June 2005

The Development of the Dental Coping Style Scale

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The Development of the Dental Coping Style Scale

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D.D.S., The Ohio State University College of Dentistry, 2001

A Thesis
Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Science
At the
University of Connecticut
2005
Master of Science Thesis
The Development of the Dental Coping Style Scale

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University of Connecticut
2005
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Development of the Dental Coping Style Scale

Introduction

Dental Anxiety and Root Canal Treatment

The general public views dental treatment as very aversive. There is a moderate to high degree of stress attached to all kinds of dental treatment (Scott et al., 1982). This heightened anxiety can have behavioral consequences. Sohn & Ismail (2005) for example, found that high dental anxiety is positively correlated with non-regular dental visits. In a cross-sectional study of 630 dentate adults, those with a high level of dental anxiety were about one third less likely to visit the dentist regularly than those adults who indicated that they were not dentally anxious. This has major ramifications for public health. Receiving regular dental care from a dental professional can provide patients with early diagnosis of potentially dangerous conditions and prevent painful pathology from occurring (U.S. Public Health Service, 2000). Furthermore, people who seek regular dental care have better oral health (Newman et al., 1992; Tickle et al., 1999).

Within dentistry itself, endodontic therapy is an anxiety-inducing procedure (AAE, 1984; AAE, 1987; LeClaire et al., 1988). It has been estimated that over 12 percent of the United States population, or over 22 million people, has experienced toothache pain at some point in their lives (Lipton et al., 1993). Endodontic therapy, or root canal treatment, is performed on inflamed or infected teeth to alleviate pain or
to clear up bacterial contamination. An examination of Delta Dental Insurance records from 1993 to 2001 showed that of approximately 14 million clients insured by the company, 1.4 million root canals were performed on over one million people (Salehrabi et al., 2004). It has been estimated that, on average, there are 2.2 root filled teeth per person in the United States (Ericksen et al., 1991). From census data, it can therefore be extrapolated that there are over 420 million endodontically treated teeth in the United States alone (Figdor, 2002). Root canal treatment is a vital and ubiquitous dental procedure being performed today.

Root canal treatment involves anesthetizing an area of the mouth and isolating the offending tooth with a rubber dental dam. Once this is accomplished, any decay present is removed with hand instruments and drills. Following complete excavation, the pulp chamber is accessed by drilling through the surface enamel and underlying dentin. The pulp chamber and all accessible root canals are cleaned and shaped with mechanical instruments and chemical irrigants. This space is then obturated, or filled, with a biologically inert core material and a cement sealer. Depending on the diagnosis and complexity of the case, this is accomplished in either one or two appointments. Upon completion of this procedure, the tooth is temporarily restored until such time that a permanent filling or a crown can be placed.

Dental research has shown that endodontic treatment is very successful (Strindberg, 1956; Grahnen et al., 1961; Sjogren et al., 1990; Salehrabi et al., 2004), however it is also often perceived as very painful. Even established patients with experience undergoing root canal treatment can be fearful of the procedure (Wong and Lytle, 1991). Although modern advances in anesthesia and pain control have
rendered root canal treatment virtually painless and as comfortable as other dental restorative procedures, the image of endodontic treatment as uncomfortable and painful persists. In a study involving 333 people undergoing endodontic treatment, Watkins et al. (2002) found that anticipated pain was significantly and consistently higher than experienced pain. As a result of this negative image, patients have a tendency to either skip appointments made, or put off needed endodontic appointments altogether. This has consequences for both the patient and the dentist. For the patient, the pain associated with pulpal inflammation and necrosis can persist or worsen, often exacerbating the initial problem and resulting in an increased incidence of post-operative problems (Wong et al., 1992). In addition, patients who delay the start of root canal treatment, or delay the completion if the procedure, have a higher incidence of these teeth being extracted (Wong et al., 1992). For the dentist, root canal treatment is often more difficult for these patients because these teeth can now either be associated with significant swelling or are extremely difficult to anesthetize (Wong et al., 1992). Failure to achieve complete anesthesia only worsens the patient’s view of root canal treatment, which in turn worsens their distress when facing the same situation in the future. Root canal treatment, then, is one area of dentistry that would benefit if patients’ coping and adaptation could be improved.

**Coping with Acute Stressors**

Due to its acknowledged aversiveness and limited duration root canal treatment offers an ideal model of an acute stressor. The way people cope with stress has been
the focus of psychological and behavioral management research for the better part of
the 20th century and into the new millennium. Over the course of this research, many
different theories attempting to explain how humans cope with stress and manage
their anxiety have been posited. The most common definition of the process states
that coping entails “constantly changing cognitive and behavioral efforts to manage
specific external and/or internal demands that are appraised as taxing or exceeding the
resources of the person” (Lazarus and Folkman, 1984, pg 141). Many different
coping constructs have been proposed and tested over the years. While many possess
great followings, none enjoy universal acceptance.

Central to the debate on coping research is the concept of coping style. A
person’s coping style is defined as the way they generally react in particular kinds of
stressful situations (Heszen-Niejodek, 1997). The nature of coping style is consistent
with a personality trait. It suggests that a person has a tendency to engage in some
types of coping more than others. Different strategies can be employed at different
times depending on the situation at hand. These coping strategies are developed over
time according to different learning modalities, but are presumably guided by the
person’s disposition. New strategies can be added to one’s repertoire especially if
they have proven to be effective over time, and are consistent with the person’s
overall coping style. Thus, one’s coping style will determine the coping behavior
employed in the various distressing situations one encounters.

Some theorists assert that coping behavior is determined mainly by situational
determinants, and that the concept of dispositional coping style fails to predict why
the same person will react differently in various distressing situations. Proponents of
the coping style construct maintain that the concept of coping style expresses the dispositions underlying individual stability in coping behavior. Absolute stability of this behavior is not essential since the influences of situational factors and environmental demands contribute to the eventual coping strategies employed by each person (Heszen-Niejodek, 1997). Proponents of the coping style construct theorize that "people habitually apply the same, stable pattern of coping in particular kinds of stressful situations" (Heszen-Niejodek, 1997, page 343). While one’s coping style may be relatively rigid over time, the coping behaviors one applies from one distressing encounter to another may be quite flexible. This may be explained by the idea that each person does in fact possess many different coping strategies, and can employ different ones depending on the situation at hand. The concept of coping style has been introduced to describe the individual factors underlying the differences in coping behavior. Knowing a person’s coping style may help predict how, and how well, a person will behave in a given distressing situation.

**Monitoring-Blunting Coping Style**

Miller has proposed a style of coping based on seeking out or avoiding information (Miller, 1987). In this conceptualization, people in a stressful situation may cope predominantly by seeking out information and attending to as much detail in the situation as possible. That is, they may engage in monitoring. Alternatively, people may cope with stress by avoiding information and distracting themselves from the reality of the situation, or blunting. Although these two coping styles were
originally conceptualized as existing on a continuum and as being relatively independent, it is commonly understood that people primarily engage in one style or the other. That is, people tend to be either Monitors or Blunters (Miller, 1987).

During the course of her research, Miller developed an instrument to measure the degree to which people engage in monitoring or blunting in the face of an acute stressful situation – the Miller Behavior Style Scale (MBSS; Miller, 1987). The MBSS presents four hypothetical problem vignettes and asks the subject to choose from a set of solutions that vary in the degree of information or distraction provided. Separate scores are computed for both Monitoring and Blunting. The validity of this instrument was tested using two different experiments.

In the first experiment, subjects were threatened with an electric shock. Individuals wore headphones and were given the choice of whether they wanted to listen to information regarding the nature and onset of the shock or whether they would rather listen to music instead. Subjects were also told that they could switch back and forth between each channel as much as they wanted. In effect, the subjects were deciding whether they desired information or desired distraction. Following the experimental session, subjects filled out self-ratings of their level of tension during the trial, their expectation of shock, and how much they had been thinking about the shock. The channel to which each individual was listening was continuously monitored. Finally, each subject also completed the MBSS. The results indicated that those scoring high on monitoring and low on blunting preferentially listened to the information channel, while those scoring high on blunting and low on monitoring preferentially listed to the music. In other words, high monitors and low blunters
characteristically sought out information and high bluters and low monitors

distracted themselves from information in this threat situation.

In the second experiment, individuals underwent a series of cognitive tasks, and
were given the choice of whether or not they wanted information regarding how they
were performing and how much time had elapsed. Again, this choice reflected their
desire for information regarding the situation. After the testing was finished, the
subjects completed the same questionnaires as in the first experiment. As in the first
experiment, high monitors and low bluters checked their status on the test more
frequently than did those scoring as high bluters and low monitors. In effect, this
experiment confirmed the results from the first study; high monitors and low bluters
seem to preferentially seek out information in a high stress situation, and high
bluters and low monitors tend to avoid information in the same situation (Miller,
1987).

