The Effect of Social Modeling on Illness Behaviour of Children of Chronic Headache Sufferers and Children of Illness Free Parents

A Thesis

Submitted to the College of Graduate Studies and Research in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the Department of Psychology University of Saskatchewan

by
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ABSTRACT

Recent epidemiological studies have revealed that as many as 78% of chronic pain sufferers come from families in which at least one other family member has suffered from chronic pain. This finding, along with results of a number of analogue studies, suggests that social modeling processes may be potent operative factors in the development of people's perceptions and responses to pain. The present study investigated the effects of social modeling on children's pain behaviours. These effects were related to parental health status. Parent groups included chronic headache patients and individuals having no physical or psychiatric illness.

Children were exposed to an auditory stimulus task in which a tone was presented at increasing intensity levels. This was preceded by exposure to either a tolerant or an intolerant model undergoing the same procedure. It was predicted that children's responses to the stimulus would be influenced by the modeling condition to which they were exposed. It was further predicted that this effect would be mediated by the child's nonverbal receiving ability and the parent's level of pain expressiveness. The study also compared parent ratings of general family functioning across the two groups, as well as the incidence of pain related illness among their offspring.
Analyses revealed no main effect for modeling or group membership. Predicted interactions between modeling condition and children's nonverbal receiving ability, and modeling condition and parental expressiveness were also statistically non-significant. However, a significant interaction between modeling and group assignment was observed when using children's degree of nonverbal expressiveness as a dependent measure. This result is discussed in terms of children's responses to stress and pain expressions of others.

When comparing children of headache sufferers to children of illness free parents it was evident that (1) children of headache sufferers were more somatically focused than their control counterparts, (2) this heightened concern with their health status may be either a reaction to, or a means of coping with ongoing stress, and (3) this way of coping tends to be predictive of the higher frequency of headaches reported by these children.

A number of strong correlations between parents' and their children's level of emotional adjustment are reported. The implications of these findings for general family health status, and characteristic coping styles are discussed.

Finally, ratings of family environment were compared across groups. No significant differences were found. However, in the chronic headache group a
number of dimensions of family environment were found to be related to ratings of pain severity. This result is discussed in relation to previous discussions of family dynamics and the psychosomatic family.
I was fortunate enough to have on my committee the two people who have had the greatest influence on my development as a psychologist. I am grateful to my advisor, Carl von Baeyer, not only for the support, encouragement and humour which he provided, but also for the example he set as a teacher and as a human being. I also wish to express my gratitude to James Pond. In one year of supervision I learned more from him about the complexity and intricacy of psychotherapy than all of my other years combined. His clarity of thinking and his unique approach to teaching have provided me with excitement and enthusiasm for the path which is before me.

I would like to thank Drs. Amsel and Parker for serving as committee members. Special thanks is extended to Dr. Kenneth Craig, who served as the external examiner. His extensive research program served as the foundation for this thesis.

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1. INTRODUCTION

For the first half of this century the predominant conception of illness was based on the linear infectious disease model. However, in recent years the leading cause of illness in Western countries has shifted from infectious to chronic diseases (Coyne & Holroyd, 1982). This has led to a move from the purely biomedical conception of disease to a biopsychosocial model, in which the individual's psychological functioning and interaction with the physical and social environment have gained greater emphasis (Engel, 1977). An exemplary illustration of this interactionist perspective is Melzack and Wall's gate control theory of pain (1982). In their theory, the authors emphasize the importance of considering multiple influences affecting an individual's experience of, and reactions to painful stimuli. These include contributions by a sensory-discriminative system, a motivational-affective system, and central control processes. In turn, each of these systems is composed of multiple components. For example, the motivational-affective system may include a number of contextual variables such as: the presence of primary or secondary gain (Engel, 1959); the meaning of the painful event (Beecher, 1946); the presence or absence of reinforcers of pain behaviour (Fordyce, 1974); and
previous pain experiences (Melzack, 1969).

One of the roles of psychology in this perspective shift has been to study the conditions under which physical health is influenced by stress and coping. This has included an examination of the role played by stress and coping as it relates to such factors as the etiology and onset of disease, the experience of illness, the course and outcome of illness, utilization of medical care, and compliance with and response to treatment (Coyne & Holroyd, 1982).

The research on stress has demonstrated that there exists an interaction between individual and environmental variables that must be considered in attempting to gain a full understanding of the relationship between stress and coping and level of adaptation (Holroyd & Lazarus, 1982). This interactional perspective emphasizes that coping processes shape the course of the person-environment relationship. Thus the environment is not viewed as a fixed external entity which impinges on the person. Rather, much of the environment remains only as a potential influence until it is actualized based on an individual's appraisal of a given situation, and in turn, his/her coping efforts. That is, although environmental influences can act to shape the set of coping efforts mobilized by an individual during a stressful event, the form of coping used by the
individual will partially determine which environmental influences will be involved and what form they will take. Folkman and Lazarus (1980) have also argued that an individual's characteristic environment can often encourage certain coping strategies while constraining others. One example of a characteristic environment is the social and family structure surrounding the individual. The family environment may mediate the individual's appraisals, decisions, and coping efforts when confronted with a stressor. These may include efforts to change one's lifestyle, adhere to treatment regimes or interpret ambiguous bodily symptoms.

Health psychologists are beginning to emphasize the importance of examining the mechanisms of health and illness in the context of family life and interactions. Coyne and Holroyd (1982) state that "Families develop their own levels of health and illness, and these levels tend to persist over time. Thus, members of some families have consistently high incidence of diverse illness, while members of other families have a low incidence." Although an obvious explanation of this finding is genetic disposition, there are patterns of illness within families which go beyond biological make up (Cobb, Kasl, French & Norstelo, 1969; Chazan & Winkelstein, 1964). Coyne and Holroyd (1982) speculate that there may be "patterned regularities" in interactions among family members and between the
family and the community, that may have implications for the health and well-being of family members. Researchers are now considering characteristic family coping strategies and how these may affect the vulnerability of family members to certain illnesses. McCubbin (1979) demonstrated that if the unit of analyses is shifted from an individual perspective to a family perspective, characteristic family coping strategies could be identified. Furthermore, such coping strategies were found to vary across a variety of situations, and in turn predict level of perceived stress and adaptation.

1.1 Chronic Pain and the Family

Pain researchers are beginning to recognize the importance of familial factors associated with the onset, maintenance and treatment of chronic pain syndromes (Turk, Flor, & Rudy, 1987; Payne and Norfleet, 1986). This research has generally taken one of two forms: it has either focused on retrospective analysis of familial patterns of pain or it has examined the effects of chronic pain on the psychological well-being of spouses of chronic pain patients. This section will review this body of literature.
1.1.1 Familial Patterns of Pain. In an effort to examine the nature of familial patterns of chronic pain, Mohamed, Weisz, and Waring (1978) compared the incidence of pain problems among family members of depressed chronic pain patients and depressed patients having no complaints of pain. The authors demonstrated that there was a greater incidence of pain problems among spouses of chronic pain patients, family members of the chronic pain patients and family members of spouses of chronic pain patients, than among the families of depressed pain patients. Furthermore, there was greater consistency of pain location among family members of the depressed chronic pain patients than among the depressed patients. In their conclusions the authors stress the potential importance of family dynamics in the propagation of such patterns. Such dynamics may include processes like identification, imitation, modeling, or operant conditioning.

Using a similar approach Violon and Giurgea (1984) compared the family histories of a group of 40 chronic pain patients to that of a group of 50 patients with chronic but pain free disease, attending an ear, nose and throat clinic. Results revealed that in 78% of chronic pain patients at least one member of the family had suffered from chronic pain. Only 44% of the patients in the control group had such a history. This difference was found to be significant at $p < .01$. The
uniqueness of this study lies in its use of pain-free, chronic-illness controls having no psychological disturbance. The authors stress the importance of using such a control group in order to rule out the possibility that the greater incidence of pain problems among family members of chronic pain patients is due to an increase in family members' attention to their own bodily, and possibly painful sensations, as a result of exposure to chronic illness in the family.

One potential explanation for such findings may be a genetically determined vulnerability to pain. This may include either a vulnerability to develop certain forms of chronic pain or, more generally, a heightened sensitivity to nociceptive stimuli. However, as Turk, Flor, and Rudy (1987) indicate, "There is a paucity of evidence for the role of genetic variables in the development of pain problems in humans" (pg. 7). Although a number of authors have attempted to make a case for genetic transmission of certain chronic pain conditions, such as headaches (e.g. Bille and Wolff, cited in Turk et al, 1987), it has generally been accepted that no data are available to support this contention (Turk et al, 1987).

1.1.2 Effects of Pain on Family Functioning.

Several studies have demonstrated that the severity and duration of various forms of pain problems are related to general marital and family adjustment of pain
patients. In one such study Shanfield, Heiman, Cope and Jones (1979) examined the relationship between psychological distress levels of pain patients and their spouses. A sample of chronic pain patients and their spouses completed the Symptom Checklist-90 (SCL-90), a widely used measure of psychologic symptom severity. Several profile comparisons were made. These included comparisons of psychiatric outpatients versus pain patients, pain patients versus spouses, spouses versus nonpatients, and pain patients versus nonpatients. Results revealed that both pain patients and their spouses exhibited a significantly higher global severity index (GSI) score than nonpatients. There was a significant correlation between pain patient and spouse GSI scores when the pain patients' GSI score was above the mean for normative psychiatric patients. Based on this result it was concluded that the correlation between patient and spouse scores is not linear, but rather, is dependent on the patient having high symptom severity scores. This result suggests that exposure to a pain patient having high levels of symptom severity could influence the emotional adjustment of the spouse. Although the authors did not examine the effects of such exposure on the offspring of the sample, it is reasonable to assume that a similar effect may be expected.
Several other investigators have reported high levels of maladjustment in marriages of chronic pain patients. Maruta and Osborne (1978) examined the effects of pain on marital and sexual adjustment in a sample of 66 married patients referred to a pain-management center. It was discovered that almost two-thirds of the sample reported deterioration in sexual activity, including decreased frequency and quality of sexual relations. In addition, more than one-third of the sample reported deterioration in the marriage itself. In a more recent investigation Maruta, Osborne, Swanson, and Halling (1981) separately interviewed fifty married patients who were referred to a pain-management clinic and their spouses. Participants were questioned about their marital and sexual adjustment before and after the onset of pain. Ratings of overall sexual and marital adjustment before the onset of pain were essentially the same in both groups. However, after the onset of pain a significantly greater number of spouses rated their marriage below average, whereas most of the pain patients rated it as being average or above. Ratings of the quality and frequency of sexual activity by both groups reflected a consistent trend toward deterioration following the onset of pain, although there was a slight tendency for patients to minimize the changes taking place. These results suggest that
the presence of a pain problem in a family member may
have a profound effect on family adjustment without
either full recognition or admission of such
difficulties on the part of the pain patient.

In a study by Feuerstein, Sult and Houle (1985) the relationship between level of pain and general
family functioning was examined, using a sample of 33 chronic low back pain patients. It was found that
certain family characteristics, as measured by the Family Environment Scale (Moos & Moos, 1981), were
predictive of pain rating indices, as measured by the McGill Pain Questionnaire (Melzack, 1975).
Specifically, there was a positive correlation between level of family independence and the sensory dimension
on the MPQ ($r = 0.40, p < .05$). Furthermore, level of family conflict and control were both positively
correlated with the affective dimension of MPQ ratings ($r = 0.37, p < .05$, and $r = 0.39, p < .05$ respectively).
Finally, family achievement orientation and organization were positively correlated with the
evaluative dimension of the MPQ ($r = 0.37, p < .05$, and $r = 0.49, p < .01$ respectively). The results point out
that several components of family functioning are intimately related to the various dimensions of the
pain experience of chronic pain patients. Thus, higher levels of pain, as reflected by ratings on the three
dimensions of the MPQ, are associated with greater
levels of family independence, more conflict and control, and a greater tendency toward achievement and organization. These findings provided empirical support for the contention that the psychosocial environment of the pain patient has a direct bearing on his/her perceptions, ratings, and overall experience of pain.

1.2 Pain Behaviour and Social Learning Theory

The above cited studies suggest not only that the presence of chronic pain in a family member can have a profound effect on family functioning, but also that the cluster of pain behaviours can be transmitted from generation to generation in a manner that extends beyond a genetic explanation. One model which may serve to elucidate how such a transmission occurs is cognitive social learning theory.

1.2.1 Overview of Social Learning Theory. Bandura (1971) suggested that most complex human behaviours are learned through a combination of verbal transmission of information and observation of a skilled model. Such learning involves four major processes, including attention, retention, reproduction, and motivation. Bandura points out that exposure to a model does not simply result in learning. It is necessary that the learner be able to focus attention on the relevant
events in the total modeling situation, as well as to perceive those cues on which his/her attention has been focused. In addition, the learner must possess the capacity to recall what the model did. This involves the coding of the model's behaviour into some symbolic form such as words. Once such coding takes place the modeled event can be covertly rehearsed to strengthen retention of performance. In the absence of such retention the observer is unlikely to demonstrate any lasting behavioural change. However, if memories of modeled behaviours have been retained in long term memory they may function to guide future performance of the learner. The likelihood that reproductions of previously retained material will be exhibited will increase if such behaviours are accompanied by a reinforcer. Bandura suggests that such reinforcers may either operate directly on the learner's behaviours, or they may operate vicariously. Thus, what the learner observes happening to the model will affect his/her future performance when presented with similar situational cues. The remainder of this section will focus on reviewing the body of research examining the role of social learning factors in pain behaviour.

1.2.2 Experimental Demonstrations of the Effects of Social Learning on Pain Behaviour. Craig (1983) has suggested that socialization plays a primary role in developmental changes in the individual's understanding
of, and reactions to, painful experiences. In his earlier work Craig attempted to demonstrate the potency of such effects under laboratory conditions. Subjects undergoing varying intensities of electric shock were exposed to one of three modeling conditions: a confederate model instructed to appear more tolerant of the shock than the subject, a confederate model instructed to be less tolerant of the shock than the subject, or a model instructed to provide ratings of the shock which were not contingent upon the subject's ratings (Craig & Weiss, 1971). Results revealed that subjects exposed to a tolerant model reported pain thresholds at substantially higher levels than the noncontingent control group, while subjects exposed to the intolerant model had thresholds which were significantly lower than those of controls. In addition to this main effect for modeling condition, Craig and Weiss found that modeling effects appeared to be strongest at moderate levels of shock intensities. It was at these levels of shock that subjects seemed to experience the greatest degree of difficulty in judgement. This result suggests that one may expect to observe the greatest effects of modeling under conditions of ambiguous stimuli.

In the same study Craig and Weiss also requested that subjects rate the model's pain tolerance in comparison to themselves using a 15-point rating scale.
varying from "less tolerant" to "more tolerant". Subjects exposed to the tolerant model provided ratings reflecting more tolerance ($\bar{X} = 12.1$), subjects exposed to the intolerant model provided ratings reflecting less tolerance ($\bar{X} = 2.9$), and control subjects rated the model as exhibiting similar tolerance to themselves ($\bar{X} = 8.6$). This finding is consistent with Bandura's (1971) contention that the learner must attend to, and accurately perceive, the model in order for learning to take place.

In a later study by Craig and Neidermayer (1974) the above findings were fully replicated with one important addition. In this investigation the authors included measures of subjects' heart rates and skin conductance. It was found that no significant differences existed between autonomic measures of subjects receiving high levels of shock and those receiving low levels of shock. This result suggests that the subjective experience of subjects was influenced by the modeling condition and not the intensity of shock. Thus, subjects accepting higher levels of shock did not seem to be motivated by either demand conditions or a sense of competitiveness with the model. If demand conditions or competitiveness with the model were responsible for the higher tolerance, one would have expected to see a discrepancy between autonomic and behavioural responses of subjects.
in this group. The implication of this finding is that modeling serves to influence not only the learner's behaviour, but also his/her subjective experience of the stimulus conditions and consequent responses. In more recent work Craig and his colleagues have successfully replicated several of the above cited findings (Craig, 1978; Craig & Patrick, 1984; Patrick, Craig, & Prkachin, 1984).

1.2.3 Clinical Demonstrations of the Effects of Social Learning on Pain Behaviour. Several investigators have attempted to apply the principles of social learning theory in the clinical setting as a means of helping patients reduce pain associated with various medical or dental procedures. Much of this work has been done using pedodontic populations. This section will present an overview of some of these efforts.

Gordon, Terdal, and Sterling (1974) present a case study in which a combination of social learning principles and desensitization techniques were used to treat dental phobia of a child and her mother. Lisa was a young child who was subjected to frequent hospitalizations at an early age, during which she developed a phobic reaction to medical and dental settings. The authors developed a treatment program whereby Lisa was given the opportunity to observe a nonanxious model undergoing the same dental procedures.
she was to receive, expected to provide responses incompatible with fear in the clinical setting, and participated in dental procedures which systematically required more time and greater involvement.

It was observed that Lisa's mother was also quite anxious about Lisa's reactions to medical and dental procedures. It appeared that mother served the dual role of model to, and reinforcer of, Lisa's fear responses. Thus, a secondary aim of the treatment program was to attempt to eliminate such behaviour on the part of the mother. This was accomplished by having the mother sit with the psychologists while observing the treatment through an observation window. During this time the psychologists continually commented on Lisa's nonanxious and cooperative behaviour and reinforced mother for recognizing such responses.

Treatment extended over a period of 9 sessions in which Lisa began by watching her older sister being exposed to various components of the dental procedure. This was immediately followed by exposing Lisa to the same regimen. Consecutive sessions involved a gradual increase in actual contact with the dentist as well as more dental work being done. In the last four sessions the model was gradually removed and the amount of time spent in the dental chair maximized. Uncooperative behaviour and crying served as the dependent measures.
The authors report that of a total of 146 minutes spent in the examining room, Lisa cried for 3 minutes and 20 seconds. At no time did she behave in an uncooperative manner. There was a remarkable improvement in Lisa's behaviour when compared with a baseline observation period. Results persisted over a follow-up period of one year. Furthermore, over the course of treatment Lisa's mother became substantially less anxious about her daughter's dental appointments.

Although the study has several limitations, the results are quite instructive in the context of the present discussion. Even though the authors failed to include direct measures of Lisa's subjective experience of pain, her behaviour would indicate that she was at least able to reduce her level of anxiety in the face of dental procedures as a function of the treatment program used. A further weakness of the study is that the multidimensional nature of the treatment program and design devised by the authors does not allow access to knowledge of the contribution of the individual components included. However, the obtained results appear to confirm several important findings. First, the apparent impact of mother's reactions to medical and dental procedures on Lisa's responses to the same situations corroborates the importance of family dynamics in the formation of perceptions, experiences, and expressions of pain of family members.
Furthermore, it would appear that social learning strategies play at least some role in influencing responses to stressful, and potentially painful, experiences. Finally, the fact that Lisa was able to serve as an effective model for her mother suggests that social learning may be a reciprocal process.

In an attempt to assess the utility of modeling in a general dental practice, Melamed, Hawes, Heiby, and Glick (1975) exposed a sample of 16 children having no previous dental experience to one of two conditions. In a tolerant modeling condition children viewed a 13 minute videotape showing an initially fearful child experiencing a typical dental procedure with a sensitive and friendly dentist. The videotape portrayed the child as coping with his anxiety, and discovering that there was nothing to fear. In the control condition children were required to view a videotape of the same duration, showing a similar child engaging in activities unrelated to dentistry. Several physiological and behavioural measures served as the dependent variables. These included the Children's Fear Survey Schedule (CFSS) and the Palmar Sweat Index (PSI). Measures on both instruments were taken on all children before exposure to the modeling condition or performance of any dental procedures. This allowed for baseline comparisons between groups.
Results revealed that the two groups did not differ on any of the measures during the baseline period. However, following exposure to a tolerant model the experimental group had a significantly lower mean rating of disruptive and uncooperative behaviour than did the control group. In fact, the control group's frequency of disruptive behaviour increased 256% during a dental procedure beyond that of baseline, while the experimental group exhibited a 25% decrease in such behaviour. In addition, the children in the modeling condition received lower ratings of anxiety by independent raters and dentists in comparison to the children shown the control film. The authors conclude that the use of a modeling approach appears to have preventive implications for producing cooperative behaviour in children undergoing dental treatment. Furthermore, the findings serve as an empirical verification of the results reported by Gordon et al (1974).

