the patients were only slightly to moderately anxious. Similarly, both the dentist's and assistant's ratings indicate that the patients were generally only slightly to moderately anxious and that they were cooperative during treatment. Moreover, observational signs of distress (e.g., gagging) were so infrequent that the observers' checklist scores were eliminated from all analyses. The physiological measures (i.e., HR, blood pressure, and salivary acidity) are also indicative of minimal response during the treatment session.

The low absolute values of the subjective, observational, and physiological stress measures may be attributed to the fact that the majority of subjects were not first-time patients. One might speculate that these patients who visit this dentist fairly regularly have become familiar with the setting, personnel, and dental procedures. Perhaps, repeated exposure to these and other potentially fear-provoking cues has resulted in the extinction or habituation of responding to these cues.

A second factor which is related to patients' affective and autonomic responses to treatment is age. Franco and Croft (1979) found that older patients report lower levels of anxiety during dental treatment than younger patients. Perhaps, in general, younger patients have comparatively less exposure to treatment than older patients and, hence, are not yet habituated to fear-provoking cues in the dental situation. Given that the subjects in the present study are typically middle-aged, this characteristic is consistent with the suggestion that repeated exposure over time to dental treatment has led to habituation to this situation.

As noted earlier, however, there are indications of reactivity to the changing situational demands as reflected in the relative values of the self-reports, observations, and physiological measures over the assessment periods. It appears, from both self-reports and assistant's ratings, that patients were least anxious during the anticipatory period. However, patients rate themselves as most anxious during the injection while the assistant rates them as most anxious during posttreatment. Patients' HR scores also indicate higher autonomic arousal during posttreatment. Conversely, salivary acidity was lower during posttreatment than during the anticipatory period. Thus, there is discordance between these various measures concerning patients' responses to posttreatment.

It is somewhat puzzling that HR scores are elevated during posttreatment. Given that treatment was completed, one might expect the patients to be relaxed and calmer than at any other point in the procedure. One possible explanation for the increased HR scores is a residual effect of autonomic arousal in response to particularly stressful points in treatment (e.g., filling or drilling).

Goldstein, Dionne, Sweet, Gracely, Brewer, Gregg, and Keiser (1982) have found that, among patients who underwent third molar extractions, heart rate generally did not return to pre-operative levels until 3 hr. after surgery. Thus, posttreatment HR scores in the present study may reflect a prolongation of autonomic arousal to earlier phases of treatment.

Furthermore, it is interesting that patients rated themselves as more anxious during posttreatment than during the anticipatory period. One might expect the reverse, that is, patients should be more anxious

before treatment begins than after it is completed. Perhaps, patients' generally higher heart rate levels during posttreatment partly accounts for the concomitantly higher self-reports of anxiety. That is, subjects may have been aware of their autonomic arousal (i.e., increased heart rate) during this last period, which might actually represent some residual physiological response to treatment. However, following the Schacterian model of attribution, these patients may have attributed their arousal to the most salient environmental cues (e.g., dental treatment) and, consequently, labeled their physiological state as anxiety (Gerdes, 1979).

#### Validity of Coping Measures

A primary objective of the present study is to determine the validity of three coping measures: the Process Cope, Modified Cope, and modified RS scales. These three measures purport to assess similar behavioral dimensions (i.e., avoidant and vigilant coping strategies). They, however, differ in their degree of situational specificity in that the process measure (i.e., Process Cope scale) has items which pertain specifically to the current treatment procedure and the scale is also administered at several points during treatment. The Modified Cope (state) measure has content which pertains generally to the treatment and is a less immediate measure of coping than the process scale since it is administered after treatment. The lowest degree of situational specificity is found in the modified RS trait measure which has no item content relevant to dental treatment.

The validity of a measure can be tested in several ways. One method is convergent validation whereby different measures which purport to assess similar attributes (e.g., avoidant coping behavior)

should be positively related and different measures which assess dissimilar attributes (e.g., avoidance vs. vigilance) should be negatively associated (Campbell and Fiske, 1959). Convergent validation, therefore, examines the interrelationships between measures. This form of validation, however, is not a sufficient test. It simply indicates that different measures assess a common construct but does not provide information about the nature of the construct. A second test of validity is concurrent validation which examines the relationship between the measures and observable behaviors which are conceptually associated with the construct being measured. Hence, concurrent validity provides information about the nature of the construct.

In terms of convergent validity, the significant interrelationships show that anticipatory avoidance is negatively related to the RS scale scores. This association suggests that the avoidant method and repression measure a similar construct (e.g., avoidance). The posttreatment behavioral method is positively associated with both the RS measure and Direct Action factor. Hence, the process behavioral coping measure appears to assess behaviors related to sensitization and taking direct action (e.g., vigilance). Moreover, posttreatment avoidant method is also negatively associated with Direct Action so there is some divergence between the process measure of avoidance and state measure of vigilance. Thus, the anticipatory and posttreatment avoidant and posttreatment behavioral methods demonstrate convergent validity with both the state and trait measures.

It is of interest to examine the directions of the



interrelationships between the coping variables, irrespective of significance levels, in an attempt to achieve a better conceptual understanding of coping behaviors which appear similar (i.e., positive associations) and those which seem to be dissimilar (i.e., negative associations). For example, the modified RS measure is positively associated with both the process behavioral method and the Direct Action factor. RS scores are also negatively associated with process avoidance and the Suppression factor. Hence, the trait measure of vigilance and avoidance is related to both the process and state measures of these attributes in appropriate directions. Relationships between process and state measures show that the behavioral method and the Direct Action factor are positively related but the avoidant method and the Suppression factor are negatively related. Therefore, there is convergence between the three measures of vigilance. However, there is divergence between the process and state measures of avoidance.