**Monitoring-Blunting Coping Style and Treatment Planning and Decision-Making**

There is evidence that patients differ in their desire for information during
medical and dental procedures. Strull et al. (1984) studied the information seeking
habits and decision-making desires of patients being treated for hypertension. 210
patients completed questionnaires asking about the information they had received
about their diagnosis and therapy, additional information they would prefer, and
about their participation in the actual decision making process. The results showed
that 41 percent of patients desired more information regarding their diagnosis while
58 percent stated that they had enough information, and just one patient desired less information. In terms of information regarding treatment, 55 percent of patients desired “quite a lot” or “very extensive” discussion about therapy, while the other 45 percent preferred either “none,” “very little,” or “a fair amount.” When the question of who should be making treatment decisions was raised, a different picture emerged. Forty-seven percent of patients did not want any participation in the actual decision-making process, while only 19 percent of patients wanted to be an equal partner in the decision-making process. Thus, although a significant percentage of patients in this study demonstrated a desire for increased information, nearly half of these patients expressed no need for any element of active participation in the situation.

While the level of participation in treatment planning and decision-making does vary from patient to patient, there is conflicting evidence that this difference is related to Monitoring-Blunting coping style. Steptoe and O’Sullivan (1986) examined the effect of monitoring and blunting coping style on desire for information in 71 women undergoing surgery. Patients completed the MBSS and a median-split was made in the to divide them into 33 monitors and 38 blunters. When these patients were asked about the level of information they received regarding their treatment, only a marginal association was made with coping style. Fifteen monitors desired more information while 16 were satisfied with the level they received. Two patients expressed no opinion. Ten blunters wanted more information, while the remaining 28 were satisfied with the information given to them. To investigate this further the patients were separated into three groups according to how much they felt they knew about the procedure to be done. Of the patients in the highest knowledge group, it
was found that only one out of 21 bluneters desired more information. This suggests that bluneters' perceived knowledge of the procedures may not be related to actual knowledge, but instead to their coping style. That is, bluneters are not seeking out any further information, and already possess all the information they desire about the situation in which they find themselves.

Schouten et al. (2004) investigated the effects of coping style on the levels of preference for information and participation in dental decision-making. The study sample consisted of regular and emergency dental patients. These patients filled out a series of questionnaires including the Threatening Medical Situations Inventory (TMSI; van Zuuren et al., 1996), the "information" subscale of the Health Opinion Survey (HOS; Krantz et al., 1980), the "information-seeking preference" and "Decision-making preference" subscales of the Autonomy Preference Index (API; Ende et al., 1989), and the Deber-Kraetschemer Problem-Solving Decision-Making scale (PSDM; Deber et al., 1996). The TMSI is a Dutch version of the MBSS, and was administered to assess patients' coping style. The HOS, API, and PSDM were used to determine the information-seeking and decision-making preferences of patients.

A total of 245 patients completed the questionnaires. The results showed that regular as well as emergency patients demonstrated a high desire for information. However, this study also showed that patients exhibited a lower preference for involvement in dental procedures. The analysis of the information-seeking and decision-making scales suggested that patients wished to be involved in decision-making tasks, but that the dentist should be responsible for problem-solving tasks.
Miller et al. (1988) investigated the role of the monitoring-blunting coping style on medical treatment in an outpatient clinic. The sample of 118 patients completed the MBSS and a questionnaire intended to measure the role patients desired to play while being treated at the physician’s office. The results indicated that desire for information was not identical to desire for control in decision-making. High monitors desired a less active role in their treatment than did low monitors. Only 48.1% of high monitors preferred that themselves and their physician jointly make their medical treatment planning decisions, whereas 71.4% of low monitors desired to play a joint role in their treatment decisions. Moreover, twice as many high monitors (36.5%) as low monitors (15.9%) desired to play a completely passive role in their treatment. These data underscore the difference between desire for instrumental control and the desire for information in the medical setting. High monitors may not be motivated by a desire for instrumental control, or active participation. That is, patients seem to make a distinction between desire for instrumental control and desire for information during a stressful medical experience. Information seeking coping style may not be predictive of desire for instrumental control.

Monitoring-Blunting and Treatment Outcome

The effect of the monitoring-blunting coping style on treatment outcome in the health care field is a field of study that has been extensively researched. Phipps & Zinn (1986) studied the effects of coping style on patients undergoing amniocentesis.
Patients were separated into two groups. The first group was the experimental group and consisted of women having amniocentesis during their pregnancies. The second group was a control group that was culled from a number of obstetric practices in the area. At the first office visit, subjects completed the MBSS, the Profile of Mood States Scales (POMS, McNair et al., 1971), the maternal attitude to pregnancy instrument (MAPI, Blau et al., 1964), and the Maternal-Fetal Attachment Scale (MFAS, Cranley, 1981a,b). The last three questionnaires were also filled out at two other occasions: immediately following amniocentesis, and one week after communication of the results. The subjects in the control group were administered the questionnaires at similar time intervals.

The results demonstrated that the MBSS showed good discriminant and convergent validity. Coping style, as measured by the MBSS, was not found to be related to either MAPI or MFAS scores. On the other hand, MBSS results were found to be correlated with the anxiety and depression subscales on the POMS. The results showed that monitors were more anxious than bluters throughout the process. While monitors showed a significant decrease in their anxiety following communication of their results, bluters showed a smaller non-significant reduction. These results suggest that differences in patients’ coping style can affect their treatment outcomes in a medical setting.

Gard et al. (1988) evaluated the effect of coping style on the frequency and severity of nausea and vomiting in patients undergoing chemotherapy. Seventy outpatient oncology patients were included in the study. Upon presentation these patients completed a Patient Chemotherapy Rating Form. This questionnaire
evaluated the incidence and severity of post-chemotherapy side-effects following their most recent chemotherapy treatment. Following treatment, patients were given the MBSS and the Post-chemotherapy Nausea and Vomiting Rating Form (PCNV, Morrow, 1984) to take home and complete 36-48 hours after treatment. The Post-chemotherapy Nausea and Vomiting Rating Form was identical to the pre-treatment form and asked the patient to record the incidence and severity of chemotherapy side-effects following this treatment. The results indicated that a significantly higher proportion of monitors experienced nausea than did the blunters. In addition, monitors also exhibited significantly longer bouts of nausea than did blunters; nine of ten patients who experienced nausea for longer than 12 hours were monitors. This was found despite the fact that a significantly greater number of monitors (87%) took anti-emetic medications than blunters (45%). Thus, monitors appeared to show an increased incidence of post-treatment distress than blunters.

Matching Information Provision to Coping Style

More important than simple observations regarding coping style and the treatment outcomes of patients is the implication that matching treatment interventions to individual coping style may improve the effect of treatment. Miller & Mangan (1983) looked into the effect of matching coping style on patients’ behavior in a gynecological setting. The study included forty patients at risk for cervical cancer undergoing a colposcopy procedure. Prior to the procedure, patients completed the MBSS, the Spielberger Trait Anxiety Scale (SSTAI; Spielberger et al.,
1969), the Repression-Sensitization Scale (Byrne, 1961), and the Multiple Affect Adjective Checklist (MAACL; Zuckerman, Lubin & Robins, 1965). Heart rate was also recorded for each patient. Following an analysis of their scores on the MBSS, half of the monitors and half of the blunters were randomly assigned to the two experimental groups. The first group was the high information group and these patients received copious amounts of information regarding the colposcopy procedure. This included both verbal and visual information, the class of their pap smears, a preview of the procedure room, and information regarding possible post-operative complications. The second group of patients comprised the low information group and these patients were given only minimum information concerning the colposcopy procedure; they were only told the class of their pap smears and that the procedure involved looking at the cervix through a microscope. Following this dissemination of information, the patients completed the mood scales and their heart rate was again recorded. These measures were also recorded following the colposcopy procedure. On the first five days following their appointment, the patients completed a series of three semantic differential self-report scales to assess mood and attention. Finally, the patients were asked before and after the colposcopy procedure if they were satisfied with the level of information they received.

The results showed that increasing the level of information increased the levels of anxiety/tension, pain/discomfort, and depression as reported by the self-report scales. In addition, patients in the high information group also reported significantly higher distress in the five days following the exam. The coping scales revealed that
there was no correlation with being a monitor or blunter, as measured on the MBSS, with repression-sensitization, trait anxiety, or education. However, monitors reported significantly higher subjective distress prior to the examination and more distress than bluters for the five days after the procedure. Bluters reported that they were satisfied with the amount of information they were provided, but monitors indicated that they desired more. Finally, during the exam, the doctors rated the monitors as having more distress than the bluters.

According to the results, all patients arrived with equal levels of arousal. However, bluters given low levels of information and monitors given high levels of information showed a decrease in their arousal. These results were indicated by a significant decrease for these patients in their initial pulse rate to their final pulse rate. The only participants to show a significant decrease in their pulse rate from the initial measurement to the pre-operative measurement were bluters given low levels of information. In addition, bluters initially rated themselves as less anxious than monitors. Bluters in the low-information group maintained this low level of anxiety throughout the exam. In contrast, bluters in the high information group showed a significant increase in their level of anxiety just prior to the exam. The results indicated that information regarding a medical procedure may exacerbate patient distress. However, when information dissemination is matched to patients' coping style, anxiety may be reduced.