Collectively, the findings of Craig and his associates in the laboratory, and Gordon and Melamed's groups in clinical settings, confirm the potency of exposure to models in altering all aspects of a learner's experience of pain. Based on these findings it was hypothesized that exposure of a child to a parent having a chronic pain condition increases the child's risk of developing a set of dysfunctional pain
behaviours where the parent’s responses to pain are also dysfunctional. The likelihood of occurrence of such behaviours on the part of the child will be increased when the child is exposed to stimuli which are found to trigger the parent’s episodes of pain, independent of the objective pain value of the stimulus for the child.

1.3 The Role of Nonverbal Behaviour

As stated earlier, social learning theory stipulates that the first step in any learning process involves attentiveness of the observer to the model’s behaviour. With respect to pain behaviour, Craig (1983) makes the point that observational learning within the family context plays a primary role in determining the child’s understanding of, and reactions to painful injury and disease. Children are frequently exposed to their parents’ "pain responses". It has been documented that such pain responses are in large part nonverbal in nature. Patrick, Craig, & Prkachin (1984) demonstrated that a specific set of facial actions consistently accompanied exposure to painful electrical stimulation. These included brow lowering, narrowing of the eye aperture from below, raising the upper lip, and blinking. The same set of nonverbal responses was observed when subjects were exposed to
cold pressor induced pain (Craig and Patrick, 1984). Nonverbal pain expressions also include behaviours such as moaning, grimacing, limping, gesturing, rubbing the affected part, taking medications and avoiding exertion (von Baeyer, Johnson, McMillan, 1984).

It is widely recognized that individuals vary greatly in their nonverbal reactions to pain. In the face of apparently similar degrees of physical pathology some patients tend to be highly expressive of their pain, while others maintain considerable stoicism (von Baeyer et al, 1984; Craig, 1986). It is suggested that level of expressivity may be an important mediating variable in the attentional stage of modeling. Specifically, if the observer is exposed to a highly expressive model it is expected that the modeled behaviour would more likely be attended to than if the observer were exposed to an unexpressive model.

Another variable which may potentially attenuate the attentional mechanisms involved in modeling is the observer's sensitivity to nonverbal communication. Buck (1976) refers to this as an individual's "nonverbal receiving ability", defined as "the ability to accurately decode the affective state of another person based on his or her facial expressions, gestures, and other nonverbal behaviors" (p. 162). Thus, the greater the observer's capacity to decode the model's expressions, the greater the likelihood of
attentive processes taking place during modeling episodes.

1.4 The Present Study

1.4.1 Social modeling in a clinical population.
Previous research has focused on exploring the effects of social modeling on pain behaviour under laboratory conditions. This body of research has predominantly employed "normal" adults as subjects. In contrast, the present study aimed to examine the effects of social modeling on children of two parent groups. Specifically, the effects of social modeling on children's pain behaviour was examined under laboratory conditions. In order to achieve this aim, children of two parent groups were exposed to either a tolerant or an intolerant model, preceding exposure to an auditory stimulus of ambiguous pain value.

Modeling conditions differed with regard to models' levels of nonverbal expressions and subjective pain ratings. These are two dimensions of the naturalistic modeling environment (i.e. parents' responses to pain) which could be experimentally manipulated in a systematic manner. Such a manipulation allowed for a laboratory equivalent of (1) high vs. low pain tolerance levels of parents and (2) high vs. low parental expressiveness in the child's
natural environment. Parent groups included individuals having chronic tension or migraine headaches and individuals free of any physical or psychiatric illness.

It was expected that the children exposed to an intolerant model would rate the stimulus as being more painful or uncomfortable than children exposed to a tolerant model. Furthermore, it was predicted that this effect would be amplified for children of chronic headache patients due to exposure to modeling of pain behaviour in their natural environment.

A second aim of the study was to examine the potential mediating effects of nonverbal behaviour on social modeling. Consideration of this dimension included both the nonverbal receiving ability of the observer and nonverbal expressiveness of the model. In relation to the present study, it was predicted that the effects of social modeling would be enhanced as (1) the nonverbal receiving ability of the child increased and (2) as the parent's nonverbal expressions of pain increased.

1.4.2 Effects of pain behaviour on the child and general family functioning. Research examining the effects of chronic pain on family functioning has been largely limited to an examination of the marital relationship. Few studies have attempted to explore general family functioning in families of chronic pain
patients. Thus, a further aim of the present study was to compare the nature of family functioning as rated by the two parent groups. Specifically, this component of the study had two aims: first, to compare the incidence of pain related illness and general behavioural disturbance among children of the two parent groups, and second, to compare parent ratings of family functioning across groups. In addition, the relationship between ratings of family functioning and severity of parental pain complaint was examined in the chronic pain group.

1.5 The Auditory Stimulus Task

Philips and Hunter (1982) developed a laboratory technique in order to evaluate headache sufferers' reactions to, and avoidance of, auditory stimulation. The task proceeds in two stages. At the first stage a set of earphones is placed on the subject's head. The subject is told that a series of tones will be presented through the earphones. A tone is presented at a fixed frequency, and the intensity is gradually increased by the experimenter from an inaudible level to a maximum of 100 dB. The subject is asked to indicate the levels at which the various intensities are experienced as being "comfortable", "uncomfortable", and "definitely unpleasant". The
experimenter notes at what point, on a 0-10 amplification scale (corresponding to 0-100 dB), the subject makes the above judgements. The point rated as being "definitely unpleasant" is considered to be the subject's noise level.

One drawback of Philips and Hunter's description of this procedure is that they do not indicate if points on the amplification scale used represent a constant increase in sound intensity. For purposes of the present investigation the assumption was made that intensity levels were increased at a constant rate.

During the second stage of the task the subject is required to listen to the tone at his/her "noise" level for a period of several minutes. However, the subject is informed that he/she could terminate the stimulus at any point, if it is felt that the exposure has become "too long". The duration of exposure to the tone during this stage of the procedure is the subject's "endurance" time.

Comparisons of subjective judgements of pain-free headache sufferers, headache sufferers experiencing a headache, and normal controls were made. Results revealed that the three groups calibrated the sound in distinguishable ways. Control subjects were considerably less sensitive to the tone intensities at all three judgement points than either of the other groups. Headache sufferers in pain were the most
sensitive. Group difference in sensitivity were not only reflected in variation in subjective ratings, but also in the range of intensity levels accepted by the groups. The controls had a range of 6.5 units between ratings of "comfortable" and "definitely unpleasant". In contrast headache cases with and without pain had ranges of 4.2 and 3.2, respectively. This result suggests that headache sufferers can tolerate only a small increase in sound intensity before the tone becomes aversive, particularly when experiencing pain. The calibration procedure was repeated in order to determine the reliability of the judgement points. Correlations ranged from .76 to .85, confirming the stability of the measure.

For most human beings sounds above 80 decibels are considered unpleasant, while sound in the range of 120 to 140 dB tends to be painful (Licklider, 1951). In the Philips and Hunter investigation controls had a mean "unpleasant" rating of 81.7 dB (based on a conversion of their original units using the above assumption). This was in contrast to "unpleasant" ratings of 52.25 db and 37.05 db for pain free headache sufferers and head sufferers in pain respectively. Based on the results of this work the conclusion can be made that the auditory stimulus task serves as an experimental pain analogue for chronic headache sufferers, but not necessarily for normal controls.
With respect to endurance time it was found that headache sufferers in pain terminated the stimulus significantly sooner than controls, but did not differ from headache cases when pain free. Although pain free headache sufferers terminated the stimulus sooner than controls this difference failed to reach statistical significance.

As indicated above control subjects seem to experience the tones as being unpleasant at intensities at, or near, the extreme of the calibration scale. In contrast, headache prone subjects rate the tones as being unpleasant at the mid point of the calibration scale. In addition, the range of tones accepted by both groups appears to be clearly different. This clear differentiation between groups makes the auditory stimulus procedure an ideal task for assessing the effects of social modeling. An especially attractive feature of this task is that it allows for use of a stimulus which has no potential for causing tissue damage. This is a particularly important consideration when employing children as subjects.

1.6 Independent and Dependent Variables

In the first phase of the experiment a 2 X 2 factorial design was used. Independent variables were: (1) parental group assignment (chronic headache
sufferers and illness free parents)

(2) social modeling condition (tolerant vs. intolerant modeling)

Additional predictor variables included:

(3) child's nonverbal receiving ability (derived from the Personality Inventory for Children)

(4) parent's pain expressiveness (rated on an 11-point Likert scale based on covertly taped facial expressions during their exposure to the auditory stimulus task)

Dependent variables were:

(1) calibration points on the auditory stimulus task.

(2) range of tones accepted during the calibration procedure.

(3) endurance time during exposure to "noise" level.

(4) children's nonverbal expressions in response to the auditory stimulus task (rated on an 11-point Likert scale).

(5) children's pain ratings as measured by a headache rating form, a 5 point Likert Scale. This measure was used for the purposes of post-hoc analyses.

In the second phase of the experiment a one-way quasi-experimental design, with two levels of group assignment, was used. The independent variable was parental group assignment, with the same levels as above.
Dependent variables were:

1. parent ratings of family environment.
2. parental ratings of pain severity, using the West-Haven Yale Multidimensional Pain Inventory (pain group only).
3. parental ratings of child's general and health-related behaviour, as measured by several subscales of the PIC.
4. parental psychological symptom reporting as measured by the SCL-90.

1.7 Hypotheses

1.7.1 Hypothesis 1. It was hypothesized that there would be significant main effects for modeling condition and parental group assignment on dependent variables specified in the first part of the design. Specifically, when compared to children in the tolerant modeling condition, children exposed to an intolerant model should: (1) have lower calibration levels for the "uncomfortable" and "definitely unpleasant" ratings, (2) accept a narrower range of tones (3) endure tones at their noise level for shorter durations, and (4) exhibit more nonverbal expressions of discomfort. It was predicted that this same pattern of results would be exhibited by children of chronic pain patients when compared with children of illness-free parents.
1.7.2 Hypothesis 2. It was expected that significant two way interactions would be observed between (1) the child's nonverbal receiving ability and modeling condition and (2) between parental expressiveness and modeling condition. Thus, in the intolerant modeling condition the pattern of means on all dependent variables was expected to be the same as above for children having high receiving ability when compared with children having low receiving ability. Likewise, when compared with children having parents exhibiting low nonverbal expressiveness, children having highly expressive parents should (1) have lower calibration levels for tones, (2) accept a narrower range of tones, (3) endure tones at their noise level for shorter durations, and (4) exhibit more nonverbal expressions of discomfort.

1.7.3 Hypothesis 3. Based on the findings of Mohamed, Weisz, and Waring (1978), and later Violon and Giurgea (1984), it was hypothesized that there would be a greater incidence of pain related illness, such as headaches and abdominal pain, among children having a parent with chronic headaches, than among children of illness free parents.

1.7.4 Hypothesis 4. In accordance with the findings of Shanfield, Heiman, Cope and Jones (1979) it was expected that there would be a greater incidence of general behavioural disturbance among children of
chronic headache sufferers than among the children of illness-free parents. Furthermore, it was expected that there would be a positive correlation between parent's symptom severity and incidence of general behavioural disturbance of the child.

1.7.5 Hypothesis 5. Following from the findings of Feuerstein, Sult, and Houle (1985) it was expected that ratings of positive family functioning by parents would correlate negatively with pain rating indices of chronic headache sufferers. In addition, it was hypothesized that ratings of family environment will reflect more dysfunction among families of chronic headache sufferers when compared with families having healthy parents.
2. METHOD

2.1 Subjects

The study included two subject groups. Control subjects were recruited from a local general optometry practice. Chronic headache sufferers were obtained through the Chronic Pain Management Service of University Hospital. Details of the manner in which both subject groups were recruited are outlined below in the Procedure section.

Forty-nine families were contacted from the list of potential control subjects. Of these 19 were unwilling or unable to participate, resulting in a 61.2% compliance rate. A total of 38 chronic pain sufferers were contacted. Of these 14 declined, resulting in a 63.2% compliance rate. In no case did an individual refuse to participate due to the nature of the study. Generally, refusal to participate was due to either other commitments, distances involved in traveling to the hospital, or scheduling difficulties. Thus, it can be assumed that the subject groups were fairly representative of the populations from which they were drawn.

Fifty four parent-child pairs formed the subject population. Each pair was categorized into one of two groups: a group in which the parent had suffered from
either migraine or tension headaches for at least 6 months preceding participation in the study and a group in which the parent had been free of any physical or psychiatric illness during the same period. Children of both sexes were included, with the only restriction being that they were between the ages of 9 and 17 years old. This was to ensure that they were old enough to understand all instructions used as part of the procedure, yet young enough to be still living at home.

2.2 Materials

2.2.1 Auditory Stimulus. The stimulus tone was generated through a MAICO-MA39 audiometer. A frequency of 8000 Hz was used, with tone intensities being delivered in increments of 5 dB. A maximum of 100 dB was imposed to insure no structural damage was incurred. Subjects listened to the tone through a pair of headphones designed to minimize any external sounds.

2.2.2 Rationale and consent form. A brief statement outlining the rationale of the study was provided for all subjects. This statement introduced the study as examining the effects of illness on general family functioning (Appendix A). A consent form describing the nature of subjects' involvement was presented. This form also requested permission to make
recordings and observations (Appendix B). Both forms emphasized that participation in the study was entirely voluntary, and that subjects had the right to withdraw from the study at any point.

2.2.3 Child Health Checklist. Both parent and child were asked to complete a checklist aimed at assessing the child's general health status. The checklist required an indication of occurrence and frequency of several illnesses prevalent during childhood (Appendix C).

2.2.4 The West Haven-Yale Multidimensional Pain Inventory (WHYMPI). This is a 52-item pain assessment inventory developed by Kerns, Turk, and Rudy (1985). The inventory is made up of 12 scales, divided into three parts examining the impact of pain on patients' lives, the responses of others to patients' communications of pain, and the extent to which patients participate in common daily activities. Reliability estimates for the 12 scales, as measured by Cronbach's alpha, ranged from .70 to .90. Pearson product-moment correlations between scores obtained 2 weeks apart ranged from .62 to .92, indicating acceptable stability levels over time. Validity of the scales was assessed by correlating scores on the WHYMPI scales with nine scales from well-known, established questionnaires. These included the Present Pain
Intensity and total Pain Rating Scale of the McGill Pain Questionnaire, the Beck Depression Inventory, the Depression Adjective Check List, the State-Trait Anxiety Inventory, the Multidimensional Health Locus of Control Scale, and the Marital Adjustment Scale. The resulting correlation matrix was factor analyzed. Thus construct validity was established by means of factorial validity. In sum this procedure supported the internal and external construct validity of the 12 WHYMPI scales.

The instrument was administered to the chronic headache sufferers in order to obtain an indication of level of dysfunction, pain attitudes, and severity of pain complaint (Appendix D).

2.2.5 Family Environment Scale (Form R). This is a 90-item self-report instrument measuring the social-environmental characteristics of families. Form R is intended to measure people's perceptions of their nuclear family environment. All parents were asked to complete the questionnaire (Appendix E).

The questionnaire, developed by Moos & Moos (1981), is composed of 10 subscales assessing three underlying dimension: the Relationship dimension, the Personal Growth dimension, and the System Maintenance dimension. Relationship dimensions are measured by the Cohesion, Expressiveness, and Conflict subscales. The Personal Growth dimension is measured by the

Reliability estimates, as measured by Cronbach's alpha, ranged from .61 for Independence, to .78 for cohesion and Active-Recreational Orientation. Test-retest reliability over a 2 month period ranged from .68 for Independence, to .86 for Cohesion.

2.2.6 Personality Inventory for Children-Revised (PIC). The short form of the PIC consists of responses to 280 items, answered "True" or "False" by the parent of each child (Appendix F). The inventory provides scores on four factor scales, a Lie scale, a Development scale, and shortened versions of 14 clinical profile scales. Raw scores are converted to T-scores, which are interpreted in a similar manner to MMPI profiles. The instrument was first developed by Wirt, Lachar, Klinedinst, and Seat (1977).

The authors report three forms of reliability for the instrument. The first addresses test-retest stability. In a study which examined responses of 34 mothers tested over an intertest interval ranging from 4 to 72 days, with an average interval of 15.2 days, an average reliability coefficient of .86 was obtained (Wirt, Lachar, Klinedinst, & Seat, 1984). These
results were replicated in two other studies.

The second form of reliability reported is coefficient alpha estimates of internal consistency. These were computed based on a heterogenous clinical sample of 1,226 profiles. Estimates for the clinical scales ranged from .57 for Intellectual Screening to .86 for Depression, with a mean alpha of .74.

The third form of reliability reported is that of interrater reliability when mothers and fathers are asked to independently complete the questionnaire. The authors cite a study by Roskos (1974 in Wirt et al, 1984, p. 107) in which two samples of profiles were examined. In the first a normal sample of 146 sets of PIC ratings by mothers and fathers of children ages 5 to 15 were compared. In the second, a clinic sample of 84 intact families of children ages 6 to 15 years of age was obtained. Results revealed an average correlation of .69 for the clinic sample and .57 for the normal sample. Closer examination of these results revealed that the relative restriction of range of scores, particularly in the normal group, may have limited the magnitude of these correlations. Thus, scores were also examined by classifying each parent pair using T-score differences for each of the scales. Results of this analysis revealed that T-score differences of less than 5 points occurred in 36.5% of the clinic sample and 48.1% of the normal sample.
Score differences of less than 10 T-score points occurred in 63.7% of the clinic sample and 77.4% of the normal sample. The authors conclude that generally, interparent agreement is good. However, fathers tend to engage in slight under reporting of problem behaviour, and thus father-completed profiles may be somewhat of a conservative estimate of a child's level of adjustment.

2.2.7 Symptom Checklist-90 (SCL-90). This is a measure composed of a list of 90 different symptoms. Using a 5-point Likert scale, subjects are asked to indicate the degree to which they have been bothered by each of the symptoms in the last 6 months. The scale provides scores on 9 factors including somatization, obsessive-compulsiveness, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. A grand total, or GSI score, can also be calculated. The scale was developed by Derogatis (1977; Appendix G).

The author reports internal consistency measures (coefficient alphas) ranging from a low of .77 for the Psychoticism scale to a high of .90 for the Depression scale. Test-retest reliability over a 1 week period ranged from .78 to .90.

2.2.8 Sensitivity to Nonverbal Communication Scale. Factor 1 scores (Undisciplined/Poor Self Control) from the Personality Inventory for Children
were used as measures of children's nonverbal receiving ability. Russell, Stokes, and Snyder (1987) demonstrated that these scores correlated highly with a number of other measures of sensitivity to nonverbal communication. These included the Face and Body Profile of Nonverbal Sensitivity (PONS), and the Expression Grouping (EG) and Cartoon Predictions (CP) subsets of the Four-Factor Test of Social Intelligence (O'Sullivan & Guilford, 1976).

The PONS is a 40-item test in which the subject watches a series of 2 s naturalistic video presentations depicting a scene enacted by a young woman. In each scene the woman expresses either positive or negative affect in a dominant or submissive role. The subject is required to choose one of two descriptions which best fits with each segment (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979).

The Expression Grouping is a 30-item multiple choice test in which sets of three stimulus drawings conveying a common intention are presented to the child. The child's task is to choose one of four line drawings depicting facial expressions, hand gestures, or body posture that best match the stimulus drawings. This measure is intended to assess the child's ability to abstract common attributes from similar expressive behaviours. The Cartoon Predictions is also a 30-item multiple choice test in which the child is presented
with a stimulus drawing depicting an emotional interpersonal situation. The child's task is to choose the best of three line drawings presenting possible resolutions to the stimulus situation. The measure provides a prediction of the child's ability to identify the social consequences of emotionally laden interactions.

Factor 1 scores of the PIC achieved bivariate correlations of -.55, -.34, and -.33 with the EG, CP, and PONS, respectively. Furthermore, Factor 1 score correctly identified 76% of children falling below the mean on the three measures of sensitivity to nonverbal communication, and only misclassified 21% of subjects not meeting this criteria. The authors conclude that these results support the ability of PIC factor scores to predict children's sensitivity to nonverbal communication.