Furthermore, the process avoidant method shows a negative association with the Direct Action factor so that these different measures do appear to assess different attributes. However, the behavioral method and the Suppression factor are positively rather than negatively related. This positive relationship may reflect a basic similarity in the item contents of the behavioral method and the Suppression factor. Specifically, although the Suppression items suggest attempts to avoid thinking about the dental situation, they also reflect attempts to remain relaxed and to prepare oneself for treatment. Perhaps, it is this second aspect of the Suppression factor which leads to its association with a behavioral rather than

avoidant method of coping.

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It is also noteworthy that significant relationships between both the state and trait measures and the process coping scale are found only in the anticipatory and posttreatment periods. This finding suggests that the three measures demonstrate the greatest degree of convergence when assessing coping strategies which occur during the initial and end stages of a stressful situation; conversely, there is less agreement between the measures at intermediate stages.

Given the conceptualization that coping behaviors represent responses to stressors (e.g., Cohen and Lazarus, 1973; Burchfield, 1979), then concurrent validity is present if some relationships exist between the coping measures and patients' affective and physiological responses to treatment. The results show that, although there is a trend towards a negative association between RS and HR scores, the RS scores are generally not associated with any subjective, observational, or physiological stress response indices. Similar findings have been reported by Cohen and Lazarus (1973), Kaloupek et al. (1983), and Kaloupek and Stoupakis (Note 1). The agreement between these various studies is particularly impressive given the range of different stressors (i.e., general surgery, blood donation, and dental treatment). The replication of the weak relationship between the RS scale and all stress response indices strongly suggests that this trait measure is, indeed, a poor predictor of an individual's response to a specific stressor.

Alternatively, both the process and state measures of coping demonstrate relationships with several subjective and observational stress

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response indices. The process avoidant method and No Focus classification are most prominently associated with patients' subjective responses to dental treatment. It is, however, interesting that the Positive Cognition and Suppression factors from the Modified Cope scale also demonstrate equally strong relationships with subjective and observational stress response scores. These results suggest that both the process and state measures of coping may be informative about patients' responses to dental treatment.

In summary, the primary hypothesis proposed in this study is partially supported by the data. The hypothesis proposes that there is a positive relationship between a measure's degree of situational specificity and its level of concurrent validity. Tests of concurrent validity demonstrate that the RS trait measure which is least situationally specific also demonstrates no significant relationship with any of the stress response indices. The process scale which is the most situationally specific measures is expected to demonstrate the highest degree of concurrent validity. However, contrary to this expectation, the process and state measures demonstrate equal (moderate) relationships with subjective, observational, and autonomic stress response indices.

#### Autonomic Self-Perception and Avoidance-Vigilance

A secondary hypothesis proposes that repressors demonstrate less awareness of their physiological responses to stressors than do sensitizers. This hypothesis is not supported since RS scale scores are not significantly associated with APQ scores. Moreover, the RS scores are not significantly associated with any autonomic stress response variables which suggests that repressors and sensitizers are

not distinguished by different levels of autonomic responses<sup>75</sup> during dental treatment.

It is of particular interest, however, that the process measure of avoidant coping is associated with APQ scores. Patients who endorse avoidant coping methods during the anticipatory and posttreatment periods tend to score low on the APQ. Hence, these individuals report low levels of autonomic self-perception. The relationship between this coping strategy and autonomic self-perception is important in its contribution to a better conceptual understanding of the process avoidant method. For example, an avoidant strategy may be manifested as denial of autonomic arousal to a stressor in an effort to minimize the negative affective impact of that stressor.

Furthermore, denial of autonomic self-perceptions may be determined by specific features of the stressful situation. During dental treatment, low autonomic perception is not associated with avoidant coping in the injection period, in contrast to the anticipatory and posttreatment periods. Perhaps, the involvement of tissue penetration and the sensations of pain and numbness during injection are highly salient cues which do not permit patients to avoid focusing on their bodily reactions. Hence, the degree of autonomic self-perception among avoidant patients may not be a consistent and pervasive behavioral tendency during all phases of treatment but, rather, is dictated by the changing situational demands. This finding further supports the premise that a situationally specific measure (e.g., Process Cope scale) is more informative about actual behaviors than is a trait measure (e.g., the

APQ).

### Implications for Dental Treatment

An important outcome of the present research is its contribution to an understanding of the types of untrained coping strategies which patients use during dental treatment and the effects of these strategies on patients' affective responses to treatment. In particular, the process measure is most informative about the shifts in patients' coping strategies during various stages of treatment. For instance, during anticipation of treatment, most patients tend to engage in avoidance but, then, the majority of patients use a behavioral strategy during the anesthetic injection.

This shift in coping methods is intuitively reasonable. During anticipation of treatment, no intrusive procedures have yet been initiated. The relative absence of fear-provoking stimuli impinging upon the patients may allow them to engage in distraction or other avoidant coping strategies. However, during the injection, when cues associated with treatment are relatively more inescapable, patients might be prompted to shift to a behavioral strategy in an effort to find out more about the procedure (e.g., duration of anesthesia) and to actively co-operate with the dentist (e.g., open mouth and sit still).

The focus of coping most often used throughout treatment is a problem focus. This consistency may reflect the highly salient nature of the stimuli (e.g., dentist) associated with the entire treatment procedure. Interestingly, an emotional focus was endorsed most frequently during the injection period. This suggests that, for some patients, their affective responses to this intrusive aspect (e.g.,

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tissue penetration) of treatment became more salient than procedural factors. Therefore, the injection period seems to elicit a focus on internal (e.g., emotional) states rather than external (e.g., treatment) factors.

It is noteworthy that the active cognitive coping method was endorsed least by patients during the treatment procedure. However, the (state) Positive Cognition factor, which is conceptually similar to a (process) cognitive method, was most consistently endorsed by patients after treatment. Both coping strategies represent rational attempts to minimize the negative aspects of dental treatment by focusing on its ultimate benefits (e.g., physical well-being). It, appears, however, that patients were not focusing on the positive aspects of dental treatment while undergoing the procedure but, rather, were more often engaged in avoiding recognition of fearful stimuli or actively cooperating with the treatment procedure. Perhaps, it is only in retrospect, after treatment is completed, that patients focus on the positive benefits of dental treatment. This discrepancy between the Modified Cope and Process Cope measures of cognitive coping strategies suggests that subjects' responses to a state measure may not accurately reflect behaviors which actually occur during a stressful situation.