Watkins et al. (1986) found similar results. Their study focused on the coping styles of patients undergoing cardiac catheterization. Patients were randomly assigned to one of three conditions. The first was a procedure information condition
in which participants received information regarding the catheterization operation.
The second was the sensation information condition. Participants in this condition received the same information as those in the first condition, but in addition, they also heard descriptions of frequently experienced sensations encountered during the procedure. The third was the control condition. Subjects in this condition received no additional information about the catheterization procedure. At the beginning of the appointment, patients completed the MBSS. In addition, all patients filled out the Spielberger State-Trait Anxiety Inventory (SSTAI; Spielberger et al., 1969) and the Multiple Affect Adjective Check List (MAACL; Zuckerman, Lubin & Robins, 1965) both before and after the information sessions and following the catheterization procedure. Heart rate and blood pressure were recorded at the same intervals and the treating physician rated each patient’s behavior during the catheterization.

The results showed that women were more likely to be blunteres, and that blunteres initially had significantly higher anxiety on both the SSTAI and the MAACL. Heart rate and blood pressure were no different between monitors and blunteres. Following the information sessions, the anxiety levels were reduced, but blunteres still showed significantly more anxiety than monitors. Moreover, monitors who received sensation information reported less anxiety and had lower heart rates and blood pressures than did monitors who only received procedure information. On the other hand, blunteres who received sensation information reported significantly higher anxiety and had higher heart rates and blood pressures than blunteres who only received procedure information. Also, when questioned about the level of information received, monitors were more likely to desire more information about the
procedure and the possible risks involved. This study indicated that blunters have more anxiety than monitors when placed in a medical setting and given information regarding that procedure. Likewise, monitors showed a greater reduction in anxiety levels when information is passed on to them.

Gattuso et al. (1992) explored the effect of monitoring-blunting coping style on self-efficacy enhancement in patients undergoing gastrointestinal endoscopy. Self-efficacy refers to one’s confidence in his or her ability to behave in such a way as to produce a desirable outcome (Bandura, 1977). According to self-efficacy theory, in a given situation, a person’s level of self-efficacy will determine what behaviors the person will choose to perform, at what intensity, and how much persistence will be shown. Thus, if strategies can be developed that increase one’s confidence in the ability to deal with a stressful situation, that person’s reported anxiety may be reduced.

The study patients were randomly assigned to one of four conditions. The first group, a self-efficacy enhancement group, was given training in relaxation techniques and given prearranged positive feedback. The second group was given the same relaxation training but without the positive feedback. The third group was shown a ten-minute video screening that explained in detail the endoscopy procedure. The fourth group was the control group, and was given neither relaxation training nor any information about the endoscopy procedure. All patients completed questionnaires that evaluated behavioral ratings of distress, physiological assessments, self-reported distress, and self-efficacy. Coping style was evaluated using the MBSS. The results showed that subjects in the self-efficacy enhancement condition (Group 1) reported
significantly less post-intervention distress than those in the procedural information group (Group 3) (Gattuso et al., 1992, page 136). It was also shown that as self-efficacy increased, affective distress decreased, indicating that increases in self-efficacy were predictive of decreases in stress during the endoscopy procedure (Gattuso et al., 1992, page 136). The frequency of gagging during the endoscopy procedure was significantly lower in monitors in the self-efficacy enhancement condition than in the control condition. In addition, the frequency of gagging in blunders was significantly lower in patients in the relaxation group and in the control group than in the procedural information group. These results indicated that blunders fare poorly when given information regarding stressful procedures. More important is the implication that behavioral management strategies are most effective when matched to patients according to their individual coping style. In this way, the MBSS may provide a way to screen patients to determine how best to manage their behavior during stressful procedures.

Monitoring-Blunting in Dentistry

The idea that coping outcomes can be better predicted when matched to coping style has been replicated in the dental field. Like root canal treatment, wisdom tooth extraction is a common dental procedure of a defined time limit with known painful or uncomfortable side effects. Therefore, it provides an excellent example of an acute stressor. A series of studies were undertaken by Litt et al. (1993, 1995) to study the effects of self-efficacy enhancement on patients undergoing third molar extraction.
The first study looked exclusively at the effects of self-efficacy enhancement with no regard to coping style. Patients in this study were divided into four groups. The first group underwent extractions with no additional support and served as the control group. The second group was administered a benzodiazepine oral sedative. The third group was taught a relaxation technique to employ during the extraction procedure. The fourth group was also taught the relaxation technique, but in addition they were given positive feedback indicating that they were excelling at the relaxation technique, thus enhancing self-efficacy for coping with the surgical procedure.

All participants completed the Dental Fear Survey (Kleinknecht, 1973) to measure their dental anxiety and an Oral Surgery Confidence Questionnaire to measure their coping self-efficacy. Following each group’s intervention training, the subjects were administered the Preparation Assessment Questionnaire to measure their understanding of the surgical procedure and the Oral Surgery Confidence Questionnaire to assess any change in their coping self-efficacy. Finally, the patients were asked to rate their level of pre-operative distress by completing a visual analogue scale. Upon completion of these forms, the surgical procedure was carried out. Behavioral ratings of distress were evaluated during the procedure by both the oral surgeon and the assistant, both of whom were bind to the study conditions. The patients rated their levels of peri-operative distress by completing the same visual analogue scale used to measure their pre-operative distress level.

The results showed that the pre-operative distress level was significantly less in the self-efficacy enhancement group than in any of the other three groups. In addition, peri-operative distress was significantly less in the self-efficacy
enhancement group than in the other three groups (Litt et al., 1993). These results indicated that self-efficacy enhancement could result in better patient acceptance of stressful dental procedures, but no measure of coping style was included.

In a subsequent study, Litt et al. (1995) explored the ability of the MBSS to determine coping styles and treatment strategies of patients undergoing third molar extractions. Their hypothesis was that intervention strategies would work best when matched to the coping style of each patient. In the study, the investigators used the MBSS to assess whether patients were monitors or bluters. Patients were assigned to one of five preparatory intervention conditions. The first four of these conditions were identical to those used in Litt et al. (1993). A fifth condition was added, involving a specific desensitization procedure to prepare the patient for insertion of the intravenous needle. This last condition was used to determine the effect of adding a specific salient imagery component to the more general procedure (Litt et al. 1995).

The results showed that behavioral ratings of distress and patient ratings of distress were significantly lower in the self-efficacy enhancement conditions than in the control group, relaxation only group, or the oral pre-medication group.

When the results were broken down by monitoring and blunting, the results yielded no main effect for monitoring behavioral style. Additionally, there was no interaction of monitoring with preparation intervention in predicting any of the outcome measures (Litt et al., 1995). However, the interaction of preparation condition with blunting scores was a significant predictor of all outcome measures (Litt et al., 1995). These results showed that patients with low blunting scores fared better with progressively more involving preparation interventions, and patients with
high blunting scores fared better with less involvement (Litt et al., 1995). While the results indicated that interventions that lowered physiological arousal and enhanced control attributions led to better outcomes, neither arousal nor control cognitions were very strong predictors of outcome. This might mean that there exists a coping threshold, above which arousal is decreased and control is enhanced (Litt et al., 1995). More interesting was the interaction of coping style with interventions. While the overall results showed significantly better outcomes for the patients in the self-efficacy enhancement groups than in the control group, patients who were blunters fared best in the control group and worst in the more involving self-efficacy enhancement groups. As in previous studies, these results suggest that intervention strategies should not be blindly administered, but ideally should be matched to the coping style of each individual patient.

Applicability of Monitoring-Blunting Coping Style in Health Care

The monitoring and blunting coping style has particular applicability in the medical and dental fields. Symptom monitoring and symptom reporting are essential aspects of medical and dental treatment and lend themselves well to either information seeking or information avoiding behavior (Gard et al., 1988; Miller, Brody & Summerton, 1988). In addition, delays in patient attendance and treatment are often related to what information patients seek out and to which they pay attention (Miller, Brody & Summerton, 1988). That is, for many patients, more information is not necessarily better; increased information regarding an upcoming dental or medical
appointment may elicit fear sufficient to persuade them skip the appointment. Also, due to the fact that informed consent is a necessary component of medical and dental treatment, the issue of information provision is a key component of the appointment and procedure (Miller & Mangan, 1983; Watkins et al., 1986). The amount of information dispensed has now become a variable, able to be modified depending on the coping style of the patient and the particular stresses of each medical or dental situation. For these reasons, monitoring and blunting coping style as measured by the MBSS has considerable applications in the dental setting.