2.2.9 The Quick Test. This is a general measure of intelligence developed by Ammons and Ammons (1962). The test is composed of three cards, each having an associated word list. Four pictures depicting various items and situations are presented on each card. Prior to exposing the cards to the subject the following instructions are read: "This is a kind of picture game. I am going to show you some pictures and read some words. You point to the best pictures for the words. Some of the words will be very easy and some of the
words will be hard. You won't know all the words. If I read a word that you don't know, just tell me that you don't know, and I will go on to another word".

Scoring is achieved by totalling the number of correct responses and determining the appropriate Mental Age from a table of Norms (Appendix N).

2.2.10 WISC-R Subscales. Two subscales of the WISC-R were administered to each of the children. These included the similarities and the comprehension subscales (Appendix O). The similarities subscale is composed of a series of 17 word pairs. The child is asked to indicate the manner in which each of the words in a given pair are alike. The items are presented in order of increasing difficulty.

The comprehension subscale is made up of 17 questions, each reflecting increasingly complex levels of knowledge. Each item is given a score of 2, 1 or 0, depending on the level of sophistication exhibited.

2.2.11 Headache Rating Form. Both parents and children were asked to provide a headache rating immediately before and after exposure to the Auditory Stimulus Task. Ratings were made on a five point Likert Scale ranging from 0 (no headache at all) to 4 (a very severe headache), (Appendix L).
2.3 Procedure

2.3.1 Overview:

1. Subject screening (parent)
2. Subject contact by phone (parent)
3. Rationale and Consent form (parent and child)
4. Health Screening form (parent and child)
5. Child Health Checklist (parent and child)

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<tr>
<th>Parent</th>
<th>Child</th>
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<td>6. PIC</td>
<td>6. Exposure to modeling tape</td>
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<td>7. FES</td>
<td>7. Pain Rating Scale</td>
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<td>8. SCL-90</td>
<td>8. Auditory stimulus task</td>
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<td>10. Auditory Stimulus Task</td>
<td>10. QT &amp; WISC-R subscales</td>
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<td>11. Pain Rating Scale</td>
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<td>12. Debriefing interview (parent and child)</td>
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2.3.2 Subject screening. In order to obtain a sample of chronic headache patients, files of the Pain Management Service at University Hospital were reviewed. Names of individuals who had been referred to the Pain Management Service for headaches were selected. These individuals were contacted by mail and given a brief description of the study (see Appendix H). The study was described as investigating the effects of various health conditions on general family functioning. Each individual was asked if he/she would
be willing to participate in the study. In addition, these potential subjects were provided with a small questionnaire package. This included the WHYMPI and a brief questionnaire asking for basic demographic information, whether they still experience headaches, and if they were currently undergoing treatment. Instructions for mailing back the questionnaires were given. Individuals meeting selection criteria, and indicating that they were willing to participate in the study were contacted by phone and invited to serve as subjects.

Subjects for the illness-free control group were obtained through a general optometry practice in the city. The files from this practice were reviewed such that the names, addresses and phone numbers of all families with illness-free parents and children in the appropriate age range were extracted. Letters describing the nature of the study (see Appendix I) and reply cards were sent out to the families by the clinic staff. The letters described the study as examining the relationship between various health conditions and general family functioning. Families were instructed to mail back the reply cards within 1 week's time if they did not wish to participate in the study. If the reply card was not mailed back the family's name and phone number was released by the clinic staff to the researchers. The family was then contacted by phone
and arrangements for further participation were made.

2.3.3 Phone contact. Each of the selected parents was contacted by phone. The aim of the study and an overview of the procedure was read to each individual. Each person was queried regarding willingness to participate. If an affirmative response was given, an appointment time was established. If no interest was expressed in participating, the individual was asked if he/she required any clarification on any part of the procedure. If no questions were asked thanks were extended and the conversation terminated.

2.3.4 Rationale, Consent, and Questionnaires. Parent-child pairs underwent individual testing sessions. Upon arrival at the laboratory all subjects were escorted to an interview room. Subjects were seated and a rationale of the study was read. Following presentation of the rationale subjects were given an opportunity to ask any questions they had. Once all questions were answered, subjects were asked to complete and sign an Informed Consent Agreement form (see Appendix B). If a subject had any questions which were judged to have potential for influencing their performance on any part of the procedure they were told that these would be answered at the end of their participation.

Following signing of the consent agreement the parent and child were asked to respond to a general
Health Screening Form and the Child Health Checklist (see Appendix J). Once this information was obtained the child was escorted to an adjoining room where he or she was exposed to a modeling condition and given the auditory stimulus task. During this time the parent was left in the interview room and asked to complete the PIC, The Family Environment Scale, and the SCL-90.

2.3.5 Modeling condition and Auditory Stimulus Trials. The child was subjected to one of two modeling conditions before exposure to the auditory stimulus trial. Half of the subjects in each group were randomly assigned to a tolerant modeling condition, while the other half were assigned to an intolerant modeling condition. In each condition the child was told that: "In a moment I'm going to ask you to listen to some tones or beeps through a pair of headphones. At first the beeps will be so quiet that you might not be able to hear them, but gradually they will get louder and louder. Once we begin I would like you to raise 1 finger when you can first hear the beeps. Then as the beeps continue to get louder, I would like you to raise 2 fingers as soon as you begin to find that the beeps have become uncomfortable. Finally, I want you to raise 3 fingers as soon as you find that the beeps have become 'definitely unpleasant'.

Before I have you put on the headphones I am going to show you a videotape of a person listening to the
tones. This will help you to know what the equipment looks like and what you have to do". At this point the child viewed a videotape of either a tolerant or an intolerant model, hooked up to the auditory stimulus task apparatus. The intolerant model was shown making the "comfortable" rating following the first intensity level, the "uncomfortable" rating following the second and third intensity levels, and the "definitely unpleasant" rating following the fourth and fifth intensity levels. The tolerant model was shown making the same ratings following the second, third, and fifth intensity levels, respectively. These rating points are based on the mean ratings of control subjects and pain free headache sufferers in the Philips and Hunter study (1982), with the limitation that the exposure time was made equal for both groups.

The modeling conditions also differed with regard to the degree of nonverbal expressiveness of each model. The intolerant model was shown expressing increasing levels of discomfort during the "uncomfortable" and "definitely unpleasant" ratings. This was expressed through greater upper body and head movements and facial grimacing. The tolerant model maintained a neutral expression during the first two ratings and exhibited moderate discomfort during the "definitely unpleasant" rating.
Two forms of each tape were made such that there were female and male adult models in each condition. The child was shown a model of the same sex as the parent participating in the study. Time was taken to respond to any questions the child may have had at this point.

Just prior to placing the headphones on the child he/she was asked to provide a rating on the Pain Rating Form (see Appendix K). Another such rating was requested following the tolerance exposure.

During the second part of the procedure the child was given the following instructions: "This time we are going to do something a little bit different from the first time. I am going to ask you to listen to only one tone for a few minutes. Some people find that this is too long. When you feel this way, feel free to say STOP and I will stop the tones right away. In accordance with the procedure outlined by Philips and Hunter (1982) a maximum intensity of 100 dB was used, with no more than 3 minutes of exposure time.

Once the child completed this portion of the procedure he/she was escorted to a third interview room in order to complete the Quick Test and the Comprehension and Similarities subscales of the WISC-R. The child was then seated in a waiting room until the parent was finished.

Following completion of all questionnaires each
parent was exposed to the auditory stimulus task and given the same instructions as above, except that no modeling videotape was shown. Both parents and children were covertly videotaped while undergoing the auditory stimulus task. The video camera was positioned so as to record the head and shoulder area of each subject.

2.3.6 Debriefing. Following exposure of the parent to the auditory stimulus trial parent and child were taken back to the initial interview room. At this point a fuller explanation of the study was provided. Additionally, parents were asked for their permission to use the video-taped material. If permission was granted the parent was asked to sign a Video Tape consent form (Appendix L). No individual refused use of the videotape material. Subjects were then asked to give an indication of their impressions of the study and an opportunity to ask questions was provided.
3. RESULTS

Data analyses are presented in the following order: data assessing the initial equivalence of groups, preliminary analyses, tests of the hypotheses, and post-hoc analyses. Tests of the hypotheses were based on 1-tailed tests of significance, while initial equivalence data, preliminary analyses and post-hoc analyses were based on 2-tailed tests of significance. Due to the exploratory nature of the quasi-experimental component of the study no correction for experiment-wise error rate was included in order to identify potential directions for future research.

3.1 Initial Equivalence Data

Before the formal tests of the hypotheses could be carried out it was essential to assess the initial comparability of the two parent groups and the two offspring groups on a number of variables.

Initial equivalence of the two parent groups was assessed using the following variables: age; sex; marital status; number of previous marriages; employment status of the primary wage earner in the family; highest level of education attained by the primary wage earner; number of children in the family; level of nonverbal expressiveness; and auditory
stimulus task threshold. No significant differences were found between the two groups on any of these variables with the exception of number of previous marriages (Table 3.1). Chronic headache patients had significantly more previous marriages ($M = .43, SD = .51$) than control subjects ($M = .07, SD = .25$), $t(49) = 3.36, p < .002$. This finding is consistent with reports in the literature pointing to the high degree of marital discord reported by chronic pain patients and their spouses (e.g. Maruta and Osborne, 1978).

Initial equivalence of the two offspring groups was assessed using the following variables: age; sex; birth order; auditory stimulus task threshold; Quick Test IQ; WISC-R comprehension and similarities scores, Child Health Checklist; and nonverbal sensitivity (Table 3.2). A significant age difference was found, with children of pain patients having a mean age of 13.67 years ($SD = 2.71$), while children of controls had a mean age of 12.23 years ($SD = 1.75$), $t(49) = 2.30, p < .026$. Although this is a chance result that should have no effects on subsequent analyses, this assumption required checking using a test which is reported in the next section. No other significant differences were found on the remaining initial equivalence variables.
Table 3.1

Descriptive Statistics and Summaries of Initial Equivalence t-tests (parent variables)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chronic Pain</th>
<th>Control</th>
<th>t</th>
<th>2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N = 24)</td>
<td>(N = 30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>age</td>
<td>40.89</td>
<td>7.46</td>
<td>38.48</td>
<td>5.56</td>
</tr>
<tr>
<td>sex a</td>
<td>1.79</td>
<td>0.42</td>
<td>1.73</td>
<td>0.45</td>
</tr>
<tr>
<td>current b</td>
<td>1.19</td>
<td>0.40</td>
<td>1.07</td>
<td>0.25</td>
</tr>
<tr>
<td>marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>number of previous marriages</td>
<td>0.43</td>
<td>0.51</td>
<td>0.07</td>
<td>0.25</td>
</tr>
<tr>
<td>work c</td>
<td>2.30</td>
<td>1.53</td>
<td>1.90</td>
<td>1.17</td>
</tr>
<tr>
<td>education d</td>
<td>3.40</td>
<td>1.05</td>
<td>4.03</td>
<td>1.19</td>
</tr>
<tr>
<td>number of children</td>
<td>2.52</td>
<td>1.08</td>
<td>2.70</td>
<td>1.26</td>
</tr>
<tr>
<td>nonverbal threshold</td>
<td>2.64</td>
<td>2.59</td>
<td>1.64</td>
<td>1.84</td>
</tr>
<tr>
<td>threshold</td>
<td>23.75</td>
<td>12.87</td>
<td>22.33</td>
<td>13.50</td>
</tr>
</tbody>
</table>

a 1=male, 2=female  b 1=married, 2=divorced

c 1=professional or technical worker, 2=manager, administrator, clerical worker, or sales worker 3=craftsman or foreman 4=operatives, service workers, farmers, or farm manager 5=labourer, farm labourer, or farm foreman 6=not in the labour force
d 1=8 years or less, 2=9 to 11 years, 3=12 years (high school graduate), 4=13-15 years, 5=16 years or more (college or university graduate)
Table 3.2
Descriptive Statistics and Summaries of Initial Equivalence t-tests (child variables).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th></th>
<th></th>
<th>t</th>
<th>2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chronic Pain (N = 24)</td>
<td>Control (N = 30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
<td></td>
</tr>
<tr>
<td>age</td>
<td>13.67</td>
<td>2.71</td>
<td>12.23</td>
<td>1.75</td>
<td>2.30</td>
</tr>
<tr>
<td>sex</td>
<td>1.54</td>
<td>0.51</td>
<td>1.60</td>
<td>0.50</td>
<td>-0.42</td>
</tr>
<tr>
<td>rank in birth order</td>
<td>1.95</td>
<td>1.20</td>
<td>1.47</td>
<td>0.93</td>
<td>1.62</td>
</tr>
<tr>
<td>threshold</td>
<td>15.42</td>
<td>9.20</td>
<td>20.83</td>
<td>14.57</td>
<td>-1.58</td>
</tr>
<tr>
<td>Quick Test IQ</td>
<td>138.50</td>
<td>37.54</td>
<td>129.03</td>
<td>30.09</td>
<td>0.20</td>
</tr>
<tr>
<td>WISC-R Comprehension</td>
<td>27.08</td>
<td>15.89</td>
<td>25.20</td>
<td>15.14</td>
<td>0.44</td>
</tr>
<tr>
<td>WISC-R Similarities</td>
<td>22.75</td>
<td>16.51</td>
<td>20.03</td>
<td>15.35</td>
<td>0.62</td>
</tr>
<tr>
<td>SNVC (PIC F1)</td>
<td>6.88</td>
<td>4.96</td>
<td>6.00</td>
<td>4.04</td>
<td>0.71</td>
</tr>
<tr>
<td>illness history frequencies</td>
<td>10.67</td>
<td>6.03</td>
<td>8.80</td>
<td>5.77</td>
<td>1.16</td>
</tr>
</tbody>
</table>
3.2 Preliminary Analyses

3.2.1 Child Age Differences. In order to determine any potential effects of offspring group differences in age, this variable was correlated with the major dependent variables. These included all three child calibration ratings on the auditory stimulus task and tolerance times. None of these correlations was found to be significantly different from zero (Table 3.3). Thus, age differences between the two offspring groups were ignored with regard to all subsequent analyses.

3.2.2 Parent-Child Genetic Link. Four of the children in the chronic pain group were adopted at, or shortly after birth. None of the children in the control group was reported to be adopted. In order to identify any potential effects of adoption on the results, children's birth status was correlated with all dependent variables for children of pain patients. With the exception of the Psychoticism scale of the PIC, none of these correlations was found to be significant. Psychoticism was found to be significantly correlated with adoption status, \( r = .417, p < .034 \). Thus, naturally born children of pain patients were more likely to have significantly higher Psychoticism scores on the PIC than were adopted children of pain patients. Due to this significant
Table 3.3

Correlations Between Children’s Age and the Auditory Stimulus Task Dependent Variables

<table>
<thead>
<tr>
<th>Age</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold rating</td>
<td>.169</td>
</tr>
<tr>
<td>Uncomfortable rating</td>
<td>.155</td>
</tr>
<tr>
<td>Unpleasant rating</td>
<td>.156</td>
</tr>
<tr>
<td>Range of Intensities</td>
<td>.160</td>
</tr>
<tr>
<td>Tolerance Time</td>
<td>.035</td>
</tr>
</tbody>
</table>
correlation, results pertaining to this variable should be viewed with caution.

3.2.3 Nonverbal Receiving Ability and IQ. A number of measures intended to provide an estimate of children's intellectual development were included. This was done in order to determine if any relationship existed between children's nonverbal receiving ability and level of intellectual development. The existence of such a relationship would have necessitated the use of a correction factor when carrying out analyses involving nonverbal receiving ability. This may have taken the form of using measures of intellectual development as covariates in such analyses.

Factor 1 scores of the PIC were correlated with a number of measures of intellectual development. These included Quick Test IQ scores and mental age, WISC-R comprehension scores and mental age, WISC-R similarities scores and mental age, and an average of the two WISC-R scores. All correlations failed to reach statistical significance (Table 3.4). Thus, it could be concluded that no relationship existed between the measure of nonverbal receiving ability used and level of intellectual development.

3.2.4 Parental Group Composition. Although all members of the chronic pain group were drawn from the records of a multidisciplinary pain clinic, it is important to verify that these individuals can be
Table 3.4

Correlations Between Children's Sensitivity to Nonverbal Communication (as measured by Factor 1 scores on the PIC) and Measures of Cognitive Development.

<table>
<thead>
<tr>
<th>QT-IQ</th>
<th>WISC-R Comprehension</th>
<th>WISC-R Similarities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fact-1</td>
<td>.099</td>
<td>.102</td>
</tr>
</tbody>
</table>
classified as chronic pain sufferers in comparison to members of the control group. This was accomplished by comparing the average monthly frequency of headaches of the two groups. The mean number of headaches per month for members of the chronic pain group was 16.63, (SD = 9.17), as compared to .90 (SD = 1.27) for members of the control group (F(1, 53) = 86.487, p < .0001). Thus, it can be concluded that the experimental group can be considered to represent a chronic pain sample in comparison to the healthy controls.

3.2.5 Ratings of Nonverbal Expressiveness. In order to obtain scores of nonverbal expressiveness each subject's face was taped during exposure to the auditory stimulus task. Tapes were rated by 4 female undergraduate psychology students. Appendix P presents the training procedure used, while Appendix Q lists the rating instructions.

Raters were asked to provided ratings of the degree of expressiveness of each subject using a scale ranging from 0 (not at all expressive) to 10 (extremely expressive). For each subject two ratings were obtained. The first of these was based on the rater's viewing of the entire calibration procedure. This included the point at which the subject was first exposed to the AST, and extended to the point at which the subject rated the tone as being "definitely unpleasant". This segment was presented in its
entirety due to its relative brevity. The second rating was based on the raters viewing of a 30 s segment of the subject's expression during exposure to the tone at his/her noise level. This segment was randomly chosen from the beginning, middle, or final section of each tolerance period.

Inter-rater reliabilities are presented in Table 3.5. As can be seen these ranged from $\alpha = .87$ to $\alpha = .94$. Given this high rate of agreement, expressiveness scores were calculated by averaging the four ratings for each of the segments. It was evident that the highest reliabilities were obtained for ratings of the calibration period. Thus, scores calculated based on these ratings were used as the final expressiveness scores in further analyses.

3.3 Tests of the Hypotheses

3.3.1 Hypothesis 1. It was suggested that a main effect for group membership (offspring of pain sufferers vs. offspring of controls) and modeling condition would be observed using the following dependent variables: (a) calibration levels for the uncomfortable and definitely unpleasant ratings of the AST; (b) range of tone intensities endured; (c) tolerance times at noise level; and (d) nonverbal expressiveness.
Table 3.5
Inter-rater Reliabilities of Parent and Child Nonverbal Expressiveness (Cronbach's alphas based on ratings of 4 raters).

<table>
<thead>
<tr>
<th>Segment</th>
<th>Parent</th>
<th>Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.943</td>
<td>.920</td>
</tr>
<tr>
<td>2</td>
<td>.897</td>
<td>.877</td>
</tr>
</tbody>
</table>
Initially a 2 by 2 multivariate analysis of variance, which would include these five dependant variables, was to be used. However, due to video equipment failure, the nonverbal expressions of 12 parent-child pairs were not obtained. Thus, nonverbal expressiveness was not included in any multivariate analyses. Inclusion of this variable would have greatly reduced sample size, and in turn power of analyses. Thus, nonverbal expressiveness is dealt with in a series of independent univariate analyses.

The remaining dependent variables were intercorrelated in order to rule out the possibility of multicolinearity. Tabachnick and Fidell (1983) suggest that correlation coefficients below $r = .80$ are considered acceptable for the purposes of multivariate analyses. As can be seen from the results presented in Table 3.6, the "definitely unpleasant" rating achieved correlation coefficients of $r = .761$ with the range of tone intensities tolerated, and $r = .797$ with the "uncomfortable" rating. As a result all MANOVAs were performed twice; with and without inclusion of the "definitely unpleasant" rating. Results of the MANOVAs were not altered by inclusion of this variables, thus it was retained in all analyses reported.