Although this information about the types of coping strategies elicited by dental treatment is important, a more practical issue is the determination of types of coping behaviors most highly associated with low levels of distress and autonomic arousal. It appears that an avoidant coping strategy is most often associated with low levels of subjective distress and diastolic blood pressure during dental

treatment. The process avoidant method, for example, was related to lower patient FT ratings during the anticipatory and posttreatment periods. Correlational analyses do not permit statements of causality; it is possible that an avoidant coping strategy leads to lower distress levels, but it is also possible that an avoidant strategy is a consequence of anxiety level (e.g., Kaloupek and Stoupakis, Note 1).

The argument could be made that the lower anxiety ratings by patients are simply manifestations of a response set of avoidant individuals to present themselves in a positive way. This argument, however, is contradicted by the absence of association between patient FT and the SD scale scores. That is, patients' reports of low levels of distress do not seem to reflect a desire to respond to the FT in a socially desirable manner. Moreover, discriminant analyses reveal that patients who endorsed an avoidant method also exhibited lower anticipatory diastolic blood pressure. Thus, an avoidant method appears to be negatively associated with patients' subjective and autonomic responses to treatment.

Kaloupek and Stoupakis (Note 1) and Kaloupek et al. (1983) have also reported that a process avoidant method is highly related to low stress ratings (e.g., patients' anxiety scores). The concordance between the blood donor studies and the present research strongly suggests that the process avoidant method may be a very effective coping strategy during some stressful medical procedures.

It is very interesting that the beneficial effects of an avoidant strategy on patients' affective responses are not demonstrated by the Suppression factor. In fact, this state measure of avoidance is

associated with arousal during treatment (e.g., high anticipatory diastolic blood pressure). This discrepancy between the process and state avoidant coping measures in relation to patients' stress responses further supports the notion that the avoidant method and Suppression are not similar, as evidenced by low correlations between these two coping variables.

In contrast to the avoidant method, the behavioral method appears to be related to higher patient FT ratings. George, Scott, Turner, and Gregg (1980) also reported that a vigilant coping strategy is associated with high pain ratings and longer recovery from tissue swelling among patients who underwent third molar extractions. The blood donor study by Kaloupek and Stoupakis (Note 1) also suggested that a behavioral method is associated with patients' reports of distress during the donation procedure. It, therefore, appears that a vigilant coping method during some medical procedures may lead patients to focus too narrowly on their negative responses to or the negative aspects of treatment.

The results of the present study have important implications for the development of programs to help dental patients cope effectively with treatment. First, in order to identify patients who are most likely to report high levels of distress during treatment, a simple scale (e.g., a general fear of treatment rating) can be administered to assess the patient's fear of dental treatment. This measure demonstrates strong predictive power in that patients who reported high levels of anxiety about undergoing dental treatment also rated themselves as more anxious during actual treatment. These patients were also rated as more anxious by the dentist and assistant. Thus,



an initial assessment of patients' emotional responses to general dental treatment may provide indications of individuals at risk for experiencing high distress levels during actual treatment.

A preparatory program to help high risk patients cope with treatment might, then, involve techniques which encourage an avoidant approach to the treatment situation. Although information is lacking about the direction of influence between avoidant coping and anxiety level, this coping strategy nonetheless appears to be associated with low subjective distress. Hence, patients might be instructed to distract themselves by engaging in pleasant imagery in order to help them avoid focusing on the various potentially fear-provoking stimuli in the dental operator (e.g., Corah, Gale, and Illig, 1979). Important questions, however, arise concerning procedural details of a preparatory program. For instance, it needs to be determined whether the training techniques (e.g., distraction) should be carried on throughout the session, or whether there are specific periods (e.g., anticipatory stage) when these techniques are most effective. Clearly, more research with process measures of coping are needed to refine these procedural details.

#### Implications for Future Research

The present study represents an important advancement in an understanding of the untrained coping strategies used by dental patients at various stages of treatment. The study also provides indications of specific types of coping behaviors which are associated with minimally negative affective responses to dental treatment. Given these encouraging results, further research on coping with dental treatment is certainly warranted.

Future studies might focus on first-time patients. The majority of subjects in the present study were returning patients, and the generally low level of responding indicated by subjective, observational, and autonomic indices suggests that an habituation or extinction effect to the dental situation may have occurred. A group of first-time patients might exhibit higher negative affective responses to the treatment procedure. Moreover, as Kaloupek and Stoupakis (Note 1) have reported, a study of first-time patients can clarify the direction of influence between coping strategies and affective responding. Results from their comparative study of first-time and repeat blood donors, for example, suggest that an avoidant coping strategy may be a consequence rather than an antecedent of anxiety level. As a general rule, first-time patients represent an important target group. These individuals need to be taught effective coping strategies which can minimize negative affective responses to treatment. A non-fearful experience during the first dental visit may increase the probability that the patient will return for further treatment (e.g., Gale and Ayer, 1969).

Future studies on coping with dental treatment should also make efforts to refine the physiological measures of patients' stress responses. In particular, instruments to assess heart rate should be able to tolerate patients' movements. In the present research, the photoplethysmograph transducer and/or the pen recorder were simply too sensitive to sudden movements. Hence, a fair amount of heart rate data was lost due to artifact.

On the other hand, salivary pH proved to be a most interesting measure of autonomic stress response. The salivary acidity test

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procedure was quick and simple to administer. However, the posttreatment salivary pH levels did not correlate well with the other stress ratings. The patients' anxiety scores, observers' stress ratings, heart rate, and blood pressure scores were all higher during posttreatment than during the anticipatory period; salivary acidity was lower during posttreatment. This is a puzzling finding which cannot be explained by any treatment variables (e.g., type of treatment). Perhaps, a salivary acidity test during the injection period would have provided some important information about changes in pH level during the course of treatment which might explain the lower posttreatment salivary pH. The additional measures of salivary volume, translucency, and protein which were absent in the present study might also have provided validity checks for the salivary acidity measure (Morse et al., 1981). Thus, the salivary acidity test holds promise as a useful and efficient assessment of autonomic stress response but still needs further research and refinement.