Problems with the MBSS

Despite the conceptual and empirical appeal of the MBSS, there are problems in administering the MBSS in clinical medical and dental situations. There have been criticisms concerning the reliability and validity of the MBSS. While Miller claimed that her original instrument had good reliability and predictive and discriminant validity, others have found flaws in the scale. The reliability of the original MBSS has been challenged in the clinical setting. Rees & Bath (2004) investigated the psychometric properties of the MBSS in a study using daughters of women with breast cancer. Their results demonstrated that the monitoring subscale of the MBSS had a moderate internal reliability, and that the blunting subscale had an insufficient internal reliability. The Cronbach’s α coefficients were α = 0.65 for the monitoring subscale and α = 0.41 for the blunting subscale. In fact, the internal reliability measurements were so low for the blunting subscale, that the results from that
measurement were excluded from all further analysis. This finding was in agreement with van Zuuren & Wolfs (1991), who found that the blunting subscale of the MBSS had an internal reliability of $\alpha = 0.33$ and the monitoring subscale had an internal reliability of $\alpha = 0.66$.

While there do not seem to be any problems with the discriminant validity of the MBSS, the convergent validity has been questioned. Van Zuuren and Wolfs (1991) investigated the personal and situational aspects of monitoring and blunting coping style. They found that subjective assessment of MBSS scores by calibrated judges did not agree with the responses given by subjects completing the MBSS. Monitoring was positively correlated with wishful thinking coping, while blunting was not related to external locus of control. In addition, blunting did not correlate with any of the attributional variables on the Trait Attribution Profile (Wong & Sproule, 1984) such as ability, effort, task, luck, internal, external, stable and unstable (van Zuuren & Wolfs, 1991). Their results led the investigators to conclude that the external validity of the MBSS was inadequate at best.

The predictive validity of the instrument has also come under fire. Van Zuuren & Muris (1993) demonstrated that coping style as measured by the MBSS failed to predict coping behavior of students viewing disturbing medical slides in a laboratory setting. Van Zuuren (1994) also found that the MBSS failed to adequately associate coping style with possible information seeking or avoiding actions taken by women undergoing pre-natal diagnosis. The MBSS may not accurately measure monitoring and blunting due to the fact that it focuses on the extremes of possible behaviors and
not actions that could fit more appropriately in the middle ground of information-seeking that may be employed by low monitors or low blunters.

However, given the potential utility of the constructs of Monitoring and Blunting, a reliable and valid measure of information-seeking coping style that may be used in the dental setting could have great applicability. The Miller Behavioral Style Scale (MBSS) may not be an optimal instrument for the purpose of measuring these constructs in a dental setting, however, due to the way it was designed. The MBSS asks the respondent to consider each of four disparate scenarios: a dental visit; being held hostage by terrorists; anticipating being laid off from work; and being a passenger in an airliner that may be experiencing technical problems. Respondents are asked to vividly imagine each scenario and to check off various actions that he or she might take. The scenarios vary widely in the degree of jeopardy in which the subject is placed, ranging from annoying to life threatening, and the acuteness of the threat (from clear and imminent to rather vague and extended). The response format itself leaves little room for nuance; coping actions are either taken or not in each scenario. The result is a scale that may be broadly applicable, and sensitive for the measurement of general tendencies, but may not be the most appropriate instrument to characterize coping style in a specified acute stressful circumstance such as a dental procedure.

Cohen & Lazarus (1973) have argued that behavior is dependent not only on individual traits, but also by situational factors that are as diverse as the mind can imagine. Therefore, coping strategies that are more useful in one situation may not be as applicable in another. Stone et al. (1991) have argued that an alternative approach
to the coping style question would be to develop different classes of coping style measurement instruments specifically designed to address the situational stresses inherent to that category. Thus, researchers could make descriptive and evaluative statements regarding coping without having to worry about confounding due to diverse sample populations (Stone et al., 1991). Thus, in order to more appropriately study coping style, an instrument with sound psychometric properties and that has demonstrated clinical relevance should be selected that is carefully matched to the population being studied (Oxlad et al., 2004).

While the MBSS has demonstrated reasonable usefulness in the medical setting, the same cannot be said of its performance in dental coping research. The MBSS has certain documented psychometric problems when used in dental situations. The trend in the Litt et al. studies was for blunterst to perform slightly better than monitors, particularly when they were given instructions that allowed them to be distracted from the oral surgery stressor. Monitoring status, however, was virtually unrelated to coping outcomes. Additionally, the separate blunting and monitoring scales, which logically ought to be negatively correlated with one another, tend to be orthogonal (Gattuso, Litt & Fitzgerald, 1988; Litt et al., 1993). This may suggest that one or both of the scales are not measuring the intended construct. Additionally, the response format of the MBSS necessarily limits the variation in scores that may be obtained, and thus limits the potential for finding associations even when they exist.
Creation of the Dental Coping Style Scale

One way to determine the true importance of the construct of monitoring-blunting in acute stressful circumstance is to create a new scale that will specifically examine monitoring and blunting in the context of a defined stressor, such as a dental procedure. The Dental Coping Style Scale (DCSS) was intended to measure Monitoring and Blunting information seeking styles as conceptualized by Miller (1987), and operationalized by the (MBSS), but in a way that might result in a scale that was more psychometrically and conceptually sensible than the MBSS, and more applicable to the dental environment. The first step in this process was the choice of a Likert-type response format for items, as opposed to the forced-choice format employed in the MBSS. It was believed that when considering possible courses of action in a hypothetical situation, a scale that allowed for likelihoods might better capture intentions than would a response scale that forced a choice between acting and not acting. Thus the response format chosen was a 4-point scale ranging from "Not at all Likely" (that such an action would be taken) to "Extremely Likely."

The second step was to generate a list of potential coping actions that might be used in the event of presenting for a dental appointment. Items were generated through the use of a 90-minute focus group conducted by Litt (Litt & O’Neill, 1995; unpublished manuscript), composed of 6 dental patients presenting for endodontic treatment at the University of Connecticut School of Dental Medicine, and agreeing to participate in a discussion of coping with dental stress. Patients in the group were asked to discuss actions they or someone like them might take when faced with a
dental visit. In the course of the group discussion over 50 items were generated. Each person was then asked to independently choose the top 20 items in terms of likelihood of being used. The lists were collated and those 20 items that appeared most often in all lists made up the second pool of items. From these 20, the investigators (M. Litt and M. O’Neill) chose by consensus 14 items that best represented the monitoring and blunting constructs (seven items tapping each construct). The 14 items were then randomly assorted to create the Dental Coping Style Scale (DCSS). An initial reliability study using 30 consecutive patients presenting to the endodontic clinic at the University of Connecticut School of Dental Medicine showed that the Blunting subscale had an internal reliability of $\alpha = 0.79$, and that the Monitoring subscale had an internal reliability of $\alpha = 0.73$. This final version of the DCSS served as the preliminary version in this study.

The purpose of the present study is to field-test such a new instrument, the Dental Coping Style Scale, and to compare the predictive ability of the new instrument with other known predictors of coping outcomes in acute aversive situations. It was anticipated that DCSS monitoring would be positively correlated with MBSS monitoring, desired control, negative affectivity, and procedural self-reported and observed levels of distress. Conversely, DCSS monitoring was expected to be negatively correlated with MBSS blunting. It was also hypothesized that DCSS blunting would be positively correlated with MBSS blunting, while it would be negatively correlated with MBSS monitoring, desired control, negative affectivity, and self-reported levels of distress related to the dental procedure. It was expected that a dentistry-specific measure of monitoring-blunting would be a significant
predictor of coping with root canal treatment, and that it would prove superior to a more global measure of the construct.

Materials and Methods

Participants

The participants in the study were patients who presented to the Graduate Endodontology clinic at the University of Connecticut School of Dental Medicine for first-time root canal treatment. A total of 81 patients were approached to participate in the study. Thirty-one patients were not included. The reasons for exclusion included history of previous root canal treatment, history of sedative or tranquilizer medication, and inability to speak or read the English language. In addition, two patients began filling out the study questionnaires but refused to complete them. The final sample consisted of 50 patients. This included 16 males and 34 females. There were a total of 29 Caucasians, 8 Blacks, 12 Hispanics, and one Indian. The ages of the participants ranged from 18 to 88 years, with a mean age of 33.8 ($SD = 14.8$). Their average number of dental visits in the past year was 2.52 ($SD = 1.75$). Their average dental anxiety was 2.21 on a scale of 0 to 5 ($SD = 1.41$), suggesting that the sample was on the whole moderately anxious on presentation. Thirty-nine out of the fifty study subjects reported no other medical problems. The remaining 11 patients reported being treated for various other medical conditions, but had no contraindications to dental treatment.
Measures and Instruments

Eight instruments were used in this study:

Screening Questionnaire The screening questionnaire collected demographic data such as age, sex, and ethnicity. In addition, it also briefly measured dental and medical history, and was used to determine inclusion and exclusion criteria.