Table 3.7 outlines results of the multivariate analysis of variance. Associated means and standard deviations for each of the 4 dependent variables can be
Table 3.6

Intercorrelation Matrix of the MANOVA Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00</td>
<td>0.457*</td>
<td>0.761*</td>
<td>0.062</td>
</tr>
<tr>
<td>2</td>
<td>1.00</td>
<td>0.797*</td>
<td></td>
<td>0.036</td>
</tr>
<tr>
<td>3</td>
<td>1.00</td>
<td></td>
<td>0.048</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

1=range of tones tolerated
2=uncomfortable calibration rating
3=definitely unpleasant calibration rating
4=tolerance time
* p < .001, based on a 1-tailed t-test.
Table 3.7

Modeling Condition by Parental Group Assignment MANOVA Using Children's Calibration Ratings, Range of Tones Tolerated, and Tolerance Times as Dependent Variables (N=54):
Examination of Main Effects

<table>
<thead>
<tr>
<th>Source</th>
<th>Hypoth DF</th>
<th>Error DF</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental Group Assignment</td>
<td>4.00</td>
<td>47.00</td>
<td>2.007</td>
<td>.109</td>
</tr>
<tr>
<td>Modeling Condition</td>
<td>4.00</td>
<td>47.00</td>
<td>1.210</td>
<td>.319</td>
</tr>
</tbody>
</table>
found in Table 3.8. As can be seen, the main effects for group membership and modeling condition were found to be nonsignificant. Failure to reach statistical significance on these differences at $p < .05$, leaves the first hypothesis unsupported.

The effects of group membership and modeling on nonverbal expressiveness of children was examined using a 2 by 2 analysis of variance (Table 3.9). Once again the main effects for both independent variables were found to be nonsignificant. However, the 2-way interaction did reach statistical significance, $F(1, 41) = 4.415, p < .042$. Figure 3.1 graphically presents group means for this analysis. Multiple comparisons of these means revealed a nearly significant difference when comparing level of expressiveness of healthy controls in the two modeling conditions. Thus, in this group, children exposed to a tolerant model exhibited a higher level of nonverbal expressiveness than their counterparts in the intolerant modeling condition, (based on Newman-Keuls, $F(1, 38) = 2.816, p < .06$). No other significant differences were found. Thus, amongst children of chronic headache sufferers no significant differences in expressiveness were found when comparing children exposed to an intolerant model and children exposed to a tolerant model. Thus, the hypothesized effects of modeling condition and parental group assignment with
Table 3.8
Group Means and Standard Deviations for the Condition By Group MANOVA

<table>
<thead>
<tr>
<th>Modeling Condition</th>
<th>Tolerant</th>
<th>Intolerant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Uncomfortable Rating(^a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain Group</td>
<td>56.54</td>
<td>18.86</td>
</tr>
<tr>
<td>Control Group</td>
<td>77.14</td>
<td>17.94</td>
</tr>
<tr>
<td>Unpleasant Rating(^a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain Group</td>
<td>74.61</td>
<td>21.36</td>
</tr>
<tr>
<td>Control Group</td>
<td>91.07</td>
<td>13.47</td>
</tr>
<tr>
<td>Range of Intensities(^a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain Group</td>
<td>60.77</td>
<td>19.13</td>
</tr>
<tr>
<td>Control Group</td>
<td>71.07</td>
<td>17.67</td>
</tr>
<tr>
<td>Tolerance Times(^b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain Group</td>
<td>117.59</td>
<td>61.38</td>
</tr>
<tr>
<td>Control Group</td>
<td>163.92</td>
<td>42.04</td>
</tr>
</tbody>
</table>

\(^a\)measured in decibels

\(^b\)measured in seconds
Table 3.9

Group by Condition Analysis of Variance Using Child Nonverbal Expressiveness as a Dependent Variable (N=42)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental Group Assignment</td>
<td>1</td>
<td>0.030</td>
<td>0.006</td>
</tr>
<tr>
<td>Modeling Condition</td>
<td>1</td>
<td>0.358</td>
<td>0.075</td>
</tr>
<tr>
<td>2-Way Interaction</td>
<td>1</td>
<td>21.011</td>
<td>4.415*</td>
</tr>
</tbody>
</table>

*p < .042
Figure 3.1
Child Nonverbal Expression as a Function of Modeling and Parental Group Assignment.

--- Pain Group
___ Control Group

Level of Expressiveness

Tolerant  Intolerant

Modeling Condition
regard to nonverbal expressiveness were not supported by the analysis. The implications of this finding will be discussed later.

3.3.2 Hypothesis 2. In this hypothesis a number of interactions were predicted. First, it was suggested that there would be a significant interaction between a child's nonverbal receiving ability and modeling condition. Thus, in the intolerant modeling condition children having high nonverbal receiving ability would exhibit lower calibrations for the uncomfortable and definitely unpleasant ratings of the AST, accept a narrower range of tone intensities, and have shorter tolerance times at noise level when compared to children having low nonverbal receiving ability. This pattern of means was expected to be reversed for children in the tolerant modeling condition. Table 3.10 presents the actual group means and standard deviations obtained.

Second, a significant interaction between parental nonverbal expressiveness and modeling condition was predicted. Specifically, children exposed to an intolerant model and having unexpressive parents were expected to exhibit higher calibration levels, accept a wider range of tone intensities, and demonstrate longer tolerance times at noise level in comparison to children in the same modeling condition and having highly expressive parents. Once again, the pattern of
Table 3.10

Group Means and Standard Deviations for Condition By Nonverbal Sensitivity (NVS) MANOVA

<table>
<thead>
<tr>
<th>Modeling Condition</th>
<th>Dependent Variable</th>
<th>Tolerant</th>
<th>Intolerant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Uncomfortable Rating&lt;sup&gt;a&lt;/sup&gt;</td>
<td>73.93</td>
<td>18.93</td>
<td>64.69</td>
</tr>
<tr>
<td></td>
<td>60.00</td>
<td>21.11</td>
<td>64.54</td>
</tr>
<tr>
<td>Unpleasant Rating&lt;sup&gt;a&lt;/sup&gt;</td>
<td>87.14</td>
<td>16.14</td>
<td>86.87</td>
</tr>
<tr>
<td></td>
<td>78.85</td>
<td>21.99</td>
<td>84.09</td>
</tr>
<tr>
<td>Range of Intensities&lt;sup&gt;a&lt;/sup&gt;</td>
<td>71.07</td>
<td>16.55</td>
<td>67.81</td>
</tr>
<tr>
<td></td>
<td>60.76</td>
<td>20.19</td>
<td>63.18</td>
</tr>
<tr>
<td>Tolerance Times&lt;sup&gt;b&lt;/sup&gt;</td>
<td>152.01</td>
<td>42.00</td>
<td>1116.14</td>
</tr>
<tr>
<td></td>
<td>130.42</td>
<td>66.66</td>
<td>154.46</td>
</tr>
</tbody>
</table>

<sup>a</sup> measured in decibels

<sup>b</sup> measured in seconds
means was expected to be reversed for children in the tolerant modeling condition (see Table 3.11 for the obtained group means and standard deviations).

A series of MANOVAS was performed to test these predictions (Tables 3.12 & 3.13). As can be seen, main effects and interaction terms in both analyses failed to reach statistical significance. Thus, the hypothesized relationships were not supported. A number of factors may have contributed to this apparent lack of findings. These will be discussed in a later section.

An equivalent set of ANOVAs was conducted using children's level of nonverbal expressiveness as the dependent measure. None of these analyses was found to be statistically significant at the $p < .05$ level (Tables 3.14 & 3.15).

3.3.3 Hypothesis 3. As outlined earlier, a number of authors have suggested that parents' illness behaviour is likely to serve as a potent source of modeling for their children. If this is the case one would expect to observe some relationship between parent and child health status. Thus, it was hypothesized that children of headache sufferers would exhibit a greater incidence of pain related illness than children of healthy controls. The first step in testing this hypothesis was to examine group differences on two components of the PIC; the somatic
Table 3.11

Group Means and Standard Deviations for Condition By Parental Expressiveness (PE) MANOVA

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Tolerant</th>
<th>Intolerant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Uncomfortable Rating*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low PE</td>
<td>71.36</td>
<td>19.11</td>
</tr>
<tr>
<td>Hi PE</td>
<td>64.37</td>
<td>22.13</td>
</tr>
<tr>
<td>Unpleasant Rating*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low PE</td>
<td>88.18</td>
<td>13.83</td>
</tr>
<tr>
<td>Hi PE</td>
<td>79.69</td>
<td>22.02</td>
</tr>
<tr>
<td>Range of Intensities*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low PE</td>
<td>70.45</td>
<td>18.77</td>
</tr>
<tr>
<td>Hi PE</td>
<td>63.12</td>
<td>18.79</td>
</tr>
<tr>
<td>Tolerance Times*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low PE</td>
<td>149.25</td>
<td>55.78</td>
</tr>
<tr>
<td>Hi PE</td>
<td>136.37</td>
<td>58.00</td>
</tr>
</tbody>
</table>

*a measured in decibels

*b measured in seconds
Table 3.12

Modeling Condition by Children's Sensitivity to Nonverbal Communication (NVS) MANOVA using Children's Calibration Ratings, Range of Intensities Tolerated, and Tolerance Times as Dependent Measures

<table>
<thead>
<tr>
<th>Source</th>
<th>Hypoth DF</th>
<th>Error DF</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeling Condition</td>
<td>4.0</td>
<td>47.00</td>
<td>1.050</td>
<td>.392</td>
</tr>
<tr>
<td>Sensitivity to Nonverbal</td>
<td>4.0</td>
<td>47.00</td>
<td>0.926</td>
<td>.457</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-way Interaction</td>
<td>4.0</td>
<td>47.00</td>
<td>1.607</td>
<td>.188</td>
</tr>
</tbody>
</table>
Table 3.13

Modeling Condition by Parental Nonverbal Expressiveness (PE) MANOVA using Children’s Calibration Ratings, Range of Intensities Tolerated, and Tolerance Times as Dependent Measures

<table>
<thead>
<tr>
<th>Source</th>
<th>Hypoth DF</th>
<th>Error DF</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modeling Condition</td>
<td>4.0</td>
<td>47.0</td>
<td>0.997</td>
<td>.418</td>
</tr>
<tr>
<td>Parental Expressiveness</td>
<td>4.0</td>
<td>47.0</td>
<td>0.370</td>
<td>.829</td>
</tr>
<tr>
<td>Modeling by PE</td>
<td>4.0</td>
<td>47.0</td>
<td>0.288</td>
<td>.884</td>
</tr>
</tbody>
</table>
Table 3.14

Parental Nonverbal Expressiveness by Modeling Analysis of Variance Using Children's Nonverbal Expressiveness as a Dependent Variable (N=42)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental Expressiveness</td>
<td>1</td>
<td>3.908</td>
<td>0.390</td>
</tr>
<tr>
<td>Condition</td>
<td>1</td>
<td>0.189</td>
<td>0.849</td>
</tr>
<tr>
<td>2-Way Interaction</td>
<td>1</td>
<td>1.384</td>
<td>0.608</td>
</tr>
</tbody>
</table>
Table 3.15

Children's Nonverbal Sensitivity by Modeling Analysis of Variance Using Children's Nonverbal Expressiveness as a Dependent Variable (N=42)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonverbal Sensitivity</td>
<td>1</td>
<td>1.047</td>
<td>0.313</td>
</tr>
<tr>
<td>Condition</td>
<td>1</td>
<td>0.052</td>
<td>0.820</td>
</tr>
<tr>
<td>2-Way Interaction</td>
<td>1</td>
<td>6.001</td>
<td>0.281</td>
</tr>
</tbody>
</table>
concerns scale and factor 3 (internalization/somatic symptoms). As can be seen from the results presented in Table 3.16, a significant difference was found for the first of these two components. Children of chronic pain sufferers had a mean somatic concerns score of $T = 52.882$ (SD = 10.964), as compared to a mean of $T = 47.695$ (SD = 8.663) for children of healthy controls, $t = 1.94, p < .026$. Group differences on factor 3 scores were also significant, with the pattern of means being in the predicted direction, $t = 1.87, p < .033$.

For purposes of clarification the somatic concerns scale was broken down into its component subscales. As can be seen from the bottom of Table 3.16, the scale can be broken down into a number of subscales representing several symptom clusters. The two groups were compared on these. This was a post-hoc analysis carried out with the intention of determining specific symptom groups which accounted for the observed difference on the somatic concerns scale.

A significant difference between group means was found on the "other" subscale ($t = 2.08, p < .042$). This subscale was made up of two items: "my child has as much pep and energy as most children" and "my child talks a lot about his (her) size or weight".

The second step in testing this hypothesis was to compare the frequency of headaches per month reported by the two offspring groups. Analysis revealed that
Table 3.16
Comparison of Child Illness Categories by Group

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean</th>
<th>S.D.</th>
<th>t</th>
<th>1-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pain/N=24</td>
<td>Control/N=30</td>
<td>Pain/N=30</td>
<td>Control/N=30</td>
</tr>
<tr>
<td>frequency of monthly headaches</td>
<td>2.750  1.200</td>
<td>3.959  1.349</td>
<td>2.01</td>
<td>0.025</td>
</tr>
<tr>
<td>factor 3</td>
<td>5.833  3.900</td>
<td>5.027  2.325</td>
<td>1.87</td>
<td>0.033</td>
</tr>
<tr>
<td>(internalizing/somatization)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>somatic</td>
<td>52.882 47.695</td>
<td>10.964 8.663</td>
<td>1.95</td>
<td>0.026</td>
</tr>
</tbody>
</table>

-------------------------post-hoc-------------------------

Subscales of the Somatic Concerns Scale

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Mean</th>
<th>S.D.</th>
<th>2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>frequency of illness</td>
<td>10.418 0.333</td>
<td>0.584 0.547</td>
<td>0.54</td>
</tr>
<tr>
<td>infrequent symptoms</td>
<td>1.292  0.900</td>
<td>1.042 1.348</td>
<td>1.17</td>
</tr>
<tr>
<td>somatizing</td>
<td>0.667  0.300</td>
<td>1.167 0.466</td>
<td>1.57</td>
</tr>
<tr>
<td>visual problems</td>
<td>0.250  0.233</td>
<td>0.532 0.504</td>
<td>0.12</td>
</tr>
<tr>
<td>excessive constipation</td>
<td>0.250  0.267</td>
<td>0.442 0.450</td>
<td>-0.14</td>
</tr>
<tr>
<td>poor stamina</td>
<td>0.875  0.933</td>
<td>0.797 0.868</td>
<td>-0.25</td>
</tr>
<tr>
<td>body temperature</td>
<td>0.375  0.133</td>
<td>0.711 0.434</td>
<td>1.54</td>
</tr>
<tr>
<td>muscular spasms</td>
<td>0.458  0.233</td>
<td>0.779 0.430</td>
<td>1.35</td>
</tr>
<tr>
<td>attention seeking</td>
<td>0.708  0.533</td>
<td>0.751 0.629</td>
<td>0.93</td>
</tr>
<tr>
<td>other</td>
<td>0.418  0.167</td>
<td>0.504 0.379</td>
<td>2.08</td>
</tr>
</tbody>
</table>
children of chronic headache sufferers reported significantly more headaches per month than did children of illness free parents (M = 2.75, SD = 3.959, M = 1.20, SD = 1.349, respectively; t = 2.01, p < .025).

Collectively, these results provide partial support for the hypothesis. Children of chronic headache sufferers reported experiencing more headaches per month, appeared to be more concerned with their body image, and were reported to have less energy than other children. However, these group differences did not generalize to other pain related illnesses.

3.3.4 Hypothesis 4. This hypothesis was divided into two parts. First, it was suggested that there would be a higher incidence of general behavioural disturbance among children of chronic pain sufferers than among children of illness free parents. This part of the hypothesis was tested by comparing group means using the PIC clinical scales (Table 3.17). As indicated above, children of chronic pain sufferers demonstrated higher mean scores on the somatic concerns scale than did children of healthy controls, t = 1.94, p < .026 (see hypothesis 3). Additionally, a significant difference was found on delinquency scores. Specifically, children of chronic headache sufferers had a mean delinquency score of T = 53.548 (SD = 13.359), as compared to a mean score of T = 47.398 (SD
Table 3.17

Comparison of Level of Behavioural Disturbance Among Children of Chronic Headache Sufferers and Healthy Controls.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean Pain (N=24)</th>
<th>Mean Control (N=30)</th>
<th>S.D. Pain</th>
<th>S.D. Control</th>
<th>t 1-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>general adjustment</td>
<td>52.646</td>
<td>47.971</td>
<td>12.385</td>
<td>7.290</td>
<td>1.72</td>
</tr>
<tr>
<td>intellectual screening</td>
<td>50.841</td>
<td>49.327</td>
<td>10.699</td>
<td>9.535</td>
<td>0.55</td>
</tr>
<tr>
<td>developmental screening</td>
<td>52.457</td>
<td>48.035</td>
<td>9.296</td>
<td>10.259</td>
<td>1.64</td>
</tr>
<tr>
<td>somatic concerns</td>
<td>52.882</td>
<td>47.695</td>
<td>10.964</td>
<td>8.663</td>
<td>1.94</td>
</tr>
<tr>
<td>family relations</td>
<td>52.370</td>
<td>48.120</td>
<td>12.821</td>
<td>6.687</td>
<td>1.54</td>
</tr>
<tr>
<td>delinquency</td>
<td>53.548</td>
<td>47.398</td>
<td>13.359</td>
<td>5.484</td>
<td>2.28</td>
</tr>
<tr>
<td>withdrawal</td>
<td>51.129</td>
<td>49.135</td>
<td>9.852</td>
<td>10.193</td>
<td>0.72</td>
</tr>
<tr>
<td>anxiety</td>
<td>51.825</td>
<td>48.540</td>
<td>11.194</td>
<td>8.855</td>
<td>1.20</td>
</tr>
<tr>
<td>psychoticism</td>
<td>49.109</td>
<td>50.686</td>
<td>9.145</td>
<td>10.712</td>
<td>-0.57</td>
</tr>
<tr>
<td>hyperactivity</td>
<td>50.167</td>
<td>49.867</td>
<td>11.434</td>
<td>8.889</td>
<td>0.11</td>
</tr>
<tr>
<td>social skills</td>
<td>47.403</td>
<td>51.991</td>
<td>8.988</td>
<td>10.420</td>
<td>-1.68</td>
</tr>
</tbody>
</table>

Reported means are based on T-scores.
achieved by children of healthy controls, $t = 2.28, p < .013$. Significant differences were also found on the general adjustment and social skills scales ($t = 1.72, p < .046; t = -1.68, p < .049$ respectively).

Once again, in order to clarify these findings post-hoc analysis were conducted in which group differences were examined by breaking down the three scales into their component parts. As can be seen from Table 3.18, a number of group differences were found on the subscales of the delinquency scale. Children of chronic headache sufferers exhibited significantly higher scores on the sadness subscale, lack of interest and impulsivity subscale, and the "other" subscale. The "other" subscale includes three items; "my child can't sit still in school because of nervousness", "several times my child has threatened to run away", and "the child's father has very little patience with the child". No individual subscale differences were found on the general adjustment or the social skills scales.

Second, it was suggested that there would be a positive correlation between measures of parent and child psychological symptom severity. The first step in testing this component of the hypothesis was to compare SCL-90 scores of the two parent groups. If no differences were found one could assume that the
Table 3.18

Comparison of Mean Subscale Scores of the PIC Delinquancy Scale for Children of Chronic Headache Sufferers and Healthy Controls.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean</th>
<th>S.D.</th>
<th>t</th>
<th>2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pain (N=24)</td>
<td>Control (N=30)</td>
<td>Pain</td>
<td>Control</td>
</tr>
<tr>
<td>disregard for limits/interpersonal insensitivity</td>
<td>1.750</td>
<td>0.933</td>
<td>2.048</td>
<td>1.388</td>
</tr>
<tr>
<td>anti-social tendencies</td>
<td>1.304</td>
<td>0.600</td>
<td>2.324</td>
<td>1.102</td>
</tr>
<tr>
<td>irritability/limited tolerance</td>
<td>0.583</td>
<td>0.300</td>
<td>0.881</td>
<td>0.596</td>
</tr>
<tr>
<td>sadness</td>
<td>0.292</td>
<td>0.033</td>
<td>0.464</td>
<td>0.183</td>
</tr>
<tr>
<td>lack of interest/impulsivity</td>
<td>1.083</td>
<td>0.700</td>
<td>0.584</td>
<td>0.466</td>
</tr>
<tr>
<td>interpersonal hostility</td>
<td>0.083</td>
<td>0.000</td>
<td>0.282</td>
<td>0.000</td>
</tr>
<tr>
<td>other</td>
<td>1.174</td>
<td>0.900</td>
<td>0.491</td>
<td>0.305</td>
</tr>
</tbody>
</table>

Reported means are based on raw scores.
distribution of scores for both groups was similar. In such a case scores of the two groups could be collapsed for the purposes of correlational analyses. However, if a significant group difference was found it must be concluded that a bimodal distribution exists. Under these circumstances the proposed correlations would need to be examined separately for each group.