In conclusion, the direction and objectives of future research on coping with dental treatment seem very clear. There is a need to return to the fundamental questions of determining dental patients' untrained coping strategies and the types of coping behaviors which most effectively manage distress levels during treatment. Indeed, those intervention studies which have introduced preparatory programs for dental treatment without prior consideration of these two basic questions (e.g., Kleinknecht and Bernstein, 1979; Siegel and Peterson, 1980) may have been premature. For example, Mathew and Rezin (1977) exposed patients to imaginal flooding of stimuli associated with the dental situation as preparation for treatment. Results from the

present study which suggest that an avoidant strategy is highly associated with low levels of distress during treatment seem to contraindicate the use of flooding as a preparatory technique.

Given that the assessment of coping strategies is an important objective, the direction of this assessment should be towards the use of process measures (e.g., Process Cope scale). The comparable concurrent validity levels of the process and state measures in the present study might suggest that the Modified Cope scale is a more cost-effective testing instrument. That is, the state measure is administered only once and provides a good deal of information about patients' affective responses. However, the state measure in the present research indicates that Positive Cognition was a predominant coping strategy during treatment but the cognitive method was actually the least endorsed item on the Process Cope scale. Hence, state measures may not accurately assess behaviors which occur during actual stressful situations. Moreover, the immediate and multiple assessment features of a process scale can measure shifts in coping strategies as situational demands change. Findings from this dental study and the blood donor studies (Kaloupek and Stoupakis, Note 1; Kaloupek et al., 1983) show that human coping strategies are indeed flexible and multidimensional (e.g., method and focus of coping). In the final analysis, then, a process measure may well represent an important step in the development of more suitable techniques to assess complex human behaviors.

Footnotes

1. A comparison of correlation coefficients between anesthetic dosage and all relevant variables for the 48 subjects who received Black Citnest and for the total sample (including two subjects who received Xylocaine) revealed no significant differences. Therefore, all correlation coefficients presented are based on the total sample of 50 subjects.
2. Behavior checklist scores greater than zero were available for only 6 (12%) subjects and 3 (6%) subjects from the dentist and assistant, respectively. Due to these extremely low frequencies of endorsement, behavior checklist scores were eliminated from all statistical analyses.
3. Due to artifact from sudden movements and/or poor recording, heart rate data were lost for several patients. In all statistical analyses involving heart rate scores, therefore, only subjects with complete heart rate data for the three assessment periods were considered ( $n = 32$ ).

Reference Note

1. Kaloupek, D.G., and Stoupakis, T. Coping with a stressful medical procedure: Further investigation with volunteer blood donors. Unpublished manuscript, Concordia University, 1983.

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## APPENDIX A

Appendix A  
Modified Repression-Sensitization Scale

PROJECT NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_

**INSTRUCTIONS:** The following are some statements on feelings, attitudes, and behavior. Read each statement and decide if it is true or false in reference to yourself. Circle "T" if the statement is true and "F" if it is false.

Be honest, but do not spend too much time with any one statement. As a rule, first impressions are as accurate as any.

- |   |   |   |
|---|---|---|
| 1. I tend to keep on a thing until others lose their patience with me.....  | T | F |
| 2. I frequently find myself worrying about something.....   | T | F |
| 3. I sweat very easily even on cool days.....   | T | F |
| 4. I think of ways to get even with certain people.....   | T | F |
| 5. Most people who know me would say I am a cheerful person.....  | T | F |
| 6. I find discussions about sex slightly annoying.....  | T | F |
| 7. I usually have to stop and think before I act, even in trifling matters.....                                   | T | F |
| 8. Sometimes when I am feeling well I am cross.....   | T | F |
| 9. I am more of a "happy-go-lucky" person than a deep thinker.....  | T | F |
| 10. I try to plan in advance what to do if certain threatening situations were to arise.....                      | T | F |
| 11. I work under a great deal of tension.....   | T | F |
| 12. When things go wrong, I cannot rest until I've corrected the situation.....                                   | T | F |
| 13. I like to let people know where I stand on things...  | T | F |
| 14. When I leave home I tend to worry about such things as whether the door is locked and the windows closed..... | T | F |
| 15. I am not easily awakened by noise.....  | T | F |
| 16. I have very few quarrels with members of my family..  | T | F |
| 17. I rarely wonder what hidden reason another person may have for doing something nice for me.....               | T | F |

- |  |   |   |
|--|---|---|
| 18. I am not often troubled with disturbing thoughts....   | T | F |
| 19. I have daydreams that I make a fool of someone who knows more than I do.....                                 | T | F |
| 20. I never get angry.....   | T | F |
| 21. Everything is turning out just as the prophets of the Bible said it would.....                               | T | F |
| 22. People have too much sex on their minds.....   | T | F |
| 23. I sometimes tease animals.....   | T | F |
| 24. Most nights I go to sleep without thoughts or ideas bothering me.....  | T | F |
| 25. I tend to get along well with people and am liked by almost everybody.....                                   | T | F |
| 26. Bad words, often terrible words, come into my mind and I cannot get rid of them.....                         | T | F |
| 27. I have a habit of counting things that are not important, such as bulbs on electric signs, and so forth..... | T | F |
| 28. Sex education should not be part of the high school curriculum.....  | T | F |
| 29. I never get so mad as to feel like beating or smashing things.....   | T | F |
| 30. I almost never think of things too bad to talk about.....  | T | F |

Appendix A  
DENTAL COPING SCALE

95

PROJECT NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_

INSTRUCTIONS: The following are some statements concerning possible reactions before or during the dental treatment just completed. Read each item and decide whether the statement is true or false as it pertains to yourself. Circle "T" if the statement is true and "F" if it is false.