Dental Coping Style Scale (DCSS) The experimental instrument measured patients’ information-seeking style in stressful dental situations. As previously described, it contained fourteen items rated on a scale of 0-3, and anchored at one end with “Not at all” and at the other end with “Extremely,” asking the degree to which the respondent would seek out or avoid information about the upcoming dental procedure. This instrument was used to measure the degree to which the person exhibited monitoring and blunting specifically in the dental environment. The items on the DCSS are shown in Table 1.
Table 1. Items of The Dental Coping Style Scale (Litt & O’Neill, 1995).a

<table>
<thead>
<tr>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I would avoid watching the dentist so I would not get nervous.</td>
</tr>
<tr>
<td>2. I would try to see what the dentist or the assistant has written in the notes, or I would ask about what is being written.</td>
</tr>
<tr>
<td>3. I would try not the make eye contact with the dentist while he/she is working or me.</td>
</tr>
<tr>
<td>4. I would watch the dentist and/or the assistant to make sure everything was OK.</td>
</tr>
<tr>
<td>5. I would go to the office and bring a Walkman or a magazine with me and try not to think too much about it.</td>
</tr>
<tr>
<td>6. I would try to look out the window, or look at something on the wall, to distract myself.</td>
</tr>
<tr>
<td>7. I would ask about the sterilization procedures used in the office.</td>
</tr>
<tr>
<td>8. I would have the dentist give me a mirror so I can watch what is happening?</td>
</tr>
<tr>
<td>9. I would try to think about what I will do after the visit is over.</td>
</tr>
<tr>
<td>10. I would ask my dentist about my teeth before I leave the office.</td>
</tr>
<tr>
<td>11. I would find out about what the visit will be like, or what procedures will be done, before I go.</td>
</tr>
<tr>
<td>12. I would ask my dentist how my teeth are looking while he is working on them.</td>
</tr>
<tr>
<td>13. I would try to talk to the staff about things other than my dental work.</td>
</tr>
<tr>
<td>14. I would try to avoid looking at the instruments and would try to look at other things.</td>
</tr>
</tbody>
</table>

aItems in bold typeface were those retained in final version of the DCSS.

Dental Experience Survey (DES) The Dental Experience Survey is modeled after the Dental Fear Survey (Kleinknecht et al., 1984). The instrument consisted of
27 questions that assessed patients’ knowledge of the dental procedure he or she will be undergoing during an appointment, and the extent to which that knowledge makes him or her nervous. This measure has been used in previous dental studies (Litt et al., 1993, Litt et al., 1995), and has demonstrated adequate validity and reliability. In the present sample the internal reliability of the total Dental Anxiety scale was $\alpha = 0.97$.

**Miller Behavioral Style Scale (MBSS)** The Miller Behavioral Style Scale (Miller, 1987), as previously described, is a global measure of monitoring and blunting coping style. In the present sample the internal reliability of the Monitoring subscale was $\alpha = 0.78$. The Blunting subscale, however, only achieved an internal reliability of $\alpha = 0.60$, which is below the conventional acceptable level of reliability for a test (Nunnaly, 1978).

**Iowa Dental Control Index (IDCI)** The Iowa Dental Control Index (Logan et al., 1991) assessed the degree to which the respondent desires to have control in the dental environment, and the degree to which the person expects to have control. Logan et al., (1991) have shown that the IDCI is not only a good indicator of desired control in a dental setting, but that it is also a better indicator of desired control in this setting than a more global index of desired control (Logan et al., 1991, page 355). In the present sample the Desire for Control subscale had an internal reliability of $\alpha = 0.69$. The Perceived Control subscale had an internal reliability of $\alpha = 0.87$.

**Positive and Negative Affectivity Scale (PANAS)** The Positive and Negative Affectivity Scale (Watson and Clark, 1988) measured characteristic affectivity, or emotional response. It consists of twenty emotion adjectives. Subjects rate each one
on a scale of 1-5 according to the frequency with which they typically experience the proposed emotion or feeling. Past studies have found that negative affectivity is related to self-related stress and poor coping (Watson et al., 1988), and health complaints (Tessler and Mechanic, 1978; Watson and Pennebaker, 1989). In contrast, positive affectivity is related to social activity and satisfaction, and to the frequency of pleasant events (Watson, 1988). In the present sample the internal reliability of the Positive Affectivity scale was $\alpha = 0.70$, and $\alpha = 0.72$ for the Negative Affectivity scale.

**Visual Analog Measures of Situational Distress (VAS)** The Visual Analog Measures of Situational Distress is a visual analogue scale (VAS) that consists of a set of five items tapping into situational distress, with each item followed by a horizontal line 100mm long. The five items asked the respondent to rate the degree to which he or she felt tense, serene, on edge, nervous or calm. The score for each item is measured from the left edge of the line using a ruler, and the scores are summed to provide an overall distress rating. An additional question in the pretreatment version of the instrument asked the respondent to rate the quality of sleep the night before the dental visit, as an indicator of perceived intrusiveness of the root canal treatment. Another two items in the pretreatment version asked about baseline pain sensation and unpleasantness. Past experience with this type of distress measure indicates that it is internally reliable (Litt et al., 1993). In the present study the internal reliability of the pre-procedure distress ratings was $\alpha = 0.83$, and the internal reliability was $\alpha = 0.81$ for the post-procedure ratings.
**Dental Procedural Coping Rating Form** The Dental Procedural Coping Rating Form measured behavioral signs of distress during the root canal treatment, as determined by the treating clinician. The rating scale was adapted from the Patient Stress Response Index devised by Baume et al. (1995). This scale includes 7 items judging the degree to which the patient appears comfortable or distressed recorded on a 0 to 4 scale anchored at one end with "Not at all" and at the other with "Extremely." Previous studies have indicated that the 7 items show a high internal reliability and an average inter-rater reliability between surgeons and dental assistants (Litt et al. 1993; 1995). The internal reliability of the rating scale was $\alpha = 0.95$ in this study.

**Procedures**

Potential subjects were identified when they first presented to the Graduate Endodontology clinic at the University of Connecticut School of Dental Medicine to check in for their appointment. Patients were asked by the clinic receptionist whether they would be interested in participating in a behavioral study involving root canal treatment. Those who indicated that they were interested were given the screening questionnaire as part of their new patient paperwork packet. Patients were recruited for the study if they met the following inclusion criteria: (1) No history of previous root canal treatment (2) The ability to speak the English language fluently (3) No history of mental illness (4) No history of taking sedative or tranquilizer medication on a regular basis (5) No history of taking a sedative of tranquilizer on the day of the appointment. Patients with no prior history of root canal treatment were used so that
the study population was completely naive to the root canal experience. This was
done to remove any bias patients might have had from previous endodontic therapy
either positive or negative. Those who refused or did not meet the inclusion criteria
were excluded from the study and thanked for their time. Patients who agreed to
participate were asked to read and sign a consent form explaining the purposes of the
study. Upon completion of the consent form, the study subjects were asked to
complete the pre-operative study questionnaire packet: The DCSS, the MBSS, the
DES, the IDCI, the PANAS, and the Pre-operative Visual Analog Measure of
Situational Distress.

Upon completion of these questionnaires root canal therapy was initiated on
each patient. Treatment time varied from patient to patient depending on the
diagnosis, type of tooth, and complexity of the case. The same operator, a post-
graduate endodontology resident (PJ), completed all root canal treatments. After the
root canal appointment was finished, subjects completed post-operative VAS, and the
treating dentist completed the Dental Procedural Coping Rating Form. Upon
completion of all forms, and after endodontic post-operative instructions were given,
the patient was dismissed.
Data Analysis

Validation of psychological constructs and their measures is a vital component to behavioral science research. Validity of a new instrument is sometimes difficult to ascertain and often instruments and scales are constructed and used without proper validation investigations (Bergin, A.E. & Garfield, S.L., 1994, page 91), casting in doubt the conclusions drawn from studies using these measures. In order to assure that the Dental Coping Style Scale would have utility, the scale was subjected to internal reliability testing, internal validity testing, and tests of construct validity. Internal validity was tested using confirmatory factor analysis. This analysis was done to confirm that the DCSS actually measured dental coping style along two factors – monitoring and blunting. Construct validity was measured by determining convergent, discriminant, and predictive validity. Predictive validity was determined by using DCSS monitoring and blunting in predictive analyses of procedural distress. Convergent and discriminant validity were established by correlating the DCSS monitoring and blunting subscales with variable expected to be correlated and uncorrelated with these constructs. Table 2 shows the hypothesized correlations.
<table>
<thead>
<tr>
<th>Variable</th>
<th>DCSS Blunting</th>
<th>DCSS Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gender</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Number of Dental Visits in the Last Year</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Typical Pain at the Doctor</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Current Medical Conditions</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nervousness at the Doctor</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Typical Pain at the Dentist</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>DES Dental Anxiety</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Negative Affectivity</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Positive Affectivity</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Desired Control</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Expected Control</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MBSS Blunting</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>MBSS Monitoring</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>MBSS Dental Blunting</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>MBSS Dental Monitoring</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Pre-op Distress Level</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Procedural Distress Level</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Procedure Coping Rating</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>
Results

Internal Validity

**Face validity.** The DCSS was intentionally designed to tap two aspects of coping style, monitoring and blunting. Items were chosen that appeared to represent those constructs. As such, the DCSS is valid on its face; that is, it has face validity. Although having face validity is a reassuring attribute in a new test, it is the most elementary form of internal validity, and in fact is not actually validity in the technical sense. Anastasi (1988) writes that face validity “refers not to what the test actually measures, but to what it appears superficially to measure. Face validity pertains to whether the test ‘looks valid’ to the examinees who take it, the administrative personnel who decide on its use, and other technically untrained observers” (p.144). Thus, whereas the DCSS appears to measure two coherent constructs, additional analysis was required to confirm this.