Table 3.19 presents results of an analysis comparing SCL-90 scores of the two parent groups. As can be seen, significant differences were observed on a number of scales including: general symptom index (GSI), somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, and phobic anxiety. As indicated above, these differences necessitated that the correlational analyses be conducted separately for each of the groups. Results of these analyses are presented in Tables 3.20 and 3.21.

For both groups a number of moderate to strong correlations were observed between measures of parent and child psychological symptom severity. Generally, these correlations were higher for parent-child pairs in the chronic pain sufferers group. However, it must be noted that variances in SCL-90 scale scores of pain patients, and PIC scale scores of their offspring, were greater than in the case of their control counterparts. This greater variability in scores may have
Table 3.19

Comparison of Level of Psychological Symptom Severity of Chronic Headache Sufferers and Healthy Controls.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean (N=21)</th>
<th>Mean (N=30)</th>
<th>SD</th>
<th>t</th>
<th>2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pain</td>
<td>Control</td>
<td>Pain</td>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>somatization</td>
<td>55.529</td>
<td>46.129</td>
<td>11.699</td>
<td>6.354</td>
<td>3.70</td>
</tr>
<tr>
<td>obsessive-compulsive</td>
<td>53.804</td>
<td>47.337</td>
<td>11.451</td>
<td>8.010</td>
<td>2.38</td>
</tr>
<tr>
<td>interpersonal communication</td>
<td>53.803</td>
<td>47.338</td>
<td>13.069</td>
<td>6.068</td>
<td>2.38</td>
</tr>
<tr>
<td>depression</td>
<td>54.010</td>
<td>47.193</td>
<td>12.343</td>
<td>6.895</td>
<td>2.52</td>
</tr>
<tr>
<td>anxiety</td>
<td>53.503</td>
<td>47.548</td>
<td>13.085</td>
<td>6.264</td>
<td>2.17</td>
</tr>
<tr>
<td>hostility</td>
<td>53.565</td>
<td>47.504</td>
<td>12.815</td>
<td>6.596</td>
<td>2.21</td>
</tr>
<tr>
<td>phobic anxiety</td>
<td>54.106</td>
<td>47.125</td>
<td>14.048</td>
<td>3.943</td>
<td>2.59</td>
</tr>
<tr>
<td>paranoia</td>
<td>50.664</td>
<td>49.535</td>
<td>12.194</td>
<td>8.326</td>
<td>0.39</td>
</tr>
<tr>
<td>psychoticism</td>
<td>52.421</td>
<td>48.305</td>
<td>13.413</td>
<td>6.413</td>
<td>1.46</td>
</tr>
<tr>
<td>GSI</td>
<td>53.596</td>
<td>34.779</td>
<td>34.097</td>
<td>16.315</td>
<td>2.63</td>
</tr>
</tbody>
</table>

Reported means are based on T-scores.
Table 3.20

Correlation Between Parent's Symptom Severity and Incidence of General Behavioural Disturbance of the Child in The Pain Group

<table>
<thead>
<tr>
<th>SCL-90 Symptom Scales (parent)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>GSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIC Scales (Child)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>intellectual screening</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>adjustment</td>
<td>.40</td>
<td>.49</td>
<td>.48</td>
<td>.57</td>
<td>.41</td>
<td>.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>developmental screening</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.38</td>
<td></td>
</tr>
<tr>
<td>somatization</td>
<td>.72</td>
<td>.62</td>
<td>.46</td>
<td>.44</td>
<td>.51</td>
<td>.67</td>
<td>.45</td>
<td>.59</td>
<td>.59</td>
<td>.62</td>
</tr>
<tr>
<td>family relations</td>
<td>.62</td>
<td>.58</td>
<td>.52</td>
<td>.65</td>
<td>.80</td>
<td>.57</td>
<td>.67</td>
<td>.61</td>
<td>.73</td>
<td>.71</td>
</tr>
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<td>.71</td>
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<td>.70</td>
<td>.74</td>
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</tbody>
</table>

*Test of significance of correlations is based on a 1-tailed t-test, and p < .05

b1=somatization,
2=obsessive-compulsive,
3=interpersonal sensitivity,
4=depression,
5=anxiety,
6=hostility,
7=phobic anxiety,
8=paranoid ideation,
9=psychoticism.
Table 3.21

Correlation between Parent's Symptom Severity and Incidence of General Behavioural Disturbance of the Child in the Control Group

<table>
<thead>
<tr>
<th>SCL-90 Symptom Scales (parent)(^b)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>GSI</th>
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<tbody>
<tr>
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<tr>
<td>anxiety</td>
<td>.36</td>
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<td></td>
<td></td>
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<tr>
<td>psychoticism</td>
<td>-.33</td>
<td></td>
<td>-.35</td>
<td></td>
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<tr>
<td>hyperactivity</td>
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<tr>
<td>social skills</td>
<td>-.42</td>
<td></td>
<td>-.34</td>
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</tr>
</tbody>
</table>

*Test of significance of correlations is based on a 1-tailed t-test, and p < .05

\(^b\)1=somatization
2=obsessive-compulsive
3=interpersonal sensitivity
4=depression
5=anxiety
6=hostility
7=phobic anxiety
8=paranoid ideation
9=psychoticism
contributed to the higher correlations in this group. Generally, however, the data corroborate the hypothesized relationship.

3.3.5 Hypothesis 5. This hypothesis made a number of predictions regarding the relationship between ratings of family environment and parental health status. To begin with, a negative correlation between positive ratings of family functioning and pain rating indicies was predicted for chronic pain sufferers. Pain rating indicies were obtained using the West Haven-Yale Multidimensional Pain Inventory. A number of scales of this questionnaire measure level of pain severity. For purposes of the present study these included scale 1 (degree to which pain interferes with daily activities), scale 3 (pain severity), scale 5 (negative mood), and all four scales of section 3 (these measure the degree to which the individual engages in a variety of activities including household chores, outdoor work, activities away from home, and social activities). Ratings of family functioning were obtained by use of the Family Environment Scale.

The pattern of correlations obtained (see Table 3.22) suggests that the predicted relationship between pain severity and positive family functioning is not as robust and direct as expected. Specifically, not all dimensions of family environment seemed to be related to pain severity.
Table 3.22

Correlations Between Ratings of Family Environment and Pain Rating Indicies of Chronic Headache Sufferers

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>7</th>
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<tr>
<td>WHYMPI Scales</td>
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<tr>
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<td>.36</td>
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<tr>
<td>Negative Mood</td>
<td></td>
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<td>.37</td>
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<tr>
<td>Mood</td>
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<td>-.40</td>
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</tr>
</tbody>
</table>

Section 3

Household Chores

Outdoor Activity     .41

Activity Away from Home

Social Activity

Test of significance for all correlations is based on a 1-tailed t-test, with p < .05 level of significance

1=cohesion
2=expressiveness
3=conflict
4=independence
5=achievement orientation
6=intellectual-cultural orientation
7=active-recreational orientation
8=moral-religious orientation
9=organization
10=control
Scale 1 of the WHYMPI achieved a significant negative correlation with level of family cohesion and active-recreational orientation of a family. Thus, the greater the degree of cohesion in a family, the lower the degree to which pain is reported to interfere with daily activities. Similarly, the greater the degree to which a family is oriented toward recreational interests, the less pain interferes with daily activity. Pain severity was negatively correlated with level of expressiveness and active-recreational orientation, and positively correlated with level of family organization. The presence of negative mood was negatively correlated with level of family cohesion and active-recreational orientation, and positively correlated with level of expressiveness. There were almost no significant correlations between the 4 scales of section 3 of the WHYMPI and the various dimensions of family functioning. The only significant correlation achieved was a positive correlation between the extent to which an individual engages in outdoor activity and the tendency to encourage independence of family members.

Collectively, these results suggest that partial support for the proposed hypothesis was achieved. However, it is clear that the relationship between pain intensity, or level of disability, and family functioning is less direct than expected.
A second component of the hypothesis was the prediction that ratings of family environment would reflect more dysfunction among families of chronic headache sufferers than families of healthy controls. A series of oneway analyses of variance, comparing mean scores on the various subscales of the Family Environment Scale for the two groups reveal no significant differences (Table 3.23). Thus, this hypothesis was not substantiated by the data.

3.4 Post-hoc Analyses

3.4.1 Parental AST Response. A comparison of responses of the two parent groups to the auditory stimulus task was carried out. A series of t-tests revealed no significant differences between the two groups on calibration ratings, range of tone intensities tolerated, or tolerance time at noise level (Table 3.24). This finding is in direct opposition to the findings of Philips and Hunter (1982) and Johanshahi and Philips (1986). In both studies highly significant group differences were found on all of these measures. In fact, Philips and Hunter (1982) indicate that an intensity level which was rated as being uncomfortable by healthy controls was generally rated as being definitely unpleasant by the headache sample. In the present study means achieved by both
Table 3.23
Summary of One-Way ANOVAs Depicting Group Differences in Family Environment Sub-Scales.

<table>
<thead>
<tr>
<th>FES Sub-Scales</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
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<tr>
<td>conflict</td>
<td>35.345</td>
<td>0.342</td>
<td>.561</td>
</tr>
<tr>
<td>independence</td>
<td>75.968</td>
<td>0.765</td>
<td>.386</td>
</tr>
<tr>
<td>active-recreational</td>
<td>1.467</td>
<td>0.014</td>
<td>.905</td>
</tr>
<tr>
<td>orientation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moral-religious</td>
<td>279.749</td>
<td>3.098</td>
<td>.084</td>
</tr>
<tr>
<td>orientation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>organization</td>
<td>297.968</td>
<td>3.098</td>
<td>.084</td>
</tr>
<tr>
<td>control</td>
<td>76.687</td>
<td>0.763</td>
<td>.386</td>
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<tr>
<td>cohesion</td>
<td>21.721</td>
<td>0.214</td>
<td>.646</td>
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<tr>
<td>achievement</td>
<td>263.083</td>
<td>2.716</td>
<td>.105</td>
</tr>
<tr>
<td>orientation</td>
<td></td>
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<td></td>
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<tr>
<td>intellectual</td>
<td>95.284</td>
<td>0.952</td>
<td>.334</td>
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</table>
Table 3.24
Comparison of Auditory Stimulus Task Dependent Variables of Chronic Headache Sufferers and Healthy Controls.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>S.D.</th>
<th>t</th>
<th>2-tailed p</th>
</tr>
</thead>
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<tr>
<td></td>
<td>Pain (N=21)</td>
<td>Control (N=30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>threshold(^a)</td>
<td>23.750</td>
<td>22.333</td>
<td>12.875</td>
<td>13.502</td>
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</tr>
<tr>
<td>uncomfortable rating(^a)</td>
<td>66.458</td>
<td>65.333</td>
<td>16.049</td>
<td>18.239</td>
</tr>
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<td></td>
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</tr>
<tr>
<td>unpleasant rating(^a)</td>
<td>81.042</td>
<td>85.667</td>
<td>14.063</td>
<td>14.126</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>range of intensities(^a)</td>
<td>57.292</td>
<td>63.333</td>
<td>16.874</td>
<td>16.153</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>tolerance times(^b)</td>
<td>131.279</td>
<td>123.153</td>
<td>63.641</td>
<td>78.808</td>
</tr>
</tbody>
</table>

\(^a\) measured in decibels

\(^b\) measured in seconds
groups for the various calibration points are fairly similar to those reported for the control group by Philips and Hunter (Table 3.25). The implications of this discrepancy will be discussed in the Discussion section.

It may be important to note that although the Johanshahi and Philips (1986) investigation was meant to serve as a validation study for the procedure outlined by Philips and Hunter, close examination of the data reveals that a number of the groups included in the validation study were those used in the original investigation. These included the headache free controls, and the non-clinic headache sufferers. This repetition in use of data, particularly the control group, suggests that the reported results are sample specific, and not as generalizable as suggested by the authors.

3.4.2 Headache Frequency of Children. It was stated earlier that a significant difference in the monthly frequency of headaches of the two offspring groups was found. Specifically, children of chronic headache sufferers reported a mean of 2.75 headaches per month, as compared to a mean of 1.20 headaches per month reported by children of headache free controls. Thus, an attempt was made to determine what variables, if any, could be used to predict children's monthly frequency of headaches.
### Table 3.25

Means Reported by Philips and Hunter (1982), Comparing Responses of Headache and Headache Free Controls to the Auditory Stimulus Task

<table>
<thead>
<tr>
<th>Variable</th>
<th>Controls (N = 20)</th>
<th>Headache Sufferers No Pain (N = 15)</th>
<th>Headache Sufferers In Pain (N = 15)</th>
</tr>
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<tr>
<td></td>
<td>original dB units</td>
<td>original dB units</td>
<td>original dB units</td>
</tr>
<tr>
<td></td>
<td>equiv.</td>
<td>equiv.</td>
<td>equiv.</td>
</tr>
<tr>
<td>threshold rating</td>
<td>2.1 19.95</td>
<td>1.3 12.35</td>
<td>0.7 6.65</td>
</tr>
<tr>
<td>uncomfortable rating</td>
<td>4.9 46.55</td>
<td>3.1 29.45</td>
<td>2.3 21.85</td>
</tr>
<tr>
<td>unpleasant rating</td>
<td>8.6 81.70</td>
<td>5.5 52.25</td>
<td>3.9 37.05</td>
</tr>
<tr>
<td>range of intensities</td>
<td>6.5 61.65</td>
<td>4.2 39.90</td>
<td>3.2 30.40</td>
</tr>
<tr>
<td>tolerance time (s)</td>
<td>115.0</td>
<td>104.6</td>
<td>91.8</td>
</tr>
</tbody>
</table>
Intuitively, an number of factors could account for this observed difference. One possibility is that simply having a parent who suffers from chronic headaches predisposes a child to more frequent headaches. Such a predisposition can either be physiological or genetic. Alternatively, environmental factors such as the effects of parental modeling in the child's natural surroundings, may account for such a difference. More likely however, some combination of these two factors is at play. If such were the case one would expect to observe some relationship between the frequency of headaches reported by children, the frequency of headaches reported by their parents, a measure of children's capacity to respond to environmental influences, and a measure assessing the nature of the modeling environment. In the present study sensitivity to nonverbal communication served as a measure of children's capacity to respond to environmental influences. Parental health status served as a crude measure of the nature of children's modeling environment. Unfortunately, no measures were included which could be said to tap the pure physiological component of a child's predisposition to headache. The only measure which comes close to achieving this is the child's auditory threshold. This represents a measure of the child's sensitivity to auditory stimuli. However, as indicated earlier, no
group differences were found on threshold. Furthermore, there was no correlation between a child's auditory threshold and monthly frequency of headaches. Thus, the argument that a child's likelihood of suffering headaches could be due to a physiological sensitivity to sound could not be made based on this data.

A second possibility that may account for frequency of headaches reported by children include variables related to personality style. A vast literature exists which has attempted to identify personality patterns which seem to be characteristic of chronic pain patients. Generally, this research has demonstrated that chronic pain patients achieve elevations on the depression, hysteria, and hypochondriasis scales of the MMPI (Watson, 1982; Armentrout, Moore, Parker, Hewitt, & Feltz, 1982; Gentry, Shows, & Thomas, 1974). One common criticism of this research is that it has failed to establish whether such personality patterns are causal factors in the development of chronic pain, or represent a response to illness. A full discussion of this argument goes beyond the scope of this thesis. However, it would be interesting to examine whether similar personality patterns are associated with headache frequency of children. An equivalent of a measure of hypochondriasis is the somatic concerns
scale of the PIC. The PIC also allowed for a measure of depression. There was no measure equivalent to the hysteria scale of the MMPI.

Two multiple regression analyses were conducted, both using children's monthly frequency of headaches as the criterion variable. In the first analysis, predictor variables included children's nonverbal receiving ability, parental frequency of headaches, and parents' scores on the somatization, depression, interpresonal sensitivity, and GSI scales of the SCL-90. Results revealed a statistically significant multiple regression coefficient; \( R = .498, F = 16.204, p < .0002 \). The only variable contributing significantly in predicting the criterion variable was parent's somatization scores on the SCL-90. These scores accounted for 28.45% of the variance in predicting children's monthly frequency of headaches.

This analysis also helps to rule out effects due to a potential confound in the present methodology. As can be noted from the interview format presented in Appendix K, children were asked to indicate their monthly frequency of headaches immediately after their parents were asked the same question. Parents' responses may have inadvertently influenced the manner in which children responded to this question. However, since parental monthly frequency of headaches did not predict children's monthly frequency of headaches, this
effect could be ruled out. Clearly this was a methodological oversight which should be avoided in future research of this nature.

A second analysis was carried out using children's age, group assignment, sensitivity to nonverbal communication, and scores on the somatic concerns scale and the depression scale of the PIC. The multiple regression coefficient was found to be significantly different from zero; \( R = .577, F = 24.044, p < .0001 \). Following the first step in the stepwise procedure, only one variable contributed significantly to the prediction of frequency of headaches; somatization scores accounted for 33.37% of the variance in this prediction. An attempt to force all of the predictor variables into the equation resulted in no significant change.

3.4.3 Children's Headache Ratings. Following exposure to the auditory stimulus task children were asked to provide a headache rating. A similar approach to the one used in the previous section was taken in order to identify variables which predicted children's post AST headache ratings. A multiple regression format was used once again, with predictor variables including scores on the somatic concerns, depression and anxiety scales of the PIC, sensitivity to nonverbal communication, and modeling condition. The multiple regression coefficient was found to be statistically
significant; $R = .453$, $F = 13.144$, $p < .0007$. The only variable contributing significantly to the prediction of post-AST headache ratings was the somatic concerns scale, accounting for 20.49% of the variance in the prediction.
4. DISCUSSION

The following discussion of the obtained results, and how they relate to the initial hypotheses, is divided into four sections. The first section will deal with the experimental manipulation, that is, the effects of social modeling under laboratory conditions. This section will also examine the manner in which modeling is related to a number of individual difference variables, including child and parent variables. The second section will examine the effects of modeling under naturalistic conditions. This will be inferred from an examination of the relationship between parent and child illness dimensions. The third section will present a discussion of issues related to family dynamics and family environment variables as they related to family illness patterns. Finally, the fourth section will present a brief discussion of potential future directions.

4.1 The experimental manipulation.

The present study had several aims. The first was to examine the effects of social modeling of pain behaviour on children of two parent groups; chronic pain sufferers and healthy controls. A main effect for modeling condition and group membership was predicted.
However, results of a 2 X 2 MANOVA did not support this hypothesis. Neither group membership nor modeling condition had a significant impact on children's calibration ratings, range of tones tolerated, tolerance times at noise level, or nonverbal expressiveness. This finding can be interpreted in a number of different ways. First, absence of a main effect for group membership may suggest that no discernable difference exists between children of headache sufferers and children of healthy controls in response to a stimulus of ambiguous pain quality. This interpretation is based on the assumption that if such a difference did in fact exist, it would be revealed by the procedure used in the present study. By this, two things are implied. First, the two groups respond differently to the auditory stimulus task. And second, the dependent variables used are sensitive enough to reflect this difference. The results of Philips and Hunter (1982) provide support for both of these assumptions. The authors indicate that group differences on the auditory stimulus task do exist when comparisons of chronic headache sufferers and healthy controls are made. Furthermore, these differences are reflected by subjects' calibration ratings, range of tones tolerated, and under certain conditions, tolerance time at noise level.
The results of the present study are in direct contradiction to these claims. As indicated in the section on post-hoc analyses, no significant differences were found between the two parent groups on any of these measures. Thus, if the auditory stimulus procedure employed was not sensitive enough to reveal differences between the parent groups, it can not be expected to reveal any differences between the offspring groups. It is evident that further work is necessary in order to establish the validity of the auditory stimulus task.