1. I tried to see the positive side..... T F
2. I tried to step back from the situation and be more objective..... T F
3. I prayed or hoped for guidance and strength..... T F
4. I took things one step at a time..... T F
5. I considered several alternatives for handling the situation..... T F
6. I drew on my past experiences: I was in a similar situation before..... T F
7. I tried to find out more about the upcoming treatment..... T F
8. I talked with a professional person (e.g. dentist or assistant)..... T F
9. I took some positive action to prepare myself..... T F
10. I watched the dentist or assistant perform the treatment procedure..... T F
11. I talked with a friend(s) about the upcoming treatment..... T F
12. I tried to relax myself..... T F
13. I prepared for the worst..... T F
14. I felt angry about the way I was treated, although I probably felt this way because I was afraid or anxious..... T F
15. I tried to reduce tension by not thinking about the situation..... T F
16. I tried to reduce the tension by imagining that I was elsewhere..... T F
17. I kept my feelings to myself..... T F
18. I got busy with other things in order to keep my mind off the upcoming treatment..... T F
19. I didn't worry about it; figured everything would probably work out fine..... T F



# Appendix A Process Cope Scale

## DENTAL STUDY PATIENT RATINGS

Project Number \_\_\_\_\_

Date \_\_\_\_\_

Please check the statement which best characterizes what you have been thinking about or doing during the past minute. Check one statement in Section A and one statement in Section B.

### Section A

During the past minute, I was...

\_\_\_\_\_ not feeling bad or upset; not thinking about unpleasant things

\_\_\_\_\_ thinking that this is not pleasant but it is necessary for my health

\_\_\_\_\_ trying to find out more about what was going to happen next (e.g., looking around or asking questions)

\_\_\_\_\_ thinking about how I have handled similar experiences in the past

\_\_\_\_\_ thinking about or wishing to be elsewhere (e.g., school, work, home)

\_\_\_\_\_ trying to prepare myself for, or co-operate with treatment (e.g. trying to keep myself relaxed)

### Section B

During the past minute, I was...

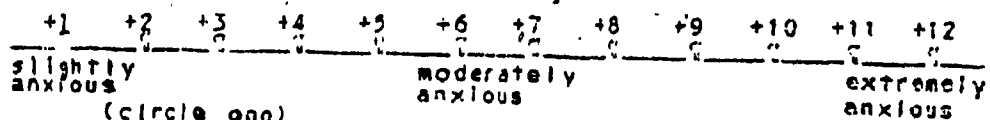
\_\_\_\_\_ focusing on the treatment procedure (e.g., what the dentist/assistant was doing or what was going to happen next)

\_\_\_\_\_ focusing on how I felt (e.g., tense, calm)

\_\_\_\_\_ not thinking about anything

### Fear Thermometer

During the past minute, the highest level of anxiety I felt was...



APPENDIX B

97

**PERCEPTION OF FEELING QUESTIONNAIRE**

The following 20 questions ask about your bodily reactions when you are anxious. Choose the number on the scale from 0 to 9 which best represents your personal experience. Each scale is labeled at both ends. Circle one number along the scale which indicates how you generally feel when you experience anxiety. Please answer carefully.

1. When you feel anxious, are you aware of many bodily reactions?

0 1 2 3 4 5 6 7 8 9  
Aware of very few                      Aware of very many

2. When you feel anxious, how often are you aware of your bodily reactions?

0 1 2 3 4 5 6 7 8 9  
Never                      Always

3. When you feel anxious, does your face become hot?

0 1 2 3 4 5 6 7 8 9  
Does not change                      Becomes very hot

4. When you feel anxious, do your hands become cold?

0 1 2 3 4 5 6 7 8 9  
No change                      Very cold

5. When you feel anxious, do you perspire?

0 1 2 3 4 5 6 7 8 9  
Not at all                      A great deal

6. When you feel anxious, does your mouth become dry?

0 1 2 3 4 5 6 7 8 9  
Never                      Always

7. When you feel anxious, are you aware of increased muscle tension?

0 1 2 3 4 5 6 7 8 9  
No increased tension                      A great deal of tension

8. When you feel anxious, how often are you aware of any change in your heart action?

0 1 2 3 4 5 6 7 8 9  
Never                      Always

9. When you feel anxious, do you experience accelerated heart beat?

0 1 2 3 4 5 6 7 8 9  
No change                      Great acceleration.

10. When you feel anxious, does the intensity of your heart beat increase?

0 1 2 3 4 5 6 7 8 9  
Does not Increase to  
Change extreme pounding

11. When you feel anxious, how often are you aware of changes in your breathing?

0 1 2 3 4 5 6 7 8 9  
Never Always

12. When you feel anxious, does your breathing become more rapid?

0 1 2 3 4 5 6 7 8 9  
Never Always

13. When you feel anxious, do you breathe more deeply?

0 1 2 3 4 5 6 7 8 9  
No change Much more  
deeply

14. When you feel anxious, do you breathe more shallowly?

0 1 2 3 4 5 6 7 8 9  
No change Much more  
shallowly

15. When you feel anxious, do you feel as if blood rushes to your head?

0 1 2 3 4 5 6 7 8 9  
Never Always

16. When you feel anxious, do you get a lump in your throat or a choked-up feeling?

0 1 2 3 4 5 6 7 8 9  
Never Always

17. When you feel anxious, does your stomach get upset?

0 1 2 3 4 5 6 7 8 9  
Not at all Very upset

18. When you feel anxious, do you get a sinking or heavy feeling in your stomach?

0 1 2 3 4 5 6 7 8 9  
Never Always

19. When you feel anxious, do you have any difficulty talking?

0 1 2 3 4 5 6 7 8 9  
Never Always

20. When you feel anxious, are you bothered by your bodily reactions?

0 1 2 3 4 5 6 7 8 9  
Not bothered Bothered  
at all very much

# Appendix B Social Desirability Scale

PROJECT NUMBER \_\_\_\_\_ DATE \_\_\_\_\_

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you personally. Circle "T" if statement is true and "F" if it is false.