**Confirmatory factor analysis.** To establish internal validity of the DCSS it was necessary to establish that the items of the scale as a whole would group into the 2 designed subscales, monitoring and blunting, using data from actual respondents. In psychometric terms it was necessary to determine if the DCSS could be represented by two latent variables, monitoring and blunting. To determine whether the monitoring and blunting constructs did in fact represent the underlying (latent) factor structure of the DCSS, a confirmatory factor analysis was conducted using structural
equation modeling. This analysis tested the expected 2-factor structure of the data against the actual data.

The top portion of Figure 1, part A, shows the initial hypotheses of the confirmatory factor model. The large ovals represent the latent or underlying variables of blunting and monitoring that presumably make up the items of the DCSS. The boxes represent the observed variables in the model, in this case the actual items of the DCSS. The small circles arrayed next to the boxes represent the error associated with the measurement of each item. The arrows pointing away from the large ovals to the boxes indicate that the content of the items themselves derives from the latent construct. (That is, an item like DCSS01, “I would avoid watching the dentist,” would be answered by a respondent according to how much he or she engaged in blunting). The double-headed arrow connecting the latent variables indicates that some correlation between monitoring and blunting constructs is expected (particularly a negative correlation).

The indices used to judge the goodness of fit of the models studies were (a) $\chi^2$ likelihood ratio statistic, (b) the Comparative Fit Index (CFI: Bentler, 1990), (c) the Parsimonious Normed Fit Index (PCFI: Mulaik et al, 1989), and (d) the Root Mean Square Error of Approximation (RMSEA: Browne & Cudeck, 1993). The CFI is a revised version of the Bentler-Bonnet (Bentler & Bonett, 1980) normed fit index that adjusts for degrees of freedom. It ranges from zero to 1.00 and provides a measure of complete covariation in the data; a value $> 0.90$ indicates a psychometrically acceptable fit to the data (Byrne, 1994, 2001). The PCFI is a variation of the CFI adjusted for parsimony by taking into account the degrees of freedom employed in
the model. The adjustment can result in PCFI values that are lower than normally considered acceptable for goodness-of-fit, and excellent models may have CFI values in the 0.90s with PCFI values in the 0.50s (Mulaik et al., 1989). The RMSEA takes into account the error of approximation, and estimates the fit of the model with the ideal population covariance matrix (Byrne, 2001). Higher values indicate greater error in the approximation of the population covariance matrix. Values less than 0.05 indicate excellent fit, and values less than 0.08 represent an adequate fit.

The initial solution indicated that the initial hypotheses shown in Part A of the figure were not borne out. The resulting model yielded a $\chi^2 (76) = 117.32, p < 0.002$, with a comparative fit index (CFI) value of 0.79, and Root Mean Square Error of Association (RMSEA) = 0.105. The model therefore differed significantly from the data.

Figure 1, Part A
Modification indices (Jöreskog, & Sörbom, 1984) were consulted to adjust the model to optimize fit with the data. The resulting model, with standardized path coefficients, is shown in Figure 1, part B. By removing two items, one from each of the modeled latent constructs, monitoring and blunting, and by allowing the correlation of the error terms of two of the items, the model became an excellent fit to the data, as indicated by the nonsignificant $\chi^2$ value, the high goodness-of-fit values, and the extremely low RMSEA. In summary, the results of the confirmatory factor analysis indicate that the DCSS, minus items 3 and 12 (“...would try not to make eye contact...,” and “…would ask how my teeth are looking while he is working on...”),
them”), consists of two coherent latent factors. The content of those factors as designed is consistent with the constructs of blunting and monitoring.

The path coefficients (from the large ovals to the boxes) are akin to correlations, and show the contribution of the latent variables to the each of the DCSS items. The values shown slightly above and to the right of each box are the $R^2$ values associated with each item, or the amount of variance of each item accounted for by the latent variable. Some of the items are better accounted for by the latent variables than are others. Almost 80% of the variance of item 14 ("...would try to avoid looking at the instruments...") is accounted for by blunting, whereas only .25% of the variance of item 8 ("...would have the dentist give me a mirror...") is accounted for by monitoring.

The two items that were not represented by the latent variables monitoring and blunting (items 8 and 13) were removed from the DCSS, and the internal reliability analyses were rerun. The resulting reliabilities of the two subscales were as follows: Monitoring $\alpha = 0.7$; Blunting $\alpha = 0.81$. These results therefore justified the modification of the DCSS, with 10 items retained. The resulting modified DCSS is shown in Table 2, with the retained items shown in bold typeface. This modified, or final, 10-item version of the DCSS was used in subsequent analyses of construct validity.
Internal Reliability

As discussed above, the preliminary version of the DCSS showed reliability coefficients of $\alpha = 0.79$ and $\alpha = 0.73$ for Blunting and Monitoring respectively. In the present sample with using the final version of the DCSS following confirmatory factor analysis, the internal reliability of the Blunting subscale was $\alpha = 0.81$, and the reliability of the Monitoring subscale was $\alpha = 0.70$. According to conventional criteria, (Nunnaly, 1978), the reliability of the Blunting subscale was considered very good, while the reliability of the Monitoring subscale was considered to be adequate.

Distribution of Subscale Scores

Frequency distributions of the modified subscales were analyzed to determine if these scales were normally distributed with acceptable ranges. The results of these frequency analyses are summarized in Table 3 and shown in Figures 2 and 3. Analysis of the data showed that the frequencies of scores on the DCSS monitoring and blunting subscales followed a normal distribution with a skewness of 0.04 for the monitoring subscale and -0.13 for the blunting subscale.
<table>
<thead>
<tr>
<th></th>
<th>DCSS Blunting</th>
<th>DCSS Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Mean</td>
<td>6.44</td>
<td>7.64</td>
</tr>
<tr>
<td>Median</td>
<td>7.00</td>
<td>7.50</td>
</tr>
<tr>
<td>Mode</td>
<td>0.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>4.39</td>
<td>3.40</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.04</td>
<td>-0.13</td>
</tr>
<tr>
<td>Standard Error of Skewness</td>
<td>0.34</td>
<td>0.34</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>14.00</td>
<td>14.00</td>
</tr>
</tbody>
</table>
Figures 2 and 3, Histograms describing the distribution of scores on the blunting and monitoring subscales of the DCSS

**Convergent and Discriminant Validity**

Pearson correlation coefficients were calculated for DCSS blunting and monitoring with the other study variables. Table 4 shows the correlations of these variables with DCSS monitoring and blunting.
Table 4  Tests of Convergent and Discriminant Validity. Correlations of DCSS Monitoring and Blunting Scores with Other Study Variables. All Tests are 2-tailed. (N=50).

<table>
<thead>
<tr>
<th>Variable</th>
<th>DCSS Blunting</th>
<th>DCSS Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.211</td>
<td>0.059</td>
</tr>
<tr>
<td>Gender</td>
<td>0.261</td>
<td>0.214</td>
</tr>
<tr>
<td>Number of Dental Visits In the Past</td>
<td>-0.274</td>
<td>-0.046</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Pain at Medical Appointment:</td>
<td>0.113</td>
<td>0.052</td>
</tr>
<tr>
<td>Current Medical Conditions</td>
<td>0.066</td>
<td>-0.220</td>
</tr>
<tr>
<td>Nervousness at the Medical Appointments</td>
<td>0.561***</td>
<td>0.054</td>
</tr>
<tr>
<td>Typical Pain at Dental Appointments</td>
<td>0.428**</td>
<td>0.475***</td>
</tr>
<tr>
<td>Dental Anxiety</td>
<td>0.735***</td>
<td>0.101</td>
</tr>
<tr>
<td>PANAS Negative Affectivity</td>
<td>0.454***</td>
<td>0.187</td>
</tr>
<tr>
<td>PANAS Positive Affectivity</td>
<td>0.245</td>
<td>0.221</td>
</tr>
<tr>
<td>IDCI Desire for Control</td>
<td>-0.354**</td>
<td>0.321*</td>
</tr>
<tr>
<td>IDCI Perceived Control</td>
<td>-0.328*</td>
<td>0.084</td>
</tr>
<tr>
<td>MBSS Blunting</td>
<td>-0.116</td>
<td>-0.231</td>
</tr>
<tr>
<td>MBSS Monitoring</td>
<td>0.021</td>
<td>0.043</td>
</tr>
<tr>
<td>MBSS Dental Blunting</td>
<td>0.301*</td>
<td>-0.054</td>
</tr>
<tr>
<td>MBSS Dental Monitoring</td>
<td>-0.089</td>
<td>0.335*</td>
</tr>
</tbody>
</table>

Note: * p < 0.05; ** p < 0.01; *** p < 0.001
The results indicated that DCSS blunting was positively correlated with Nervousness at the Doctor’s Office, Typical Pain at the Dentist, DES Dental Anxiety, PANAS Negative Affectivity, the Dental Subscale of the MBSS. DCSS blunting was found to be negatively correlated with IDC1 Desire for Control and IDC1 Perceived Control. DCSS monitoring was positively correlated with Typical Pain at the Dentist, IDC1 Desire for Control, and the Dental Subscale of the MBSS.