The second interpretation is based on the lack of findings for the modeling condition. Specifically, the fact that no main effect for modeling was observed may mean that social modeling is uninfluential with regard to children's pain behaviour. Such a conclusion would be in direct opposition to the findings reported in the numerous investigations cited earlier. How then can the results of the present study be understood in the context of previous work examining this construct? One critical factor may be the nature of the modeling condition employed.

The modeling procedure used in the present study can be considered static in comparison to procedures used in other investigations. For example, the procedure used by Craig and his colleagues (see Craig & Weiss, 1971; Craig & Neidermayer, 1974; Craig and
Patrick, 1984) can be described as being interactive. A number of different things are meant by this. First, subjects were exposed to a live model. Furthermore, model and subject were exposed to the stimulus in each other's presence. Finally, the model's responses to the stimulus (i.e. the modeled behaviour) was determined by the subject's baseline responses. Due to the practical and ethical limitations imposed by use of child subjects, none of these conditions could be incorporated in the modeling condition used.

A second limitation of the modeling procedure employed is the length of time the child was exposed to the model. Due to the brevity of the calibration procedure, subjects' exposure to the model was approximately 1 minute. Although Craig does not give any indication of the duration of exposure to the model in his work, Melamed et al (1975) indicate that their modeling tape extended for a period of 13 minutes. Bandura (1971) suggests that exposure to the model must extend to the point whereby the learner has focused his/her attention on the relevant events in the total modeling situation. Unfortunately, no data was found which provided any indication of the minimum length of time require for such focusing to occur. Thus, it can only be conjectured that perhaps the procedure used in the present study did not allow sufficient exposure time of the subject to the model in order for the
predicted effects to be observed. However, this is a question which is open to empirical testing. One way of addressing this issue in future work would be to include a manipulation check, such as requiring subjects to rate the degree of discomfort expressed by the model. Such ratings would give some indication as to the extent to which the subject correctly perceived the intended behaviour by the model. The main drawback of this approach is the likelihood of contamination of the modeling condition that would be incurred by requesting a pain or distress rating before exposure to the task.

4.1.1 Cognitive-Developmental Variables and Modeling. The present study did not consider the potential role of cognitive-developmental factors with regard to the above findings. The sample size employed did not allow for sufficient examination of this variable as there was an unequal distribution of subjects across the age range included. However, a number of recent investigations provide evidence that cognitive-developmental stages may be an important consideration in investigations of children's reactions to, and understanding of illness.

Gaffney and Dunne (1986) examined developmental changes in children's definitions of pain. The investigators used a Piagetian developmental model in which they included children in three stages of
cognitive development: the pre-operational stage (ages 5, 6, and 7); the concrete operational stage (ages 8, 9, and 10); and the early formal operational stage (ages 11, 12, 13, and 14). The results revealed that children's acquisition of the concept of pain, as reflected by their definitions, followed a developmental sequence that was consistent with Piaget's theory of cognitive development.

Specifically, there was a clear shift "from concrete, perceptually dominated perspectives in younger children, to more abstract, generalised and psychologically oriented views in older subjects", (p. 108). Not only was there an increase in the degree of abstractness, but also in the number of themes older children were able to draw on in providing a definition of pain. In a later study the authors demonstrated a similar pattern of development with regard to children's understanding of the causality of pain, (Gaffney and Dunne, 1987).

These results suggest that older children's understanding of pain and its causes encompass a wider scope of stimuli and events. Thus, in a modeling situations, a child's stage of cognitive development may be an operative variable with regard to the characteristics of the necessary stimuli which will influence learning and in turn, the child's response. Conceivably, failure to take into account
the role of cognitive developmental factors in the present investigation may have further contributed to the lack of effect for modeling.

4.2 Modeling and Individual Difference Variables.

The second hypothesis involved predictions about the interactions between modeling condition and two individual difference variables. These included 1) the nonverbal receiving ability of the child (i.e. the degree to which the child was in fact able to attend to, and perceive, the modeled behaviour) and 2) the nonverbal expressiveness of the parent (i.e. the strength and clarity of the modeled behaviour in the child's natural setting). A series of MANOVAS was performed to test these relationships. As indicated earlier, main effects and interaction terms in these analyses failed to reach statistical significance.

In light of the limitations outlined above, it is difficult to interpret these results. As stated in the case of the first hypothesis, the lack of a significant finding may mean that no relationship exists between modeling condition and the two individual difference variables. Alternatively, and perhaps more likely, the limitations of the procedure outlined above would suggest that true tests of the hypothesized relationships were not carried out. If the dependent
variables employed lacked sufficient sensitivity to distinguish between the two groups, then an examination of the nature of the predicted interactions cannot be accurately carried out.

Partial support for this argument is provided by the presence of a significant interaction between modeling condition and parental group assignment when degree of nonverbal expressiveness is used as a dependent measure. As stated earlier, among children of controls a nearly significant effect for modeling was found. Thus, among children of headache free parents, those exposed to an intolerant model were less nonverbally expressive than those exposed to a tolerant model. This same pattern of response was not observed among children of headache sufferers. In this group of children no significant difference in degree of expressiveness was found between children in the two modeling conditions. This effect was not dependent on either the level of expressiveness of the parent, or the child’s nonverbal receiving ability. Evidence for this is given by the lack of a significant interaction between either of these variables and modeling condition when conducting equivalent analyses employing children’s nonverbal expressiveness as a dependent measure.

4.2.1 Alternative Theoretical Perspectives. The observed interaction seems to be contrary to the
expected result. Specifically, it was expected that children of chronic headache sufferers would have been more reactive to nonverbal communications of pain than children of healthy controls. Results from two previous investigations may help to explain this apparent discrepancy.

In the first of these two studies Block (1981) demonstrated that spouses of chronic pain patients found watching nonverbal pain expressions of models and their own spouse to be stressful. This was reflected by increases in measures of skin conductance and heart rate. In a later study Traue, Gottwald, Henderson, and Bakal (1984) reported that when headache sufferers were exposed to stress they reacted with increases in psychophysiologic functioning, yet exhibited few signs of facial or bodily expressiveness when compared to controls. These two findings may help to make sense of at least part of the above result. First, based on Block's findings, it can be concluded that exposure to pain expressions of another individual, whether or not he/she is a family member, is a stressful event. Second, headache prone individuals seem to respond to stress at a physiological level, while suppressing more overt reactions such as facial or bodily expressiveness. The lack of a difference in responses of offspring of chronic headache sufferers in the two modeling conditions may be due to the apparent
discrepancy between physiologic and behavioural reactions to stress that one would expect to find among their parents. In other words, it may be the case that children of headache sufferers respond to stress in a manner similar to their parents. Thus, although these children may have had reactions to the model's pain expressions, they may not have been overtly observable.

The direction of the reported relationship among children of controls is an anomaly (i.e. greater nonverbal expressiveness being exhibited in response to exposure to a tolerant model). There seems to be little reported in the nonverbal communications literature that can shed light on the meaning of this finding. However, in the interpersonal communication literature complementary communication patterns have been described. Simply stated, it is suggested that interpersonal communication of one sort by a sender elicits a complementary or opposite response by the receiver (Kiesler, 1982). Thus, in the present study the reported effect may be a nonverbal form of this type of communication pattern.

These two lines of research, along with the observed effect in the present study, suggest that perhaps components of communications theory and theories of stress may need to be taken into consideration when examining children's reactions to pain. Specifically, it would be important to determine
if children of chronic headache sufferers respond differently to their parents' expressions of pain than do children of healthy controls. Such an investigation would need to include both behavioural as well as psychophysiological measures of children's reactions. Furthermore, in putting forward social modeling theory as an explanatory mechanism for children's pain behaviour it would be important to determine what is being modelled; parents' pain behaviour, or their reactions to stress, and subsequent coping strategies.

4.2.2 Modeling Under Naturalistic Conditions.
Although the effects of parental modeling could not be directly examined, it was argued that if modeling of pain behaviour did occur in the child's natural environment, one would expect to see a greater incidence of pain related illness among children of chronic headache sufferers than among children of illness free controls. There was only partial support for this hypothesis. Children of chronic headache sufferers did achieve higher scores on the somatic concerns scale and factor 3 of the PIC. However, items differentiating between the two groups dealt with concerns regarding body image and lack of energy. Specifically, children of chronic headache sufferers were reported to have less pep or energy than most children, as well as being more concerned about their size or weight. In addition, children of headache
sufferers reported having a higher frequency of headaches per month than did children of headache free parents. Subsequently it was shown that scores on the somatic concerns scale of the PIC could account for over 33% of the variance in predicting the frequency of headaches.

The somatic concerns scale was developed with the intention of identifying children who tend to have an exclusively "neurotic adjustment" to stressful situations (Wirt et al, 1984). Specifically, children who achieve a high score on this scale tend to respond to stress through a heightened concern over body functioning, energy level, diffuse physical symptoms, and so on. One can argue that such a focus may develop in response to repeated illness, prolonged episodes of pain, or in this case, frequent headaches. However, it is important to note that children suffering from chronic health conditions or illness do not achieve elevated scores on this scale (Wirt, Lachar, Klinedinst, and Seat, 1984).

Collectively, these results suggest that children of chronic headache sufferers are more concerned with their health status and bodily functioning than children of healthy controls. That is, they tend to be more somatically focused. Furthermore, there is a direct relationship between being somatically focused and having frequent headaches.
As noted above, Wirt et al, also indicated that becoming somatically focused tends to occur in response to stress. Although the present study included no measures of perceived stress, several of the reported findings are consistent with this relationship. It was demonstrated earlier that children of chronic headaches sufferers had significantly higher scores on the general adjustment and delinquency scales than did controls. When this result was examined more closely it was evident that the components of the delinquency scale which accounted for this group difference included the sadness subscale, the lack of interest/impulsivity subscale, and the "other" subscale. Items on these subscales focused on such factors as negative or depressed mood, distractability, inability to concentrate or remain focused, and poor family relations. As can be seen, these two scales, and the component subscales, can be considered to reflect either sources of stress, or end products of stress.

In summary, it would appear that children of chronic headache sufferers tend to be more somatically focused than their control counterparts, that this heightened concern with their health status may be either a reaction to, or a means of coping with ongoing stress, and that this way of coping tends to be associated with a higher frequency of headaches.
experienced by these children. One important point needs to be added here, however. As indicated in the last section, it may be the case that when children of chronic headache sufferers are faced with a stressful situation they respond at a psychophysiologic level, while suppressing more overt expressions of their reaction. Thus, if they appear to be more somatically focused when stressed, it may be due to the fact that they have more to be focused on than children who are able to express their reactions more overtly.

4.3 Family Dynamics, Family Environment and Family Illness Patterns.

A number of hypotheses were made regarding family functioning and illness behaviour. First, it was suggested that a positive correlation would be observed between measures of parent and child psychological symptom severity. This relationship was examined separately for each of the parent-child groups for reasons outlined earlier. A number of strong relationships were identified. The most interesting of these was a positive correlation between parents' somatization scores and children's somatic concerns scores. This correlation was found to be significant in both groups (r = .72 in the chronic headache group and r = .35 in the control group). What makes this
relationship particularly noteworthy is the fact that in a multiple regression analysis which included a number of parent variables as predictors, degree of parents' somatization was the only variable to predict monthly frequency of headaches reported by children. Somatization scores accounted for 25% of the variance in this prediction. As noted earlier, children's scores on the somatic concerns scale of the PIC was the only child variable to predict monthly frequency of headaches. Combining these two results suggests that when both child and parent tend to be somatizers the child is more predisposed to experiencing headaches. If somatization is viewed as a characteristic style of coping as suggested by Wirt et al (1984), then this finding is consistent with McCubbin's (1979) contention that there exists characteristic family coping strategies, and that these may affect the vulnerability of family members to certain illnesses. For example, if family members tend to respond to stressful situations through increased muscle contraction as suggested by Traue et al (1985), then they may be more predisposed to headaches following such periods.

Another finding of interest is the pattern of correlations between parent and child symptom severity in the two groups. In the chronic pain group positive correlations were found between all scales of the SCL-90 and several of the PIC scales (i.e. somatic
concerns, family relations, anxiety, and psychoticism). No such pattern was observed in the control group. It will be recalled that with the exception of paranoid ideation and psychoticsm, chronic headache sufferers have significantly higher elevations on all scales of the SCL-90, including the general severity index (GSI). In the study by Shanfield et al (1979) it was found that there was a significant correlation between pain patient and spouse GSI scores when the patient's scores were above the mean for normative psychiatric patients. Results of the present study can be considered analogous to this finding. In fact, given that normal, as opposed to psychiatric controls were used in the present study, the result suggests that emotional adjustment of children may be more influenced by levels of parental symptom severity, than the emotional adjustment of spouses. This would make sense given that a child's capacity to deal with and filter out pathological behaviour is likely to be less developed than that of a mature adult.

One potential limitation of these results is that the parent was require to fill out both the PIC and the SCL-90. Thus, it may be argued that at least part of the observed correlation in parent and child emotional functioning is due to shared method variance. However, this is not a serious limitation as all scales of the PIC have been shown to correlate highly with more
objective ratings of children's behaviour (Wirt, 1984). Furthermore, interrater agreement for the instrument as a whole has been found to be quite acceptable, (Roskos 1974, cited in Wirt et al, 1984).

The prediction was made that ratings of family environment would reflect more dysfunction among families of chronic headache sufferers as rated by pain patients, than families of healthy controls. This hypothesis was not substantiated by the results. The absence of an effect can be explained in at least two ways. First, it may reflect the tendency of chronic pain patients to idealize relationships both previous to and following the onset of pain. This tendency was described by Mohamed et al (1979) when they examined evaluations of marital relationships by chronic pain patients and their spouses. Patient evaluations were found to be considerably more positive than ratings provided by the spouse. Ideally, ratings of family functioning by the child would have been informative in the present study. Initially, these ratings were to be solicited. However, due to the length of the procedure used this was not possible.

A second explanation is that there may be no differences in the quality of family environment in the two groups. However, in order to determine this ratings of family functioning must be provided by at least one other family member. Ideally, several
ratings of family environment should be obtained.

The final result to be examined is the relationship between pain patients' ratings of family environment and indices of pain severity. As stated earlier, measures of pain severity also included ratings of mood, degree to which pain interferes with daily activity, and activity level. One consistent relationship which emerged is the negative correlation between ratings of active-recreational orientation, that is, the extent of a family's participation in social and recreational activities, and (1) pain severity, (2) the degree to which pain interferes with daily activities, and (3) negative mood. Thus, amongst chronic headache sufferers, patients reporting a high degree of active-recreational orientation within their families were more likely to provide lower ratings of pain severity. Likewise, they were less likely to indicate that their pain interferes with daily activities or report lower mood. This is not a surprising result, and in fact, one which appears to make intuitive sense. The point to be emphasized however, is that the relationship is based on a rating of general family functioning. Thus, one would expect that individuals who have severe pain and low mood, and feel that their pain interferes with their daily activities, would not be highly involved in social or recreational activities. However, it is not so clear
that an entire family should respond in a like manner as a result of having one such family member. Thus, this finding stresses the importance of the interaction between a patient's level of functioning and functioning of other family members.

The other interesting finding is actually a nonfinding. There seemed to be no relationship between level of pain severity, or general disability, and the dimensions of family cohesion or control. A number of investigators (Minuchin, 1974; Feuerstein et al, 1985) have described "psychosomatic" families to be highly controlled and enmeshed, or overly cohesive. That was not the case in this sample. One possibility is that the small sample size in the present study did not allow for this finding to be replicated. However, it is also possible that this may not be as general of a relationship as indicated by previous research. It is possible that this relationship is specific to particular classes of illness or disability.

A final note that is worthy of mention is the strong negative correlation between pain severity ratings on the WHYMPI, and level of expressiveness in a family as measured by the FES. It would appear that the greater the level of expressiveness in a family the less the degree of pain severity reported by chronic headache sufferers. This finding suggests a refinement of Traue et al's (1985) conclusion that headache
patients tend to be more overtly unexpressive than nonheadache sufferers in the face of stress. It may be the case that the degree to which headache sufferers respond overtly to stress is a reflection of a more general communication pattern that is established within their families.

4.4 Future Directions.

A number of investigators have indicated that family members of chronic pain patients have a higher incidence of pain problems or pain complaints than family members of various controls (Mohamed et al, 1978). Violin and Giurgea (1984) took this finding even further by demonstrating that as many as 78% of chronic pain patients had at least one other family member who suffered from chronic pain. It was these reports which led to a number of the predictions made in the present study. One result which emerged in this work is that even at a relatively early age, children of chronic headache sufferers are already reporting a higher incidence of headaches than their control counterparts. The central thesis posited herein is that modeling may be at least partially responsible for this effect. However, the support for this contention is somewhat mixed. In order for a clearer answer to emerge a number of things need to occur. First, it is
necessary that more sensitive and valid measures be
developed in order to differentiate between pain
behaviours of chronic pain sufferers and/or their
offspring and healthy controls. The auditory stimulus
task appeared to be a promising start. However,
clearly more work needs to be done in order to
establish the suitability of this technique in similar
studies.

A second direction that needs to be explored is
the possibility of identifying various means by which
parental modeling may be observed under natural
conditions. Along with this one must include such
considerations as defining the minimal conditions
necessary in order for modeling to occur. This may
include such considerations as exposure time,
parent/child gender combinations, critical age of
exposure, etc.

A third area of investigation suggested by the
present results would involve attempts to identify
other variables which may account for the higher
incidence of headaches among children of chronic
headache sufferers. One possibility would be to
examine these children’s responses to stress, and their
associated coping styles. Taking this one step
further, it would be interesting to test McCubbin’s
hypothesis in a more systematic manner. Specifically,
to determine (1) if families have characteristic coping
styles and (2) if such coping styles are related to family illness patterns (McCubbin, 1979).

In studying the nature of family environments, it is essential that multiple ratings of family functioning be obtained. If pain patients are found consistently to present a more optimistic account of their relationships than do other family members, we may need to begin paying closer attention to this potential blind spot in our treatment of these patients. It may well be that the higher incidence of marital discord in these families is due to the patient's inability to recognize, and in turn deal with, such interpersonal difficulties.

Finally, a word about the focus of research and treatment in the area of chronic pain. For the most part the efforts of researchers and clinicians alike, have focused on gaining an understanding of chronic pain from the perspective of the patient. In instances where attempts have been made to expand this focus, the work has been either fairly broad (e.g. consideration of cultural influences), or not broad enough (e.g. examination of the marital relationship and how it is effected by the patient's pain condition as opposed to a broader family perspective). Undoubtedly, this work is important and needs to continue. However, to date, the effects of chronic pain on patients' children has not been adequately investigated. The above results
suggest that children of pain patients differ on several dimensions than children of healthy controls. Furthermore, the data suggest that these differences may in part be related to the manner in which these children are affected by their parents' condition. Children may experience their parents' suffering as an ongoing stressor. However, they may be brought up in an environment in which (a) they are not taught how to adequately deal with such a stressor and/or (b) they are not exposed to effective coping models. Furthermore, they are not included in any component of their parents' treatment program. Although results of the present study do not allow for any specific suggestions as to how children could be included in their parents' treatment program, they do suggest that future research should address this issue.
REFERENCES


APPENDIX A
Appendix A

Rationale Presentation

We are concerned with the family's reaction to various chronic medical conditions and illnesses. Specifically, we are examining the degree to which such conditions and illnesses affect children's level of adjustment in the family environment.

A great deal of research has examined the ways in which various chronic illnesses affect the marital relationship. In fact, a number of studies have described the manner in which couples must adjust various aspects of their relationship in response to one of the partners having a chronic medical condition. This information has been quite useful in helping health care workers provide patients with more complete information regarding necessary adjustments.

One area in which our knowledge lacks, however, is our understanding of the impact such conditions have on children's adjustment. Our study examines children's reactions to illness in general, children's understanding of and responses to parent's communications about their illnesses or occasional discomforts, and children's level of adjustment.

As has already been explained to you on the phone, you will be asked to fill out some questionnaires and take part in a brief interview. In addition, both of you will be asked to listen to a series of tones
through a pair of head phones. This part of the study will be very similar to taking a hearing test.