- |   |   |   |
|---|---|---|
| 1. Before voting I thoroughly investigate the qualifications of all the candidates.....                                   | T | F |
| 2. I never hesitate to go out of my way to help someone in trouble .....  | T | F |
| 3. It is sometimes hard for me to go on with my work if I am not encouraged .....   | T | F |
| 4. I have never intensely disliked anyone .....   | T | F |
| 5. On occasion I have had doubts about my ability to succeed in life .....  | T | F |
| 6. I sometimes feel resentful when I don't get my way .....   | T | F |
| 7. I am always careful about my manner of dress .....   | T | F |
| 8. My table manners at home are as good as when I eat out in a restaurant .....   | T | F |
| 9. If I could get into a movie without paying and be sure I was not seen I would probably do it .....                     | T | F |
| 10. On a few occasions, I have given up doing something because I thought too little of my ability .....                  | T | F |
| 11. I like gossip at times .....  | T | F |
| 12. There have been times when I felt like rebelling against people in authority even though I knew they were right ..... | T | F |
| 13. No matter who I'm talking to, I'm always a good listener....  | T | F |
| 14. I can remember "playing sick" to get out of something .....   | T | F |
| 15. There have been occasions when I took advantage of someone .....  | T | F |
| 16. I'm always willing to admit it when I make a mistake .....  | T | F |
| 17. I always try to practice what I preach .....  | T | F |

-2-

- |  |   |   |
|--|---|---|
| 18. I don't find it particularly difficult to get along with loud mouthed, abnoxious people..... | T | F |
| 19. I sometimes try to get even rather than forgive and forget..                                 | T | F |
| 20. When I don't know something I don't at all mind admitting it .....                           | T | F |
| 21. I am always courteous, even to people who are disagreeable..                                 | T | F |
| 22. At times I have really insisted on having things my own way.....                             | T | F |
| 23. There have been occasions when I felt like smashing things .....                             | T | F |
| 24. I would never think of letting someone else be punished for my wrongdoings .....             | T | F |
| 25. I never resent being asked to return a favor.....  | T | F |
| 26. I have never been irked when people expressed ideas very different from my own .....         | T | F |
| 27. I never make a long trip without checking the safety of my car .....                         | T | F |
| 28. There have been times when I was quite jealous of the good fortune of others .....           | T | F |
| 29. I have almost never felt the urge to tell someone off .....                                  | T | F |
| 30. I am sometimes irritated by people who ask favors of me....                                  | T | F |
| 31. I have never felt that I was punished without cause.....                                     | T | F |
| 32. I sometimes think when people have a misfortune they only got what they deserved.....        | T | F |
| 33. I have never deliberately said something that hurt someone's feelings .....                  | T | F |

## APPENDIX C


## Appendix C

DENTAL PATIENT CONSENT FORM (II)

Dr. D.G. Kaloupek and his research associates from the Department of Psychology at Concordia University are conducting a research project in cooperation with Dr. Leonard Kent. The goal of this project is to develop ways of helping dental patients be more relaxed and comfortable during dental treatment. This work is presently at a preliminary stage which simply involves examining the anxiety-management approaches which people use on their own.

We would like to have you participate in this project. Your participation is completely voluntary and is not required as part of the dental treatment you may receive from Dr. Kent. There is no additional fee associated with the project. Also, if you decide to participate and later change your mind, you may withdraw from the project at any time without affecting your dental care in any way.

As part of the project, you may be asked to do the following:

- 1) Complete a series of brief questionnaires which concern your preferred way of handling stress.
  - 2) Provide information concerning your sex, age, and previous experience with dental treatment.
  - 3) Give brief ratings of what you are feeling and/or thinking about before, during, and after dental treatment. Dr. Kent and his assistant will also be
- 



making anxiety ratings.

- 4) Have your blood pressure taken before, during, and after dental treatment.
- 5) Have a sensor placed on your index finger to monitor your heart rate. This is a painless procedure which leaves no permanent mark on your finger.
- 6) Have the assistant place a piece of litmus paper in your mouth briefly in order to measure the acidity of your saliva before, during, and after dental treatment. This is also a safe and painless procedure.

Please note that all information collected about you for the project is completely confidential. To insure this fact, your name will not appear on any of the project materials - except for this consent form. All other information is coded by a number which Dr. Kent or one of his assistants will assign.

If you have any questions about this form or the project itself, please ask Dr. Kent or one of his staff.

If you are interested in participating in the project, please sign below. Your signature indicates that you have read and understood this form, and are volunteering your participation.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Witness \_\_\_\_\_

# Appendix C

## DENTAL HISTORY

Project Number \_\_\_\_\_ Date \_\_\_\_\_

Sex \_\_\_\_\_ Age \_\_\_\_\_

- 1) How long ago was your last dental visit? \_\_\_\_\_ months.
- 2) What is the average number of dental visits you make per year? \_\_\_\_\_
- 3) As far as you can remember, how many times have you had very traumatic (e.g., stressful) dental visits? \_\_\_\_\_
- 4) What was your worst experience during a dental visit (if any)? Explain briefly. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- 5) How would you rate the worst experience you have had during a dental visit?

+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
slightly traumatic				moderately traumatic				extremely traumatic			

(circle one)

- 6) How would you rate having an anesthetic injection (i.e., needle)?

-6	-5	-4	-3	-2	-1	+1	+2	+3	+4	+5	+6
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
extremely pleasant			slightly pleasant			slightly traumatic			extremely traumatic		

(circle one)

- 7) In general, how do you feel about undergoing dental treatment (e.g., having your tooth filled)?

-6	-5	-4	-3	-2	-1	+1	+2	+3	+4	+5	+6
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
extremely calm			slightly calm			slightly anxious			extremely anxious		

(circle one)

- 8) During the past minute, the highest level of anxiety I felt was...