Predictive Validity

In addition to the preceding variables, correlation coefficients were calculated for two variables, Procedural Self-rated Distress and Behavior Coping Rating to evaluate the predictive validity of the DCSS. Table 5 shows the correlations of these variables with DCSS Blunting and Monitoring.

Table 5 Tests of Predictive Validity. Correlations of DCSS Blunting and Monitoring Scores with Outcome Variables. All Tests are 2-tailed. (N=50).

<table>
<thead>
<tr>
<th>Variable</th>
<th>DCSS Blunting</th>
<th>DCSS Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-procedural Self-rated Distress</td>
<td>0.778*</td>
<td>0.159</td>
</tr>
<tr>
<td>Procedural Self-rated Distress</td>
<td>0.201</td>
<td>0.051</td>
</tr>
<tr>
<td>Behavioral Coping Rating</td>
<td>0.465*</td>
<td>-0.234</td>
</tr>
</tbody>
</table>

Note: * p < 0.05
Contrary to the hypothesis, DCSS blunting appeared to be related to greater perioperative distress, as indicated by the highly significant positive correlation with Behavioral Coping (the endodontist’s ratings of patient behavior). However, as shown in Table 5 above, blunters were also more likely to be anxious about dentistry, and reported more distress prior to the root canal treatment. When dental anxiety was partialled out, the correlation between DCSS Blunting and Behavioral Coping dropped to -0.02. That is, virtually all the variance attributable to blunting in the behavioral coping ratings was explained by pretreatment dental anxiety. The result is that the unique contribution of blunting was unrelated to the rating made by the endodontist.

Whereas the analysis of coping ratings was not inconsistent with the hypothesis that blunters would generally cope better with the root canal treatment, it was not entirely consistent either. The analyses of self-reported distress are somewhat more interesting, however. When pre-treatment distress is partialled out of the correlation between DCSS blunting and post-treatment distress, the correlation is -0.26 (p < .05). That is, when pre-treatment distress is controlled for, those high in blunting actually had lower post-treatment distress. The relationship between blunting and self-reported distress is shown in the top panel of Figure 4. In the figure, high and low blunters are classified according to a median split on the DCSS Blunting score. Means shown for post-treatment distress are adjusted for pre-treatment distress.
As seen in the top panel of Figure 4, those high in blunting also reported higher pretreatment distress scores. However, by post-treatment, those high in blunting had mastered their distress sufficiently to report significantly lower distress by the time the RCT had ended. This was supported empirically. A repeated measures analysis of variance analyzing changes in self-reported distress from pre- to post-treatment as a function of Blunting status (see top panel, Figure 4) yielded a significant interaction of time X Blunting group, such that those high in Blunting experienced significantly
greater reduction in self-reported distress than those who scored as low blunting. These results, then, are in fact consistent with the hypothesis that high blunters will cope better with acute dental stressors than will those low in blunting.

The bottom panel of Figure 4 shows results of similar analyses when patients are classed as high or low on Monitoring. As seen in the figure, all patients regardless of monitoring status reported reduction in distress from pre- to post-root canal treatment. A repeated measures ANOVA like that performed for high v. low blunters was performed for high v. low monitors. The analysis yielded no main effect for monitoring status (high v. low), and no significant interaction between monitoring status and time. There was a significant effect for Time. That is, the reduction in self-reported distress from pre- to post was statistically significant \( F(1, 48) = 34.75; p < 0.001 \). These results were also hypothesized on the basis of past research; monitoring has frequently failed to account for outcome in stressful procedures.

Discussion

For many people the idea of dental appointments is frightening. Dentistry is an anxiety inducing proposition, and one that many people avoid due to their fear of dental procedures. Endodontic therapy, or root canal treatment, causes a great deal of anxiety within the practice of dentistry. Often, patients requiring root canal treatment are in a great deal of pain, and this pain becomes the focus of people's experience with endodontic therapy. While the purpose of root canal treatment is to alleviate this pain and clean and fill the offending tooth, the discomfort that brings people to the
dentist for root canal treatment can be difficult to disassociate from the procedure itself. This negative perception of dentistry and endodontics often leads people to avoid treatment for long periods of time, or altogether, thus leading to increased problems, exacerbation of symptoms, and undiagnosed disease. Therefore, insights into how people attempt to cope with dental treatment could lead to a better understanding of how to effectively treat these patients.

Coping style has been proposed as a dispositional construct to explain how people cope in diverse stressful situations. The concept of coping style posits that people have consistent and stable differences in their abilities and inclinations to cope with stressful situations (Miller, 1987). An individual's coping style is not rigid over time and across situations, but rather acts as a limit on what coping strategies each individual will employ in a given stressful situation.

Information-seeking is a coping style construct that has garnered much interest. It has been proposed that people differ in their desire for information during stressful situations. Some people tend to seek out as much information as possible, while others attempt to distract themselves from the situation at hand as much as possible. To this end, the Miller Behavioral Style Scale was developed and validated (Miller, 1987). The MBSS purports to identify people as information-seekers (Monitors) or information-avoiders (Blunters).

The information-seeking construct has particular applicability in the health care field. With informed consent being a necessary aspect of medical and dental treatment, some level of information must be dispensed to all patients. The content and extent of the information that should be given out is a question that has yet to be
answered. The MBSS has been used in the medical and dental fields to assess the
effect of coping style on anxiety level and treatment outcomes (Miller & Mangan,
1983; Phipps & Zinn, 1986; Watkins et al., 1986; Litt et al., 1995). The results have
been conflicting. Monitors have been shown to be more anxious (Miller & Mangan,
1983; Phipps & Zinn, 1986) in some studies, while blunters have been shown to be
more anxious in others (Watkins et al., 1986). Meanwhile, Litt et al. (1995) showed
that the monitoring subscale of the MBSS was completely unrelated to treatment
outcome during third molar extraction. Clearly, there appears to be some confusion
regarding information-seeking in the health care field.

The problem may not be with the information-seeking construct, but with the
instrument most often used to evaluate individuals. Several authors have criticized
the psychometric properties of the MBSS. Its internal reliability has been found to be
inadequate (van Zuuren & Wolfs, 1991; Rees & Bath, 2000), its convergent validity
has been challenged (van Zuuren & Wolfs, 1991), and its predictive validity has been
found to be modest to poor (van Zuuren & Muris, 1993; van Zuuren, 1994).

A different approach to the information-seeking dilemma is to design a new
instrument to measure monitoring and blunting coping style in a situation-specific
manner. To this end, the Dental Coping Style Scale was developed to be used as a
dentistry-specific instrument to measure information-seeking and information-
avoiding during dental procedures. Thus, it was hoped that through the development
and use of this instrument dentists would be better able to assess the information
desires of their patients and to treat them accordingly.
In this study, the DCSS was tested in a dental clinic on 50 patients undergoing root canal treatment for the first time. Prior to starting this treatment, these patients completed a series of questionnaires and instruments included to test the internal reliability, and the convergent, discriminant, and predictive validity of the DCSS. Confirmatory factor analysis provided evidence that the items on the two subscales of the DCSS did in fact represent the underlying factor structure of the DCSS.

**Internal Reliability**

Reassuringly, the DCSS met the first test for utility, with the modified 10-item version yielding acceptable internal reliability statistics for both the monitoring and blunting subscales. In contrast, the internal reliability of the blunting subscale of the MBSS in the present sample was only $\alpha = 0.60$. This inadequate value only lends support to past studies demonstrating the problems of the MBSS in evaluating blunting coping style (van Zuuren & Wolfs, 1991; Rees & Bath, 2000).

**Construct Validity**

**Discriminant Validity.** The purpose of determining construct validity is to determine if a new instrument is actually measuring the construct that it is intended to measure. Overall, the results indicated that the DCSS showed fairly good discriminant validity, particularly the Monitoring subscale. As expected, DCSS monitoring was not significantly correlated with Age, Gender, Number of Dental
Visits in the Past Year, Typical Pain at Medical Appointments, Nervousness at Medical Appointments, and Current Medical Conditions. DCSS blunting was not significantly correlated with Age, Gender, Number of Dental Visits, Typical Pain at Medical Appointments, or Current Medical Conditions. Theoretically, coping style should be independent of these characteristics. That is, in one can imagine that both blunter and monitors will vary in their general anxiety and dental anxiety. However, if coping style helps to shape one’s reactions to, and appraisals of, stressful situations, then we would expect coping style (particularly a defensive style) to be correlated with general and specific measures of anxiety (Aldwin, 1994; Lazarus & Folkman, 1984). This is, in fact, what happened.