Your participation in this study is completely voluntary, and you have the right to withdraw participation at any point you chose. We would like you to know that we greatly appreciate the time you have taken to come here and take part in this study. Now I would like to answer any questions that you may have before we begin.
APPENDIX B
Appendix B

Informed Consent Agreement

Department of Psychology
University of Saskatchewan

My child and I hereby volunteer to participate in a research project that involves the following:

1. Listening to a series of tones through a pair of headphones.
2. Completing a number of questionnaires.
3. Taking part in a brief interview following the above.

On behalf of my child and I, I give my permission for recordings and observations to be made, with the understanding that all information collected will be strictly confidential and used only for the purposes of the present study.

The purposes and nature of the above conditions have been fully explained to my child and I by Mr. Sam Mikail. We have been given the opportunity to ask questions concerning the investigation, and any such questions have been answered to our full satisfaction.

It has been explained to us that at any time during the course of the study we may revoke our consent and withdraw participation.

I have read and understood the above.

Signed on the University of Saskatchewan campus, Saskatoon, Saskatchewan, on this _____ day of ____, 1986.

Volunteer ______________________________
Witness _______________________________
Appendix C

Child Health Checklist

Listed below are a number of illnesses and conditions children may contract. Please place a check mark beside each condition your child has experienced and indicate the number of times throughout your son or daughter's childhood, he/she has contracted the illness, and the last time it was contracted.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Number of times contracted</th>
<th>Last occasion contracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appendicitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broken bones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burns (Severe)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chickenpox</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleft lip or palate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club foot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congenital heart defect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eczema</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epilepsy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hernia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>Number of times Contracted</td>
<td>Last occasion Contracted</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>----------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Influenza</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvenile rheumatoid arthritis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lupus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mumps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otitis media</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poisoning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeated nose bleeds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rheumatic fever</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ringworm infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scarlet fever</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staph infections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus (lock jaw)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonsillitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin deficiency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix D

Pain and Headache Form

We want to learn more about your pain and how it affects your life. Under each question is a scale to be used to determine your answer. Read each question carefully and after selecting the proper number from the scale under the questions colour in the corresponding number on the answer sheet to indicate how that specific question applies to you. An example may help you to better understand how you should proceed to answer these questions.

Example

How nervous are you when you go to a dentist?

0 1 2 3 4 5 6

Not at all Extremely

Nervous Nervous

If you are not at all nervous about going to a dentist, you would want to select the number 0, and colour in the "0" on the answer sheet. If you are very nervous about going to a dentist, you would then select the number 6, and colour in the "6" on the answer sheet.
1. Rate the level of your pain at the present moment.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>no pain</td>
<td>very intense pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. In general, how much does your pain interfere with your day to day activities?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>no interference</td>
<td>extreme interference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Since the time you developed pain, how much has your pain changed your ability to work? (Mark 9 if you have retired for reasons other than your pain)

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>no change</td>
<td>extreme change</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

4. How much has your pain changed the amount of satisfaction or enjoyment you get from participating in social and recreational activities?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>no change</td>
<td>extreme change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. How supportive or helpful is your spouse (significant other) to you in relation to your pain?

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<tr>
<td>not at all supportive</td>
<td>extremely supportive</td>
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6. Rate your overall mood during the past week.

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<td>extremely low mood</td>
<td>extremely high mood</td>
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7. On the average, how severe has your pain been during the last week?

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<td>not at all severe</td>
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8. How much has your pain changed your ability to participate in recreational and other social activities?

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<tr>
<td>no change</td>
<td>extreme change</td>
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9. How much has your pain changed the amount of satisfaction you get from family-related activities?

   0  1  2  3  4  5  6
   no change          extreme change

10. How worried is your spouse (significant other) about you because of your pain?

   0  1  2  3  4  5  6
   not at all           extremely
   worried              worried

11. During the past week how much control do you feel that you have had over your life?

   0  1  2  3  4  5  6
   not at all          extremely
   in control          in control

12. How much suffering do you experience because of your pain?

   0  1  2  3  4  5  6
   no suffering        extreme suffering

13. How much has your pain changed your relationship with your spouse, family, or significant others?

   0  1  2  3  4  5  6
   no change           extreme change

14. How much has your pain changed the amount of satisfaction or enjoyment you get from work? (Mark 9 if you are not presently working).

   0  1  2  3  4  5  6
   no change           extreme change

15. How attentive is your spouse (significant other) to you because of your pain?

   0  1  2  3  4  5  6
   not at all          extremely
   attentive           attentive

16. During the past week how much do you feel that you've been able to deal with your problems?

   0  1  2  3  4  5  6
   not at all          extremely well
17. How much has your pain changed your ability to do household chores?

0 1 2 3 4 5 6
no change extreme change

18. During the past week how irritable have you been?

0 1 2 3 4 5 6
not at all extremely
irritable irritable

19. How much has your pain changed your friendships with people other than your family?

0 1 2 3 4 5 6
no change extreme change

20. During the past week how tense or anxious have you been?

0 1 2 3 4 5 6
not at all extremely
tense or anxious tense or anxious

In this section we are interested in knowing how your spouse (or significant other) responds when he or she knows that you are in pain. Use the scale listed below each question to select the number which best indicates how often your spouse responds to you in that particular way when you are in pain, then colour in the corresponding number on the answer sheet. Please answer all of the questions.

21. Ignores me.

0 1 2 3 4 5 6
never very often

22. Asks me what he/she can do to help.

0 1 2 3 4 5 6
never very often

23. Reads to me.

0 1 2 3 4 5 6
never very often

24. Expresses irritation at me.

0 1 2 3 4 5 6
never very often
25. Takes over my jobs or duties.
   0  1  2  3  4  5  6
   never    very often

26. Talks to me about something else to take my mind off the pain.
   0  1  2  3  4  5  6
   never    very often

27. Expresses frustration at me.
   0  1  2  3  4  5  6
   never    very often

28. Tries to get me to rest.
   0  1  2  3  4  5  6
   never    very often

29. Tries to involve me in some activity.
   0  1  2  3  4  5  6
   never    very often

30. Expresses anger at me.
   0  1  2  3  4  5  6
   never    very often

   0  1  2  3  4  5  6
   never    very often

32. Encourages me to work on a hobby.
   0  1  2  3  4  5  6
   never    very often

33. Gets me something to eat or drink.
   0  1  2  3  4  5  6
   never    very often

34. Turns on the T.V. to take my mind off my pain.
   0  1  2  3  4  5  6
   never    very often
Listed below are a number of common daily activities. Please indicate how often you do each of these activities by selecting the appropriate number on the scale listed below each activity, and filling in the corresponding number on the answer sheet. Please complete all questions.

35. Wash dishes.

0 1 2 3 4 5 6
never very often

36. Mow the lawn. (mark 9 if you do not have a lawn to mow)

0 1 2 3 4 5 6
never very often

37. Go out to eat.

0 1 2 3 4 5 6
never very often

38. Play cards or other games.

0 1 2 3 4 5 6
never very often

39. Go grocery shopping.

0 1 2 3 4 5 6
never very often

40. Work in the garden. (mark 9 if you have no garden)

0 1 2 3 4 5 6
never very often

41. Go to a movie.

0 1 2 3 4 5 6
never very often

42. Visit friends.

0 1 2 3 4 5 6
never very often

43. Help with the house cleaning.

0 1 2 3 4 5 6
never very often
44. Work on the car. (Mark 9 if you have no car)

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45. Take a ride in a car or bus.

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46. Visit relatives. (Mark 9 if you have no relatives within 100 miles).

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47. Prepare a meal.

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48. Wash the car. (Mark 9 if you have no car)

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49. Take a trip.

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50. Go to a park or beach.

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51. Do the laundry.

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52. Work on a needed house hold repair.

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APPENDIX E
In this part of the questionnaire there are 90 statements. They are statements about families. You are to decide which of these statements are true of your family and which are false. Make all your marks on the separate answer sheets. If you think the statement is True or mostly True of your family, fill in the circle marked "1" or (B). If you think the statement is False or mostly False of your family, fill in the circle marked "2" or (C).

You may feel that some of the statements are true for some family members and false for others. Mark "1" or (B) if the statement is True for most members. Mark "2" or (C) if the statement is False for most members. If the members are evenly divided, decide what is the stronger overall impression and answer accordingly.

Remember, we would like to know what your family seems like to you. So do not try to figure out how other members see your family, but do give us your general impression of your family for each statement.
1. Family members really help and support one another.
2. Family members often keep their feelings to themselves.
3. We fight a lot in our family.
4. We don't do things on our own very often in our family.
5. We feel it is important to be the best at whatever you do.
6. We often talk about political and social problems.
7. We spend most weekends and evenings at home.
8. Family members attend church, synagogue, or Sunday School fairly often.
9. Activities in our family are pretty carefully planned.
10. Family members are rarely ordered around.
11. We often seem to be killing time at home.
12. We say anything we want to around home.
13. Family members rarely become openly angry.
14. In our family, we are strongly encouraged to be independent.
15. Getting ahead in life is very important in our family.
16. We rarely go to lectures, plays or concerts.
17. Friends often come over for dinner or to visit.
18. We don't say prayers in our family.
19. We are generally very neat and orderly.
20. There are very few rules to follow in our family.
21. We put a lot of energy into what we do at home.
22. It's hard to "blow off steam" at home without upsetting somebody.
23. Family members sometimes get so angry they throw things.
24. We think things out for ourselves in our family.
25. How much money a person makes is not very important to us.
26. Learning about new and different things is very important in our family.
27. Nobody in our family is active in sports, Little League, bowling, etc.
28. We often talk about the religious meaning of Christmas, Passover, or other holidays.
29. It's often hard to find things when you need them in our household.
30. There is one family member who makes most of the decisions.
31. There is a feeling of togetherness in our family.
32. We tell each other about our personal problems.
33. Family members hardly ever lose their tempers.
34. We come and go as we want to in our family.
35. We believe in competition and "may the best man win."
36. We are not that interested in cultural activities.
37. We often go to movies, sports events, camping, etc.
38. We don't believe in heaven or hell.
39. Being on time is very important in our family.
40. There are set ways of doing things at home.
41. We rarely volunteer when something has to be done at home.
42. If we feel like doing something on the spur of the moment we often just pick up and go.
43. Family members often criticize each other.
44. There is very little privacy in our family.
45. We always strive to do things just a little better the next time.
46. We rarely have intellectual discussions.
47. Everyone in our family has a hobby or two.
48. Family members have strict ideas about what is right and wrong.
49. People change their minds often in our family.
50. There is a strong emphasis on following rules in our family.
51. Family members really back each other up.
52. Someone usually gets upset if you complain in our family.
53. Family members sometimes hit each other.
54. Family members almost always rely on themselves when a problem comes up.
55. Family members rarely worry about job promotions, school grades, etc.
56. Someone in our family plays a musical instrument.
57. Family members are not very involved in recreational activities outside work or school.
58. We believe there are some things you just have to take on faith.

59. Family members make sure their rooms are neat.

60. Everyone has an equal say in family decisions.

61. There is very little group spirit in our family.

62. Money and paying bills is openly talked about in our family.

63. If there's a disagreement in our family, we try hard to smooth things over and keep the peace.

64. Family members strongly encourage each other to stand up for their rights.

65. In our family, we don't try that hard to succeed.

66. Family members often go to the library.

67. Family members sometimes attend courses or take lessons for some hobby or interest (outside of school).

68. In our family each person has different ideas about what is right and wrong.

69. Each person's duties are clearly defined in our family.

70. We can do whatever we want to in our family.

71. We really get along well with each other.

72. We are usually careful about what we say to each other.

73. Family members often try to one-up or out-do each other.

74. It's hard to be by yourself without hurting someone's feelings in our household.
75. "Work before play" is the rule in our family.
76. Watching T.V. is more important than reading in our family.
77. Family members go out a lot.
78. The Bible is a very important book in our home.
79. Money is not handled very carefully in our family.
80. Rules are pretty inflexible in our household.
81. There is plenty of time and attention for everyone in our family.
82. There are a lot of spontaneous discussions in our family.
83. In our family, we believe you don't ever get anywhere by raising your voice.
84. We are not really encouraged to speak up for ourselves in our family.
85. Family members are often compared with others as to how well they are doing at work or school.
86. Family members really like music, art and literature.
87. Our main form of entertainment is watching T.V. or listening to the radio.
88. Family members believe that if you sin you will be punished.
89. Dishes are usually done immediately after eating.
90. You can't get away with much in our family.
Appendix F

Personality Inventory For Children

In this part of the questionnaire there are a number of statements about children. You are to decide which of these statements are true of your child and which are false. Make all your marks on the separate answer sheets.

If you think the statement is True or mostly True of your child fill in the circle marked "1" or (B). If you think the statement is False or mostly False of your child, fill in the circle marked "2" or (C).

It is important to answer all questions, and not leave any questions blank. If you are unsure of a question you are encouraged to take your best guess.

When you have filled an entire answer sheet simply move on to the next answer sheet. As you go along check to see that the number of your response on the answer sheet corresponds to the number of the question on the questionnaire.
1. My child often plays with a group of children.
3. Other children often get mad at my child.
4. My child worries about things that usually only adults worry about.
5. My child has many friends.
6. My child seems average or above average in intelligence.
7. My child's manners sometimes embarrass me.
8. My child has a good sense of humor.
10. My child is worried about sin.
11. Other children don't seem to listen to or notice my child much.
13. My child has little self-confidence.
14. I often wish my child would be more friendly.
15. My child can comb his (her) own hair.
16. My child is usually rejected by other children.
17. My child seems to enjoy destroying things.
18. Now and then my child writes letters to friends.
19. Thunder and lightning bother my child.
20. The school says my child needs help in getting along with other children.
21. My child often asks if I love him (her).
22. Other children look up to my child as a leader.
23. My child could ride a tricycle by age five years.
25. My child frequently complains of being hot even on cold days.
26. My child's behaviour often makes others angry.
27. Recently my child has complained of eye trouble.
28. Others think my child is talented.
29. My child frequently has gas on the stomach (sour stomach).
30. My child is good at lying his (her) way out of trouble.
31. My child often cheats other children in deals.
32. My child is good at leading games and things.
33. At one time my child had speech difficulties.
34. Pester ing others is a problem with my child.
35. My child can cut things with scissors as well as can others of his (her) age.
36. My child doesn't seem to care to be with others.
37. My child has difficulty doing things with his (her) hands.
38. Others think my child is mean.
39. My child seems to know everyone in the neighborhood.
40. My child would never take advantage of others.
41. My child can be left home alone without danger.
42. My child jumps from one thing to another.
43. My child has been in trouble for attacking others.
44. My child seems too serious minded.
45. My child has more friends than most children.
16. When my child gets mad, watch out.
17. My child really has no real friend.
18. My child is as happy as ever.
19. My child often complains that others don't understand him (her).
20. My child has very few friends.
21. My child likes to play active games and sports.
22. Sometimes I worry about my child's lack of concern for others' feelings.
23. Often my child is afraid of little things.
24. My child tends to see how much he (she) can get away with.
25. My child almost never argues.
26. My child often disobeys me.
27. My child likes to show off.
28. Others have said my child has a lot of "personality."
29. My child goes to bed on time without complaining.
30. My child likes to "boss" others around.
31. Reading has been a problem for my child.
32. A scolding is enough to make my child behave.
33. My child sometimes disobeys his (her) parents.
34. My child is in a special class in school (for slow learners).
35. My child usually plays alone.
37. My child often brings friends home.
38. My child learned to count things by age six years.
69. My child could print his (her) first name by age six years.

70. My child doesn't seem to learn from mistakes.

71. My child can't seem to wait for things like other children do.

72. My child always does his (her) homework on time.

73. My child is usually a leader in groups.

74. Sometimes my child lies to avoid embarrassment or punishment.

75. Other children make fun of my child's different ideas.

76. Sometimes my child's muscles twitch.

77. My child worries about talking to others.

78. My child first talked before he (she) was two years old.

79. School teachers complain that my child can't sit still.

80. My child has some bad habits.

81. Several times my child has spoken of a lump in his (her) throat.

82. My child frequently has nightmares.

83. My child almost never acts selfishly.

84. My child is usually in good spirits.

85. My child seems fearful of blood.

86. My child seems more clumsy than other children his (her) age.

87. My child will do anything on a dare.

88. My child sometimes becomes envious of the
possessions or good fortune of others.

89. Shyness is my child's biggest trouble.

90. Usually my child gets along well with others.

91. My child gets lost easily.

92. My child often has headaches.

93. My child seems to get along with everyone.

94. My child is easily embarrassed.

95. My child is very popular with other children.

96. My child gets confused easily.

97. My child is almost always smiling.

98. My child loses most friends because of his (her) temper.

99. My child is shy with children his (her) own age.

100. My child was difficult to toilet train.

101. My child wants a lot of attention when sick.

102. My child can count change when buying something.

103. My child can tell the time fairly well.

104. Many times my child has become violent.

105. My child can take a bath by himself (her) self.

106. Recently my child has complained of chest pains.

107. There is seldom a need to correct or criticize my child.

108. My child has as much pep and energy as most children.

109. Recently the school has sent home notes about my child's bad behaviour.

110. Sometimes my child will put off doing a chore.

111. My child often talks about death.
112. My child has been difficult to manage.
113. Sometimes my child's room is messy.
114. My child is usually afraid to meet new people.
115. My child almost never needs punishing or scolding.
116. My child could eat with a fork before age four years.
117. Often my child complains of blurring (blurred vision).
118. My child needs protection from everyday dangers.
119. My child respects the property of others.
120. Frequently my child will put his (her) hands over his (her) ears.
121. Everything has to be perfect or my child isn't satisfied.
122. Spanking doesn't seem to affect my child.
123. My child talks a lot about his (her) size or weight.
124. My child often will cry for no apparent reason.
125. My child will worry a lot before starting something new.
126. My child usually looks at the bright side of things.
127. My child often has crying spells.
128. Sometimes my child gets hot all over without reason.
129. My child seems tired most of the time.
130. Others have remarked how smart my child is.
131. My child takes illness harder than most children.
132. My child tends to pity him (her) self.
133. Others always listen when my child speaks.
134. Several times my child had complaints, but the doctor could find nothing wrong.
135. I often wonder if my child is lonely.
136. Usually my child takes things in stride.
137. My child is likely to take remarks the wrong way.
138. Little things upset my child.
139. My child keeps thoughts to him (her) self.
140. It has been a long time since our family has gone out together.
141. My child has never mentioned his (her) heart racing or pounding.
142. My child has usually been a quiet child.
143. At times my child has seriously hurt others.
144. My child has never had cramps in the legs.
145. At times my child yells out for no reason.
146. My child is liable to scream if disturbed.
147. My child has no special talents.
148. Our family seems to enjoy each other more than most families.
149. My child broods some.
150. My child could do better in school if he (she) tried.
151. My child never liked to be cuddled.
152. Our marriage has been very unstable (shaky).
153. The child's father seems jealous of the child.
154. I am afraid my child might be going insane.
155. My child seldom talks about sickness.
156. My child has had convulsions.
157. My child often gets up at night.
158. Most of my child's friends are younger than he (she) is.
159. There is a lot of swearing at our home.
160. My child never takes the lead in things.
161. My child takes criticism easily.
162. My child sometimes swears at me.
163. My child is not worried about disease.
164. My child seems bored with school.
165. The child's parents are now separated or divorced.
166. My child gets exhausted so easily.
167. I can't get my child to do his (her) school lessons.
168. My child stays close to me when we go out.
169. Often my child goes about wringing his (her) hands.
170. The child's parents have broken up their marriage several times.
171. Sometimes my child runs errands for me.
172. It is not too unlikely that my child will stay in the house for days at a time.
173. My child has had brief periods of time when he (she) seems unaware of everything that is going on.
174. My child has never had face twitchings.
175. My child usually runs rather than walks.
176. My child is different from most children.
177. My child is afraid of dying.
178. My child believes in God.
179. My child doesn't seem to care for fun.
180. Often my child will sleep most of the day on a holiday.
181. My child often stays in his (her) room for hours.
182. My child has never had any paralysis.
183. My child seldom breaks rules.
184. How to raise the child has never been a problem at our house.
185. Several times my child has threatened to kill him (her) self.
186. My child usually doesn't trust others.
187. My child has many friends of the opposite sex.
188. My child seems unhappy about our home life.
189. Others often remark how moody my child is.
190. The trouble with my child is a "chip on the shoulder."
191. Nothing seems to scare my child.
192. My child doesn't seem to be interested in practical things.
193. My child can't seem to keep attention on anything.
194. The child's parents are not active in community affairs.
195. My child tends to swallow food without chewing it.
196. My child loves to stay overnight at a friend's house.
197. School has been easy for my child.
198. My child can't sit still in school because of nervousness.
199. I do not approve of most of my child's friends.
200. Constipation has never been a problem for my child.
201. My child is often restless.
202. Several times my child has been in trouble for stealing.
203. My child seldom complains of stomachaches.
204. My child has never failed a grade in school.
205. My child is afraid of strangers.
206. The child's parents can't seem to live within their income.
207. My child loves to work with numbers.
208. My child has never been in trouble with the police.
209. My child seldom visits a doctor.
210. My child's favorite stories are fairy tales or nursery rhymes.
211. The child's father doesn't understand the child.
212. Dizzy spells are no problem with my child.
213. The child's father drinks too much.
214. My child tends to brag.
215. My child would rather be with adults than with children his (her) own age.
216. My child tends to be pretty stubborn.
217. My child seldom talks.
218. Our whole family seldom gets to eat together.
219. Reading is my child's favorite pastime.
220. The child's father usually makes the important decisions at our house.
221. "Bad days" are frequent with my child.
222. My child insists on keeping the light on while sleeping.
223. My child seems to prefer adults to children.
224. My child is dependent on others.
225. My child gets common colds more often than most children.
226. The child's parents disagree a lot about rearing the child.
227. Often my child locks himself (herself) in the bedroom.
228. Often my child will laugh for no apparent reason.
230. My child is not as strong as most children.
231. Others have remarked how self-confident my child is in a group.
232. Others often remark how sensible my child is.
233. My child seems to understand everything that is said.
234. Sometimes the child's father will go away for days after an argument.
235. Money seems to be my child's biggest interest.
236. I have often found my child playing in the toilet.
237. The child's father sometimes gets drunk and mean.
238. My child is a healthy child.
239. My child thinks others are plotting against him (or her).
240. Usually my child plays inside.
241. The child's father seldom misses work.
242. Often my child takes walks alone.
243. The child's parents have set firm rules that must be obeyed.
244. Often my child will wander about aimlessly.
245. Several times my child has threatened to run away.
246. At times my child has difficulty breathing.
247. There is always a lot of argument at our dinner table.
248. My child plays with friends who are often in trouble.
249. My child seldom has nose bleeds.
250. My child has never been expelled from school.
251. My child whines a lot.
252. My child has never run away from home.
253. My child shows unusual talent.
254. Speaking up is no problem for my child.
255. I had an especially difficult time with temper tantrums in my child at an early age.
256. Sharing things has been no problem for my child.
257. The child's parents always discuss important matters before making a decision.
258. My child smokes at home.
259. The child's father frequently "blows up" at the
child.