+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
slightly anxious				moderately anxious				extremely anxious			

(circle one)

## Appendix C

## DENIAL STUDY DATA SHEET

Project Number \_\_\_\_\_

Date \_\_\_\_\_

New Patient? Yes / No

Blood Pressure Reading 1: \_\_\_\_\_

PH Value 1 \_\_\_\_\_

Blood Pressure Reading 2: \_\_\_\_\_

PH Value 2 \_\_\_\_\_

PH Value 3 \_\_\_\_\_

Amount of anesthetic used: \_\_\_\_\_

Type of anesthetic used: \_\_\_\_\_

Approximate duration of treatment: \_\_\_\_\_ minutes

Comments (e.g., violations of protocol; unusual difficulties):

## Appendix C

## DENTAL STUDY PRACTITIONER RATINGS

Project Number \_\_\_\_\_ Date \_\_\_\_\_

1) Please check the behaviors which you have noticed in the patient during the past minute.

- ☐ rapid breathing  
☐ excessive swallowing  
☐ gagging  
☐ observable perspiration  
☐ hands clenched into fists or gripping the arms of the chair  
☐ jaw clenched  
☐ mouth tended to close during treatment  
☐ reflexively jerked when touched  
☐ drawing back from dentist/assistant  
☐ sliding down in chair  
☐ pushing dentist's/assistant's hand away or holding onto dentist's/assistant's hand

The patient's attitude during the past minute was...

-6	-5	-4	-3	-2	-1	+1	+2	+3	+4	+5	+6
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
extremely		slightly				slightly				extremely	
cooperative		cooperative				resistant				resistant	
(circle one)											

The patient's highest level of anxiety during the past minute was...

+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
slightly						moderately				extremely	
anxious						anxious				anxious	
(circle one)											

APPENDIX D

## Appendix D

Table A

Bivariate Correlation Coefficients between Process  
Cope Scale Behavioral Items and Stress Scores (N=50)

<u>Process Cope Scale Behavioral Items</u>		
	Item 3	Item 6
<u>Anticipatory</u>		
Patient FT	.12	.17
Assistant FT	.27	-.01
Assistant RT	-.08	.07
Systolic BP (mm/Hg)	-.02	-.11
Diastolic BP (mm/Hg)	.02	-.01
HR (bpm)	.00	.07
Salivary pH	.01	-.05
<u>Injection</u>		
Patient FT	-.27	.08
Assistant FT	-.05	.06
Dentist FT	-.08	.10
Assistant RT	.04	.19
Dentist RT	.00	.02
HR (bpm)	-.04	-.21
<u>Posttreatment</u>		
Patient FT	-.06	.40*
Assistant FT	.15	.10
Dentist FT	.00	.22
Assistant RT	.09	.20
Dentist RT	.02	.20
Systolic BP (mm/Hg)	-.11	-.06
Diastolic BP (mm/Hg)	-.09	.06
HR (bpm)	-.19	-.02
Salivary pH	-.16	.10

Notes 1. All heart rate data based on 32 subjects.  
2. FT = Fear Thermometer; RT = Resistance Thermometer;  
BP = Blood Pressure; HR = Heart Rate.

\* $p < .01$  (two-tailed)

## Appendix D

Table B

Bivariate Correlation Coefficients Between  
Non-Stress Measures and both Trait and State Coping Variables (N=50)

	<u>Modified Coping Factors</u>					
	<u>RS</u> <u>Scale</u>	<u>Direct</u> <u>Action</u>	<u>Suppression</u>	<u>Positive</u> <u>Cognition</u>	<u>Social</u> <u>Support</u>	<u>Resignation</u>
<u>Demographic</u>						
Age	-.11	-.28	.23	.21	-.22	-.25
Sex	-.09	.10	.07	-.18	.19	.07
<u>Personality</u>						
SD Scale <sup>a</sup>	-.20	.33*	.10	.14	-.16	-.01
APQ <sup>b</sup>	.23	.32	-.05	-.06	.20	.18
<u>Posttreatment</u>						
Last Dental Visit (Mo.)	.22	.25	-.05	.07	-.07	.13
Average Dental Visits per year	-.07	.08	-.02	-.13	-.18	.19
No. of Traumatic Visits	-.11	.08	.24	.11	.03	.09
Worst Experience Rating	-.21	-.01	.08	-.18	-.03	.13
Injection Fear Rating	-.07	-.07	-.15	-.12	.02	.16
Treatment Fear Rating	.25	.31	.02	-.12	.19	.20
<u>Present Treatment</u>						
Patient Status (Repeat or New)	.04	-.04	.11	.19	.16	.03
Duration (min.)	-.05	.06	.10	.04	.38*	.01
Type (Filling or Gold)	-.10	-.01	.08	-.04	.23	-.15
Anesthetic (Dose)	.12	.13	-.04	.16	.26	.10

<sup>a</sup> SD Scale - Social Desirability Scale

<sup>b</sup> APQ - Autonomic Perception Questionnaire

\*  $p < .02$  (two-tailed)

Table C

Bivariate Correlation Coefficients Between Process  
Cope Methods and Non-Stress Variables (N=50)

	Anticipatory		Injection		Posttreatment	
	Behavioral Avoidance	Active Cognitive	Behavioral Avoidance	Active Cognitive	Behavioral Avoidance	Active Cognitive
<u>Demographic</u>						
Age	.04	.03	.07	.13	.14	.17
Sex	.22	-.07	-.12	.08	.02	-.07
<u>Personality</u>						
SD Scale <sup>a</sup>	-.25	.08	.21	.16	.19	-.07
APQ <sup>b</sup>	.21	-.34*	.19	-.05	.27	-.36*
<u>Past Treatment</u>						
Last Dental Visit (No.)	.11	-.21	.24	-.13	.26	-.23
Average Dental Visits Per Year	.05	.06	.09	.11	-.10	.14
No. of Traumatic Visits	-.01	.05	.25	-.16	.12	-.07
Worst Experience Rating	.04	-.06	.03	-.15	.12	-.05
Injection Fear Rating	-.12	.18	.02	-.04	-.13	.04
Treatment Fear Rating	.02	-.11	.13	-.14	.24	-.21
<u>Present Treatment</u>						
Patient Status (Repeat or New)	.17	-.15	-.02	.17	.10	-.03
Duration (Min.)	-.08	.02	.07	-.17	.04	-.02
Type (Filling or Gold)	-.17	.17	-.00	-.08	-.13	.10
Anesthetic (Dose)	.05	-.23	.24	.18	.04	-.02