**Convergent Validity.** The blunting subscale of the DCSS was correlated with Nervousness at Medical Appointments and both the blunting and monitoring subscales were significantly correlated with Typical Pain at Dental Appointments. While the latter result is somewhat surprising, there is a logical explanation for why both blunting and monitoring would be correlated with pain felt while at dental appointments. Pain is obviously an unpleasant experience, and one that can cause an increase in distress. This result could be indicating that when blunter and monitors experience pain while at the dentist, both groups of patients are actively employing their respective coping strategies more frequently.

In addition, the blunting subscale, but not the monitoring subscale, was found to be positively correlated with Dental Anxiety as measured by the DES, with nearly 50% of the variance of DCSS blunting associated with dental anxiety. This is in contrast to Phipps and Zinn (1986), where monitors presented with higher levels of
anxiety, and Miller and Mangan (1983) where there was no difference in the two 
group with respect to anxiety. While it was hoped that neither DCSS blunting nor 
monitoring would be correlated with dental anxiety, there is evidence from past 
studies that blunting coping style is associated with increased levels of anxiety. 
Watkins et al., (1986) showed that blunters undergoing cardiac catheterization 
initially presented with significantly higher levels of anxiety as measured by general 
anxiety measures. The measure of anxiety used in this study, the Dental Experience 
Survey, was a dentistry-specific instrument that taps into what knowledge patients 
have concerning dentistry and the dental procedures to be done. It is possible that by 
elucidating information regarding dental procedures, blunters completing the 
questionnaire could be presented with exactly the information they do not want, and 
may thus present with higher anxiety scores. Those high in monitoring, on the other 
hand, may use this presentation of information to lower their anxiety.

Surprisingly, DCSS monitoring and blunting were uncorrelated with MBSS 
monitoring and blunting. However, the DCSS blunting subscale was correlated with 
the dental subscale of the MBSS, suggesting that coping style may be specific to 
specific stressful situations. This fits nicely into the prediction that the MBSS is too 
global a measure to be applicable in the dental setting, but that the DCSS is still 
tapping into the same construct being measured by the MBSS.

As expected, there was a significant relationship between dental control and 
DCSS coping style. Desire for control was negatively correlated with DCSS blunting 
and positively correlated with DCSS monitoring. In addition, DCSS blunting was 
also positively correlated with perceived control. This fits the hypothesis that desire
for control in the dental setting would be correlated with dental monitoring-blunting coping style. Dental Monitors, in their desire and pursuit for information, will want and actively seek out control while engaged in a dental appointment. Dental Blunters, on the other hand, will consciously avoid this ability to control the situation.

DCSS blunting was also positively correlated with the Negative Affectivity subscale of the PANAS. Again, this correlation was not unexpected given the results from this study. “Negative Affect is a general dimension of subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states including fear and nervousness (Watson et al., 1988; page 1063).” Past studies have found that negative affectivity is related to self-rated stress and anxiety (Watson and Pennebaker, 1989). DCSS blunters in this study presented with increased levels of dental anxiety, so it is not surprising that they would also present with higher negative affectivity scores. “Positive Affect reflects the extent to which a person feels enthusiastic, active and alert (Watson et al., 1988; page 1063).” Positive affectivity has been related to social satisfaction and to the frequency of pleasing events in one’s life (Watson, 1988), while there is no evidence that it is related to anxiety or stress (Watson and Pennebaker, 1989). Our results confirm this as neither DCSS monitoring nor DCSS blunting were correlated with the positive affectivity subscale of the PANAS.

Predictive Validity. DCSS blunting was positively correlated with Pre-procedural Self-rated Distress, but was not correlated with Procedural Distress. Also, DCSS blunting was positively correlated with Behavior Coping Rating. Monitoring, on the other hand, was not correlated with any of these three measurements. When
dental anxiety was controlled for, it was found that high bluters reported a significant reduction in their distress levels, and low bluters had a smaller, non-significant reduction in their distress levels. That is, high bluters are initially presenting with higher levels of distress, but that by the end of the root canal procedure, this distress level is significantly reduced. This relationship is shown in Figure 4, in which, as stated earlier, subjects were divided into high and low bluters via median split. The results indicate that high bluters are actively employing their distracting coping strategies and that those strategies appear to be working well. Thus, the blunting subscale of the DCSS appears to be predictive of reduction in distress when controlled for dental anxiety. This is also consistent with other research indicating that distracting coping strategies are among the most efficacious means of adapting to acute, well-defined stressors such as a dental procedure, particularly if the stress is not very intense (Corah, Gale & Illig, 1979a,b; McCaul & Malott, 1984).

The monitoring subscale of the DCSS was not correlated with any of the distress or coping ratings in this study. Thus, from the data in this study, it appears that the DCSS monitoring subscale is not predictive of treatment outcome. These results resemble those from similar studies using the MBSS. Litt et al. (1995) found that the monitoring subscale from the MBSS was uncorrelated with treatment outcome measures in patients undergoing third molar extraction.

One conceptual conundrum in this research is that monitoring and blunting appeared to be orthogonally related instead of linearly related (e.g., Litt et al., 1995). The results from this study appear to bear this out. In addition, DCSS monitoring and DCSS blunting were also found to be uncorrelated. It would be expected that these
two subscales would be negatively correlated if they truly represent opposite ends of
the information-seeking spectrum. What may be occurring is that patients are
actively participating in both monitoring and blunting coping strategies
simultaneously, and this blurring of the two coping styles is reflected in the
ambiguous predictive results of the DCSS and distress ratings.

There are some limitations regarding the design of this study. First, the nature
of the study precluded the ability to perform an test-retest reliability examination
since patients were only seen one time, and follow-up is difficult to attain. Thus, it is
not known whether the pre-procedure self-ratings of coping style might be modified
by experience with root canal treatment, or if the scores would remain stable from
one administration to the next.

The condition under which patients completed the questionnaires may not have
been ideal. Patients were first identified when they presented to the front desk of the
Graduate Endodontic Clinic as a new patient. After having the nature of the study
explained to them, they completed the study questionnaire packet while sitting in the
waiting room. For many patients, simply coming to the dentist is a distressing event,
resulting in a significant increase in their anxiety level. This increased baseline level
of anxiety could have resulted in an increased incidence of self-reported anxiety, and
influenced the responses on the subjective questionnaires. A better time and place to
complete the study instruments may have been at home, several days prior to their
dental appointment by having the study questionnaires sent to each potential patient
in the mail. This could have resulted in more balanced responses due to the distance,
both geographic and temporal, from the root canal treatment. Unfortunately, carrying
out the study in this way was logistically difficult to impossible for several reasons. First, since the new patients presenting to the School of Dental Medicine often are not registered, patient addresses are often not known. Second, it was considered inappropriate care to reschedule patients without treatment upon initial presentation in order to complete study-related material. Finally, it was determined that more accurate responses would be garnered on the questionnaires if the treating dentist (PJ) were present to answer any questions regarding the individual instruments.

Along these same lines, the treating endodontic resident (PJ) had a significant impact on each patient treated during the course of this study. One of the most significant determiners of patient behavior during dental treatment is the demeanor and attitude of the treating dentist (see Litt, 1996 for a review). Thus, being treated by a calm, caring, and professional dentist could result in lowered anxiety during the course of treatment. Conversely, a nervous or impolite treating dentist may make it harder for patients to cope with the distress of a root canal treatment. In this study, there was only one operator, whose personality and demeanor could affect patients’ anxiety and distress level. This may have introduced bias into the results, but the bias introduced was systematic in that every patient was theoretically treated in the same manner by this dentist, who was blind to monitoring and blunting status. Future studies could look not only at how much information is disseminated, but also in what manner that information is given out; the effect of different dentist behavior and demeanor on treatment outcome could be investigated.
The data from this study indicates that the Dental Coping Style Scale is a reliable instrument measuring information-seeking coping style along two factors—monitoring and blunting. In addition, the scale shows good discriminant validity in that the results from the two subscales are independent of demographic data collected from the study population. Convergent validity is present also in the form of appropriate correlations with desired control in the dental setting, negative affectivity, MBSS dental information-seeking, and dental anxiety. Finally, the blunting, but not the monitoring subscale, shows good predictive validity in regards to reduction in distress when controlled for presenting anxiety.

This study represents the first step in establishing the validity of the DCSS. No attempt was made in this study to match treatment intervention with coping style. Future research should include the use of the DCSS to determine if altering the dissemination of information or providing distraction training to patients depending on their coping style will affect treatment outcomes in the dental setting. Thus, dentistry-specific studies set up to match coping style with information dissemination similar to the study designs of Miller & Mangan (1983), Watson et al. (1986), and Litt et al. (1995) should be completed using the DCSS to determine the effect of coping style on patient distress during root canal therapy and other dental procedures. The goal of, and challenge for, dentistry is not only to preserve dentition and provide excellent care for patients, but also to do so in a fashion that provides the patient with as comfortable a procedure as possible. In doing so, dentistry can produce better patient acceptance of a previously fearful profession and improved oral health for the population. It is our hope that validation of the DCSS will provide dentistry
with a reliable instrument to determine patients’ coping style, and that future research can elucidate the effect of coping style on dental distress.
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