260. My child is shy with adults.

261. I have heard that my child drinks alcohol.

262. My child is rather absent-minded.

263. My child is afraid of the dark.

264. My child boasts about being sent to the principal in school.

265. My child never has fainting spells.

266. The child's father is too strict with the child.

267. My child will never clean his (or her) room.

268. My child is able to keep out of everyday dangers.

269. Most of my child's time is taken up watching television.

270. Frequently my child has a high fever.

271. The child's father is hardly ever home.

272. Sometimes I don't understand what my child means.

273. My child is exceptionally neat and clean.

274. My child speaks of him (her) self as stupid or dumb.

275. There is a lot of tension in our home.

276. Several times my child has threatened to kill others.

277. The child's father spends very little time with the child.

278. My child seldom has back pains.

279. The child's father has very little patience with the child.

280. The child's parents frequently quarrel.
Appendix G

Symptom Check List-90

Name: ___________________  Marital Status: __________
Age: ____________________  Sex:  Male  Female
Number of Sons ___________  Ages: ____________
Number of Daughters _______  Ages: ____________

Instructions

Below is a list of problems and complaints that people sometimes have. Read each one carefully, and select one of the numbered descriptors that best describes HOW MUCH DISCOMFORT THAT PROBLEM HAS CAUSED YOU DURING THE PAST 6 MONTHS INCLUDING TODAY. Place that number in the blank to the right of the problem. Do not skip any items, and print your number clearly. If you change your mind, erase your first number completely. Read the example below before beginning.

EXAMPLE

HOW MUCH WERE YOU DISTRESSED BY:  DESCRIPTORS

Ex. Body Aches........... 0 Not at all

Answer 1  A little bit

2 Moderately

3 Quite a bit

4 Extremely
HOW MUCH WERE YOU DISTRESSED BY:  

Descriptors

0 Not at all
1 A little bit
2 Moderately
3 Quite a bit
4 Extremely

1. Headaches........................................

2. Nervousness or shakiness inside................

3. Repeated unpleasant thoughts that won’t leave your mind.................................

4. Faintness or dizziness..........................

5. Loss of sexual interest or pleasure...........

6. Feeling critical of others........................

7. The idea that someone else can control your thoughts..................................

8. Feeling others are to blame for most of your troubles........................................

9. Trouble remembering things.....................

10. Worried about sloppiness or carelessness....... 

11. Feeling easily annoyed or irritated...........

12. Pains in heart or chest..........................

13. Feeling afraid in open spaces or on the streets.....

14. Feeling low in energy or slowed down...........

15. Thoughts of ending your life.....................

16. Hearing voices that other people do not hear.....

17. Trembling........................................

18. Feeling that most people cannot be trusted......

19. Poor appetite....................................
20. Crying easily
21. Feeling shy or uneasy with the opposite sex
22. Feelings of being trapped or caught
23. Suddenly scared for no reason
24. Temper outbursts that you could not control
25. Feeling afraid to go out of your house alone
26. Blaming yourself for things
27. Pains in lower back
28. Feeling blocked in getting things done
29. Feeling lonely
30. Feeling blue
31. Worrying too much about things
32. Feeling no interest in things
33. Feeling fearful
34. Your feelings being hurt easily
35. Other people being aware of your private thoughts
36. Feeling others do not understand you or are unsympathetic
37. Feeling that people are unfriendly or dislike you
38. Having to do things very slowly to ensure correctness
39. Heart pounding or racing
40. Nausea or upset stomachs
41. Feeling inferior to others
42. Soreness of your muscles
43. Feeling that you are watched or talked about by others
44. Trouble falling asleep
45. Having to check and doublecheck what you do
46. Difficulty making decisions
47. Feelingn afraid to travel on buses, subways or trains
48. Trouble getting your breath
49. Hot or cold spells
50. Having to avoid certain things, places, or activities because they frighten you
51. Your mind going blank
52. Numbness or tingling in parts of your body
53. A lump in your throat
54. Feeling hopeless about the future
55. Trouble concentrating
56. Feeling weak in parts of your body
57. Feeling tense or keyed up
58. Heavy feelings in your arms or legs
59. Thoughts of death or dying
60. Overeating
61. Feeling uneasy when people are watching or talking about you
62. Having thoughts that are not your own
63. Having urges to beat, injur, or harm someone
64. Awakening in the early morning
65. Having to repeat the same actions such as touching, counting, washing
66. Sleep that is restless or disturbed
67. Having urges to break or smash things
68. Having ideas or beliefs that others do not share.
69. Feeling very self-conscious with others

70. Feeling uneasy in crowds, such as shopping or at a movie

71. Feeling everything is an effort

72. Spells of terror or panic

73. Feeling uncomfortable about eating or drinking in public

74. Getting into frequent arguments

75. Feeling nervous when you are left alone

76. Others not giving you proper credit for your achievements

77. Feeling lonely even when you are with people

78. Feeling so restless you couldn't sit still

79. Feelings of worthlessness

80. The feeling that something bad is going to happen to you

81. Shouting or throwing things

82. Feeling afraid you will faint in public

83. Feeling that people will take advantage of you if you let them

84. Having thoughts about sex that bother you a lot

85. The idea that you should be punished for your sins

86. Thoughts and images of a frightening nature

87. The idea that something serious is wrong with your body

88. Never feeling close to another person

89. Feelings of guilt
90. The idea that something is wrong with your mind...
Appendix H

Patient Letter

Dear [Your Name]:

A study examining the effects of various medical conditions on family functioning is being conducted through the Department of Psychology, University of Saskatchewan. You and one of your children (age 10 to 16) are invited to participate in this study. With Dr. G. M. Wyant's approval your name was selected from the files of the Pain-Management Service, University Hospital, Saskatoon.

If you are interested in taking part in the study you are asked to fill out the enclosed questionnaire and mail it back to us in the envelope provided. Once we receive your completed questionnaire we will contact you by phone in order to tell you more about your potential participation. At this time if you decide to participate in the study, a time will be arranged for you and your son or daughter to come to the University in order to complete several other questionnaires and tasks. This would involve approximately 1 to 2 hours of your time.

We would like to remind you that this type of research is made possible by the cooperation of people like yourself. In the past other people who have participated in studies similar to this one have commented on how interesting and educational they have found the experience. We are confident that both you and your child will find your participation rewarding and valuable. We thank you in advance for your cooperation.

Sincerely

Samuel F. Mikail, M.A.
Phone: 966-6657 (business)
       382-7084 (home)
Dear Family Members:

A study examining the relationship between various health conditions and general family functioning is being conducted through the Department of Psychology, University of Saskatchewan. Our practice has been asked to support this project by inviting our patients to participate. After reading a summary of the proposed project we have agreed amongst ourselves that it is a worthwhile study.

On behalf of the research team we would like to invite one parent and one child (age 10 to 16) from your family to participate in the study. If you are not interested in participating simply mail the enclosed post-card back to our office. If we do not receive your post-card in one week's time we will assume that you are interested in finding out more about the study, and your name and home number will be given to one of the members of the research team in order that you may be contacted.

When the research assistant contacts you, he/she will provide you with more information about the study, and will invite you to participate. At this time you will have an opportunity to ask any questions you may have regarding your involvement.

If you are interested in taking part in the study, the research assistant will arrange for you and your son or daughter to come to the University in order to complete several questionnaires and tasks. This would involve approximately 60 to 90 minutes of your time.

We would like to remind you that this type of research is made possible by the cooperation of people like yourself. In the past other people who have participated in studies similar to this one have commented on how interesting they have found the experience. We are confident that both you and your child will find your participation rewarding and valuable. We thank you in advance for your cooperation.

Sincerely,

Dr. C.S. Hayes
Dr. C.W. Hutton
Dr. P.K. Hrynchak
Optometrists
Appendix J

Phone Contact

Hello, my name is Sam Mikail and I am from the Department of Psychology at the University of Saskatchewan. I am calling regarding the letter you may have received describing the Family Health Study. Have you received your letter yet?

Do you have a few minutes for me to tell you about the study?

(If no: May I call you back at a more convenient time?)

As the letter stated we are conducting a study which will examine the effects of various medical conditions on family functioning. We are calling to invite you and one of your children to participate in this study. Your child has to be between the ages of 10 and 16 years.

The study we are conducting will examine the impact of various medical conditions have on children's reactions and adjustment in the family environment.

If you participate you and your child will be asked to come to University Hospital for about 60 to 90 minutes. As part of the study you would be required to fill out a number of questionnaires and participate in a brief interview. In addition part of the procedure requires that both you and your child listen to a number of tones through a pair of headphones. If you have ever had your hearing tested you will find this part of the procedure very similar to that.

Of course your participation is completely voluntary and you would be free to withdraw from the study at any time.

Do you have any questions about the study? (if yes address any questions the subject may have). If no:

Could we make an appointment for you to participate?

If no: Are there any concerns that you have regarding the study that I might be able to clear up.

If yes: Arrange a time for the subject to come to the lab and give all information regarding the location. Subjects were also be given the option to have a reminder call the day before their appointment.
APPENDIX K
Appendix K

Health Screening Form

1. Do you experience frequent headaches (more than one or two headaches a month)? If yes, specify frequency.
   Parent: Yes No Frequency_____  
   Child: Yes No Frequency_____  

2. Do you have any chronic illness or medical condition (e.g. asthma, heart disease, etc.)? If yes, indicate age of onset.
   Parent: Yes No  
   Type of illness ___________________________  
   Age of onset ___________________________  
   Child: Yes No  
   Type of illness ___________________________  
   Age of onset ___________________________  

3. Does anyone else in your family suffer from any chronic illness or medical condition (specify condition and length of time)?
   Yes _____ No _____  
   Individual (indicate relationship to you, e.g. husband, son, daughter)___________________________  
   Type of illness ___________________________  
   Age of onset ___________________________  

4. Do you suffer from any hearing loss that you are aware of.
   Parent: Yes No  
   Child: Yes No  
   If yes: Right ear Left ear Right ear Left ear
APPENDIX L
Appendix L

Headache Rating Form

If I were to ask you to rate whether or not you have a headache or any discomfort right now using the following scale what would your rating be:

**Child: Pre AST**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>no headache or discomfort</td>
</tr>
<tr>
<td>1</td>
<td>very severe headache or discomfort</td>
</tr>
</tbody>
</table>

**Child: Post AST**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>no headache or discomfort</td>
</tr>
<tr>
<td>1</td>
<td>very severe headache or discomfort</td>
</tr>
</tbody>
</table>

**Parent: Pre AST**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>no headache or discomfort</td>
</tr>
<tr>
<td>1</td>
<td>very severe headache or discomfort</td>
</tr>
</tbody>
</table>

**Parent: Post AST**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>no headache or discomfort</td>
</tr>
<tr>
<td>1</td>
<td>very severe headache or discomfort</td>
</tr>
</tbody>
</table>
Appendix M

Video-Tape Consent Form

It has been explained to me that my child and I were video-taped during our exposure to the auditory stimulus task, and I _____________________.

___ 1. Give my consent for this video-tape to be used for research purposes, with the understanding that the information obtained will be held strictly confidential.

___ 2. Do not consent to use of this video-tape and understand that it will be erased.

Signed at the University of Saskatchewan campus, Saskatoon, Saskatchewan, this ________ day of_______, 1986.

Volunteer ___________________________

Witness ____________________________
APPENDIX N
Appendix N

Quick Test

This is a kind of picture game. I am going to show you some pictures and read some words. You point to the best pictures for the words. Some of the words will be very easy and some of the words will be hard. You won't know all the words. If I read a word that you don't know, just tell me that you don't know, and I will go on to another word.

<table>
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<tr>
<th>List 1</th>
<th>List 2</th>
<th>List 3</th>
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</thead>
<tbody>
<tr>
<td>belt</td>
<td>cans</td>
<td>sheet</td>
</tr>
<tr>
<td>dancing</td>
<td>chewing</td>
<td>exercise</td>
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<td>falling</td>
<td>machine</td>
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<tr>
<td>whistle</td>
<td>dinner</td>
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<td>dish</td>
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<td>drying</td>
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<td>music</td>
<td>sitting</td>
<td>food</td>
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<td>country</td>
<td>fork</td>
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<td>danger</td>
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<td>plate</td>
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<td>river</td>
<td>washing</td>
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<td>tears</td>
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<td>fighting</td>
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<tr>
<td>sugar</td>
<td>sky</td>
<td>kitchen</td>
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<tr>
<td>track</td>
<td>table</td>
<td>tasty</td>
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</table>
school  careless  windy
partner  manners  pitiful
couples  adding  contest
rail  injury  sorrow
respectful  merchandise  loser
betting  waitress  heartbreak
daring  horizon  struggle
stadium  retail  rotary
pedestrian  irrigation  opponents
graceful  unaware  grief
fluid  current  utensils
solutions  fertile  lever
discipline  descending  portion
bleachers  spacious  edible
crystallized  proprietor  exhibition
turntable  inattentive  soothed
saccharin  indulging  caress
immature  precipitation  combatant
cordiality  freshet  forlorn
velocity  transom  nutrient
decisive  consumption  solace
laceration  aquatic  pacify
foliage  perilous  contorted
imperative  terrain  jets
intimacy  imminent  doleful
concoction  foresight  tines
conviviality  condensation  disconsolate
chevrons  satiation  sustenance
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<td>imbibe</td>
<td>prehesnion</td>
<td>bellicose</td>
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<td>amicable</td>
<td>ingress</td>
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<tr>
<td>pungent</td>
<td>celerity</td>
<td>despondency</td>
</tr>
</tbody>
</table>
Appendix O
WISC-R Subtests

Similarities
Begin with Item 1 for all children. Discontinue after 3 consecutive failures. Say "In what way are a wheel and a ball alike? How are they the same"? Repeat for the following items:

1. Wheel-ball
2. Candle-lamp
3. Shirt-hat
4. Piano-guitar
5. Apple-banana
6. Beer-wine
7. Cat-mouse
8. Elbow-knee
9. Telephone-radio
10. Pound-yard
11. Anger-joy
12. Scissors-copper pan
13. Mountain-lake
14. Liberty-justice
15. First-last
16. The numbers 49 and 121
17. Salt-water

Comprehension
Begin with Item 1 for all children. Discontinue after 4 consecutive failures.

1. What is the thing to do when you cut your finger?
2. What are you supposed to do if you find someone’s wallet or pocket book in a store?
3. What should you do if you see thick smoke coming from the window of your neighbor’s house?
4. What are some reasons why we need policemen?
5. What is the thing to do if you lose a ball that
belongs to one of your friends?

6. What is the thing to do if a boy (girl) much smaller than yourself starts to fight with you?

7. In what ways is a house built of brick or stone better than one built of wood?

8. Why is it important for cars to have license plates?

9. Why are criminals locked up?

10. Why do we have to put stamps on letters?

11. Why is it important for the government to hire people to inspect the meat in meat-packing plants?

12. Why is it usually better to give money to a well-known charity than to a street beggar?

13. Why is it good to hold elections by secret ballot?

14. In what ways are paperback books better than hard-cover books?

15. Why should a promise be kept?

16. Why is cotton often used in making cloth?

17. What are the advantages of having senators and congressmen?
Training Procedure Used for
Raters of Nonverbal Expressions

The training program extended for a period of 3 hours and consisted of 3 stages. In the first stage raters were asked to complete Ruck's (1976) Communication of Affect Receiving Ability Test (CARAT). In this test raters were shown 32 videotape segments of subjects watching one of 4 types of emotionally loaded slides. These included slides depicting sexual material, landscapes, unusual visual effects and unpleasant content. Raters were asked to identify what kind of slide the subject was watching and the subject's emotional reaction to it.

In the second stage of training raters watched a series of 60 slides depicting a model exhibiting a variety of facial expressions. These included expressions of sadness, disgust, happiness, fear, pain, puzzlement, and surprise. Three levels of intensity of each expression were shown including low, medium, and high. The raters were asked to identify the emotion being expressed and the intensity of it. After each rater made her ratings they were discussed. Raters were asked to identify the salient features of the slide which led to their choices. When necessary these were complemented by comments by the experimenter so
that the dimensions outlined on the videotape rating form were covered (see Appendix Q).

The final stage of training involved showing raters an additional 30 slides similar to the ones above. These, were previously shown to a group of 60 undergraduate and graduate students and average intensity and category ratings were obtained. Thus, rater's responses could be compared to these, as well as to one another. Where there was disagreement it was discussed and a consensus was reached.
Appendix Q

Instructions for Ratings of Degree of Subjects' Nonverbal Expressiveness

You will be shown a series of video tape material of subjects who are listening to a series of tones of varying intensities through a pair of headphones. The tones range from moderate to being unpleasantly loud. The video tape segments have been randomly arranged, so that they will have no particular pattern to them other than they will usually alternate between adult and child.

Your task will be to rate the degree of expressiveness of each of the subjects. Simply, this means you are to determine how expressive each of these subjects is being. In order to make this judgement you should focus on a number of behaviours including:

1) facial expression i.e. -wrinkling of the forehead
   -raising and lowering of the brows
   -eye opening and closing
   -position of the cheeks
   -mouth movements

2) total head movements

3) total body movements
Your rating will reflect a composite of all of these possible behaviours using the following scale:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>9</th>
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</tr>
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<tbody>
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<td>extremely</td>
</tr>
</tbody>
</table>

Subject : Time 1 | Time 2; Subject : Time 1 | Time 2;