<sup>a</sup>SD Scale = Social Desirability Scale

<sup>b</sup>APQ = Autonomic Perception Questionnaire

\*p < .02 (two-tailed)



## Appendix D

Table D

Bivariate Correlation Coefficients Between Process Cope  
Focuses and Non-Stress Variables (N=50)

	Anticipatory			Injection			Posttreatment		
	Problem	Emotion	No Focus	Problem	Emotion	No Focus	Problem	Emotion	No Focus
<b>Demographic</b>									
Age	.00	-.04	.02	.10	-.17	.09	.03	.34*	.23
Sex	-.08	-.02	.10	-.02	.12	-.08	.08	-.09	-.02
<b>Personality</b>									
SD Scale <sup>a</sup>	.09	-.24	.08	.12	-.18	.21	.16	-.17	-.04
APQ <sup>b</sup>	-.15	.29	-.04	-.18	.30	-.10	.02	.03	-.04
<b>Past Treatment</b>									
Last Dental Visit (Mo.)	-.25	.08	.20	.05	.05	-.14	-.03	.22	-.15
Average Dental Visits Per Year	-.16	.05	.12	-.17	-.02	.28	.08	-.20	.07
No. of Traumatic Visits	-.05	.19	-.07	-.01	.03	.01	.13	-.16	-.08
Worst Experience Rating	-.07	.38*	-.20	-.12	.07	.07	.18	-.16	-.07
Injection Fear Rating	.03	-.15	.08	.01	-.06	.02	.10	.02	-.12
Treatment Fear Rating	.03	.11	-.10	-.07	.16	-.12	.21	.03	-.25
<b>Present Treatment</b>									
Patient Status (Repeat or New)	.18	-.17	-.07	.27	-.16	-.15	.07	-.02	-.05
Duration (Min.)	.07	.00	-.07	.11	-.11	-.02	.07	-.14	.04
Type (Willing or Gold)	.11	-.07	-.07	-.10	-.01	.08	.04	-.21	.12
Anesthetic (Dose)	.09	-.17	.03	.41*	-.31	-.06	.22	-.24	-.05

<sup>a</sup>SD Scale = Social Desirability Scale<sup>b</sup>APQ = Autonomic Perception Questionnaire

\*p &lt; .02 (two-tailed)

# Appendix D

## Table E

Bivariate Correlation Coefficients Between Process

Cope Methods and Stress Variables (N=50)

	Anticipatory	Injection	Posttreatment
	Active	Active	Active
	Behavioral Avoidance Cognitive	Behavioral Avoidance Cognitive	Behavioral Avoidance Cognitive
	Behavioral Avoidance Cognitive	Behavioral Avoidance Cognitive	Behavioral Avoidance Cognitive
<u>Anticipatory</u>			
Patient FT	.24		
Assistant FT	-.39*		
Assistant NT	-.24		
Systolic BP (mm/Hg)	.07		
Diastolic BP (mm/Hg)	.14		
HR (bpm)	.14		
Salivary pH	-.23		
	.02		
<u>Injection</u>			
Patient FT			
Assistant FT			
Dentist FT			
Assistant NT			
Dentist NT			
HR (bpm)			
<u>Posttreatment</u>			
Patient FT			
Assistant FT			
Dentist FT			
Assistant NT			
Dentist NT			
Systolic BP (mm/Hg)			
Diastolic BP (mm/Hg)			
HR (bpm)			
Salivary pH			

Notes 1. Injection Period (n=44); Posttreatment (n=49)

2. FT = Fear Thermometer; NT = Resistance Thermometer; BP = Blood Pressure; HR = Heart Rate

\*p < .02 (two-tailed)

\*\*p < .01 (two-tailed)

# Appendix D

## Table F

Bivariate Correlation Coefficients Between Process Cope  
Focuses and Stress Variables (N=50)

	Anticipatory			Injection			Posttreatment		
	Problem	Emotion	No Focus	Problem	Emotion	No Focus	Problem	Emotion	No Focus
<u>Anticipatory</u>									
Patient FT	-.15	.40*	-.13						
Assistant FT	.06	.09	-.13						
Assistant RT	-.04	.12	-.05						
Systolic BP (mm/Hg)	-.10	.10	.03						
Diastolic BP (mm/Hg)	-.15	.05	.12						
HR (bpm)	.09	-.24	.11						
Salivary pH	-.12	.11	.05						
<u>Injection</u>									
Patient FT	-.21	.27	-.04						
Assistant FT	-.12	.26	-.11						
Dentist FT	.04	.03	-.08						
Assistant RT	-.02	.15	-.15						
Dentist RT	.03	-.11	.13						
HR (bpm)	-.01	.01	-.06						
<u>Posttreatment</u>									
Patient FT	.43*	.06	-.50*						
Assistant FT	.20	-.25	-.02						
Dentist FT	.35*	-.23	-.19						
Assistant RT	.24	-.16	-.13						
Dentist RT	.40*	-.30	-.20						
Systolic BP (mm/Hg)	-.07	-.03	.10						
Diastolic BP (mm/Hg)	.06	-.06	-.02						
HR (bpm)	-.09	.06	-.06						
Salivary pH	-.01	.19	-.14						

Note: 1. All heart rate data are based on 32 subjects

2. FT = Fear Thermometer; RT = Resistance Thermometer;

BP = Blood Pressure; HR = Heart Rate

\*p < .01 (two-tailed)